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Chapter 1

Risk, Uncertainty and the Management of Public Risk

Overview

Risks exist where the future is not known with certainty, meaning that risk is omnipresent. Risk has an objective component—the frequency with which accidents occur can often be measured, as can the magnitude of a given loss—but risk also has a subjective component: we all have different attitudes towards risk. The major challenge of risk management, according to many experts, is identifying and managing attitudes to and perceptions of risk, rather than just dealing with the objective side of probability, frequency and severity.

Risks are risks, in one sense, whether they are faced by public or private organisations. But risks do have unique properties in a public-sector environment, where clearly the organisations facing risk are unique: public bodies have numerous legal, financial, social and political attributes not seen in the private sector. Furthermore, many of the public risks are themselves unique and can only be handled by public institutions.

This book is about the management of risks in public organisations. In a broad and general sense, governments exist to manage risks—to provide for common defence, public safety, security, etc—and, therefore, the management of risks is a central function of public bodies. The focus of this book, however, is not on the broad philosophical basis of government as an instrument for managing social risk, but rather on the function of risk management within public bodies, a focus that will come to be known as organisation risk management.

Principles and concepts

Risk appears to be a multi-faceted, textured concept, so risk means (and may need to mean) different things in different situations.

The classic Hindu story about the blind men and the elephant comes to mind here: depending on where one stands, the thing observed reveals itself differently. Also, although the various definitions of risk can appear idiosyncratic and inconsistent, it is nevertheless true that there is a whole thing called ‘risk’—and risks, like elephants, are fascinating objects in no way diminished by the difficulty in producing a simple definition.

This book does not intend to labour over theory or terminology, so the purpose of this chapter is to establish a workable understanding of risk. After considering definitions of risk, the chapter turns to the matter of uncertainty, then to a few related concepts, and concludes by identifying ‘public risks’ and explaining why these risks should be managed.

What is risk?

Risk is a direct product of what might be called the ‘dynamic’ characteristic of reality: a static, certain world would not contain risk. This dynamism leads to a world filled with non-certain outcomes, outcomes that may fall within a definable possibility set (a coin toss will produce either a heads or tails outcome), or that may not be defined or anticipated in any easy way (eg terrorism). However, simply noting that risk exists when there is more than one possible outcome in a given situation does not seem adequate. One should—at least—want to know the relative likelihood of each outcome, and have some expectation of what is likely to happen the next time similar circumstances arise. If such information could be gathered, the ingredients for a simple definition of risk would be present.

Risk is the variation in outcomes around an expectation.

Mathematicians offer a quantitative version of the definition of risk. It is called ‘the coefficient of variation’, and is determined by dividing standard deviation by the expected value. The coefficient of variation measures the degree of standardised dispersion relative to the ‘average’ or expected value (see Exhibit 1.1). The problem with relying on the mathematician’s interpretation of risk is that a risk manager may learn that a particular coefficient of variation is 2.8, but not believe that he or she has any better understanding of the risk in question. One of the limitations of the coefficient of variation is that it is a relative value, and must be compared with other risks to increase its usefulness. Another limitation is that this ‘objective’ measure does not capture much of the texture of risk. The concept of risk, this book asserts, contains both quantitative (objective) and qualitative (subjective) dimensions.

‘Texture’ refers to the subjective or qualitative aspects of risk that seem to be missing from the mathematical definition given above. After all, two individuals might know objectively that some event has a one in ten chance of producing a £1000 loss, but have very different reactions to that knowledge. Subjectivity, perspective and attitude would seem to be a part of risk. Furthermore, texture would have to include not just perceptual factors, but also what might be thought of as ‘fuzziness’ factors. Fuzziness suggests a lack of clarity, the hidden interrelatedness of risks, and the complexity of our environment.

**Exhibit I.1.
The coefficient of variation**

To demonstrate how the coefficient of variation is computed, consider the following:

**Total property losses per year
in a fleet of five cars**

Losses per year Probability

£0	0.606
£1000	0.273
£2000	0.100
£4000	0.015
£10,000	0.003
£20,000	0.002
£40,000	0.001

The average or expectation for this distribution is found by:

$$\begin{aligned} &£0(0.606) + \\ &£1000(0.273) + \\ &£2000(0.100) + \\ &£4000(0.015) + \\ &£10,000(0.003) + \\ &£20,000(0.002) + \\ &£40,000(0.001) \\ &= \mathbf{£643} \end{aligned}$$

The standard deviation for this distribution is found by calculating the square root of the following:

$$\begin{aligned} &(0-£642)(0.606) + \\ &(£1000-£643)(0.273) + \\ &(£2000-£643)(0.100) + \\ &(£4000-£643)(0.015) + \\ &(£10,000-£643)(0.003) + \\ &(£20,000-£643)(0.002) + \\ &(£40,000-£643)(0.001) \\ &= \mathbf{3,199,312} \end{aligned}$$

The square root of this is £1789 (the standard deviation). Thus, the coefficient of variation is:

$$£1789/£643 = \mathbf{2.8}$$

Given these assertions, a useful definition would somehow need to reflect the following elements:

- the number of possible outcomes that might occur, and the relative frequency of occurrence of each;
- the quantitative value and magnitude of possible outcomes, relative to some expected value;
- the qualitative/perceived nature of the possible outcomes;
- an ability or confidence in an ability to know or define the possible outcomes—that is, the level of uncertainty present;
- attitude toward risk and uncertainty; and
- the externalities, interdependencies and complicating factors associated with the risk.

Can each of these elements be woven into a clear, elegant definition? Probably not. However, a working definition might be as follows:

Risk is a characteristic of our world that is present when certainty is absent. Objectively, risk is the variability of outcomes around an expectation; while subjectively, risk is further shaped by our attitude toward or perception of risk—which is influenced by uncertainty, by personal, social and cultural factors, and by the risk's relationship to the larger environment (its context).

Although this definition is by no means poetic, it is useful enough and should signal that the management of risk will not aspire merely to manage probabilities and outcomes, but also to manage uncertainty and attitudes toward risk—and also, to recognise that the management of a risk may have broader psychological and social (even ethical) considerations not easily captured in a narrow, quantitative assessment of risk (see Exhibit 1.2).

Exhibit 1.2. Fundamental elements of risk

The six elements of this book's definition of risk can be illustrated in an example. Assume a public body is contemplating hiring an individual to fill an internal auditor position. One risk presented by the hiring process is the possibility that the new hire might perpetrate a fraud. The elements of this risk are:

- Since behaviour is either fraudulent or it is not, only two possible outcomes can occur. One might be able to quantify the risk by gathering data on fraud committed by internal auditors. How often does it happen?
- What are the ranges of magnitude of loss when fraud occurs? What are the effects of such losses on a public body?
- The qualitative nature of those outcomes is readily imaginable, but this is not to say that fraud is simple to understand. What causes someone to commit fraud?
- How much information can be gathered on this risk and on the interviewees—and at what cost? What is the level of confidence in this information?
- How do the public body and its managers account for personal biases and attitudes in the analysis of the risk (eg whether the interviewee's race is factored into managers' judgement)?
- The hiring of an individual does not present just one risk. The worker may bring intangible value to the organisation through exceptional industry; he or she may be injured at work; refusal to hire may bring a discrimination suit; or the worker may discover potential losses and prevent them from occurring elsewhere.

What is uncertainty?

The dictionary definition of uncertainty is 'doubt about our ability to know', and this is a useful way to think about the concept. 'Knowing', or cognition, requires: first, data; second, a means of receiving that data; and third, the capability of processing or converting it into information. Numerous factors can produce doubt: data or information may be incomplete; one may be incapable of receiving the data; or one may be able to receive it but be unable to process or understand it. Note that risk and uncertainty are separate-but-linked concepts. The characteristics of a risk may influence the level of uncertainty; but other factors (such as attitude toward risk) can affect uncertainty as well (see Exhibit 1.3). Risk may be said to pertain to the dynamic state of reality, whereas uncertainty relates to a state of mind.

Exhibit I.3. Smith's four levels of uncertainty

Professor Michael L. Smith of Ohio State University has developed an important conceptualisation of uncertainty. He argues that, like risk, uncertainty exists in varying degrees, and he has proposed a scheme for classifying levels of uncertainty. His 'certainty–uncertainty continuum' appears as follows:

Levels of uncertainty	Characteristics	Examples
None (certainty)	Outcomes can be predicted with precision	Physical laws
Level 1 (objective uncertainty)	Outcomes are identified and probabilities known	Games of chance
Level 2 (subjective uncertainty)	Outcomes are identified but probabilities unknown	Fire, investments
Level 3	Outcomes not fully known and probabilities unknown	Space exploration

What is risk management?

Since risk management is the subject of this entire book, its meaning and substance are thoroughly explored and explained in subsequent chapters. For purposes of definition here it is sufficient to state the following:

Risk management is the formal process by which individuals, organisations and societies assess and address risks in accordance with overall objectives.

Substantively, risk management consists of five activities:

- risk management mission identification (goal- and policy-setting);
- risk and uncertainty assessment (identification, analysis and measurement);
- risk control (eliminating, avoiding, reducing, preventing and otherwise managing risk);
- risk financing (measures to address the financial consequences of risk); and
- programme administration (implementation measures, including review and monitoring).

Other important concepts

Categories of risk

Over time, various categories of risk have been developed. While all the categories may be useful from time to time, the most commonly discussed are *pure risks* and *speculative risks*. Pure risks are those risks with two outcomes—either nothing will happen or a loss will occur. Speculative risks have three possible outcomes—nothing happens, a loss occurs, or a gain occurs.

The pure risk/speculative risk distinction is somewhat arbitrary. However, psychologists have demonstrated that individuals react differently to pure and speculative risks (basically, the presence of a chance for gain in speculative risks tends to alter behaviour and provides an incentive for risk-taking), and thus risk managers should recognise that reactions to risk differ depending on the type of risk involved. However, in many other respects risks are risks.

Components of risk

Risk arises from *sources of risk*. A source of risk is an environment from which *hazards* or *risk factors* emerge. Hazards are characteristics of a risk source that elevate the chance for loss (or potential severity of loss), while risk factors are those characteristics that elevate the chance or magnitude of loss or gain. For example, icy roads would be a hazard arising from the physical environment as a source of risk. Voter unrest or uncertainty would be an example of a risk factor arising from the social or political environmental as a source of risk.

Hazards may produce *perils*, which are actual causes of loss: the hazardous condition of an improperly maintained heater may result in the peril of fire. In this book, the term *opportunity* serves as a speculative risk analogue to ‘peril’. The use of ‘opportunity’ is open to some debate, but the book develops the concept of ‘opportunities arising from risk factors’.

Finally, although the discussion here is based on the notion of risk arising from sources of risk, the imagery is somewhat imprecise. Risk also requires *exposure*, which does not arise from sources of risk. An icy road cannot produce a loss to a driver who does not drive on that road. Likewise, an individual who does not invest does not face market risk.

It could be argued that, like the tree falling unheard in the forest, the icy road does exist physically as a hazardous condition whether anyone experiences the icy road or not. However, in the context of organisations managing risks, it is exposure that provides the primary motivation to act.

Perception of risk

Experts from many disciplines study how humans behave under conditions of risk and uncertainty—what might be called the *perception of risk*. For instance, economists tend to focus on the impact of risk on the individual's quest to maximise utility (satisfaction), and hypothesise that most humans tend to be risk-averse. Psychologists argue that economic rationality is only one factor governing attitudes toward risk, and so focus more on personality, family upbringing, personal history, and other behavioural characteristics. By contrast, anthropologists place considerable credence in the notion that culture influences attitudes toward risk, largely by imposing 'filters' through which individuals broadly judge risks as being important or unimportant. Even medical researchers are actively involved in risk-related research, and have uncovered gene-based influences in attitude toward risk.

Risk in the public sector

If public-sector managers were asked whether they think management in public bodies differs from private-sector management, the majority would—undoubtedly—answer yes. Comments about 'the absence of a bottom line', 'public accountability', and 'the separation of power and authority' would be heard; and these would all be valid points. However, additional differences can be noted—differences that are important in understanding whether public-sector risks possess unique characteristics.

Drawing distinctions between the public and private sectors is not straightforward. Broadly speaking, the distinctions are rooted in (at least) cultural and social factors, and this means that 'public' is whatever a society says it is. While this idea may be somewhat unsatisfying for some readers, it does explain a wide range of inconsistencies observed in the public life of democracies. Some nations believe health and health care are public matters, others do not. Some nations believe that government should own and manage the means of mass transportation, while others do not. The values ascribed to the role of public education can also vary widely.

The subject of 'publicness' is fascinating and intellectually challenging, but of course a full discussion here would take the book far away from its intended purposes. However, avoiding the topic is not entirely appropriate either, so the following section offers a brief treatment of the subject of publicness and—importantly—its implications for risk management in public institutions.

What is publicness?

The concepts of public and private are best understood as points on a continuum rather than as mutually exclusive states. Since this is so, it is important to understand how things move from private to public, and also how publicness

relates to government as an institution. Two views, the political scientist's and the economist's, seem useful in suggesting the contrasts in views and the difficulties such differences promote.

The political science perspective

Political scientists remind us that in the United Kingdom, government's powers may be enumerated or implied, but in a most fundamental sense, government exists:

- to protect individual rights;
- to advance politically agreed-upon values and purposes; and
- to balance interests.

This view of government's role is something of an amalgamation of two distinct philosophical traditions, what could be called conservative and liberal. The conservative view puts its emphasis on the citizen's responsibility to society, while the liberal view tends to look at government's obligation to assure individual freedom.

Considering government's fundamental role shows that it is an instrument by which society imposes order on itself. Societies have basic desires to express identity, values, beliefs, and aspirations. Informal social mechanisms such as religious institutions and fraternal associations, indeed even culture itself, cannot always connect to fulfil communal needs. Thus, government may serve as a vehicle for expressing communal values (and often serves to form them) when they cannot be expressed elsewhere—and the expression and clarification of values can create order. Likewise, in the process of forming and expressing values, democratic government serves the related purpose of balancing interests. Balancing interests is an imprecise science, but it is a critical element of a government's 'ordering' role. The preceding points can be summarised by saying that, from a political science perspective, government in the United Kingdom mediates conservative and liberal impulses in the pursuit of social order. But it also should be noted here that public endeavour is not synonymous with government endeavour. Government is not the only occupant of the public sector.

The economics perspective

Modern economists approach the role of government in a slightly different way. They maintain that fully functioning markets can also serve a public purpose in that markets organise the desires of individuals and organisations (in a manner of speaking), allocate scarce resources, and also—like governments—bring order to human affairs. Economists further assert that, all else being equal, markets

coincide best with the political values of democracy, inasmuch as competitive markets rely fundamentally on individual choice—a distinctly classic liberal argument. However, it is widely recognised that the concept of markets assumes that rules are abided by and that enforceability of interests occurs in an orderly manner. Thus, government has a clear *de minimis* role (in the eyes of economists) in serving as a referee. Beyond that, however, is a consensus that the assumptions underlying free, fully functioning competitive markets often are not met. Economists call this phenomenon ‘market failure’ and have developed a fairly elegant argument as to how government’s role might be characterised in part as a response to market failure.

Markets also might fail because some goods or services are ‘public goods’. Public good is a status conferred on goods or services that are *non-appropriable*, meaning that the consumption of the good/service cannot be restricted to those who pay for it. The classic example of a public good is national defence: even if individuals do not pay for it explicitly, they enjoy the benefits of expenditure on the common defence.

‘Externalities’ also could be a justification for government intervention. Externalities exist in goods and services when the costs and benefits cannot be captured fully in the price system: a relevant example is pollution. A polluting organisation can damage the environment without cost, in the sense that the cost of pollution can be passed on to the surrounding community, and thus is not captured in the market price. Those bearing the cost of pollution are not involved in the market transaction for the good produced and thus cannot, through the buy-sell transaction, impose that cost on the polluter.

The fact that public goods and externalities exist does not mean (to the economist, anyway) that aggressive government intervention need occur. For one thing, there can be ‘government failure’ as well, suggesting that a less-than-efficient market with no government intervention might still be preferable to a similar market with ineffective governmental intervention. As a result, public economists speak of a hierarchy of government responses to market failure—ranging from doing nothing, to providing information, to light intervention in restoring the functioning of a private market, to absolute monopolistic provision by government of the good/service (this concept is derived from canon law, and is known as ‘subsidiarity’). The idea of market failure can be connected to the political science view by suggesting that it reflects part of a more conservative view of government—that is, society is more than a collection of utility-maximising individuals, and collectiveness gives rise to social obligations and responsibilities. Also, economists, like political scientists, would argue that not all public matters need involve government.

What does all this suggest about the public sphere? First, the distinction between public and private is a rather fuzzy abstraction. One might be tempted to suggest

that any human action is public inasmuch as it will have some effect on other humans. In such a restrictive view only a person's interior life is truly private. Culturally and politically, that view has been extended to include familial and other close relational activity. Publicness becomes a more distinct feature of human endeavour as its impact broadens to the larger community.

Second, even when a circumstance is deemed to be public in nature, direct government involvement should not be assumed. Depending upon whether the economics or political science view is employed, justification for governmental involvement derives from the failure of private or market-based efforts, or from the need to secure and protect rights or arbitrate interests.

Is there such a thing as public risk?

Let us set aside for the moment the more general discussion of publicness, and turn now to the matter of risk and uncertainty. Since risk is pervasive, it is reasonable to wonder whether distinctions can be made between public and private risk.

Economic theory implies that efficient markets manage risks. This means that the efficient market allocates the cost of responsibility for risks attendant on the product or service. However, it might be imagined that some (or many) risks might not be suited to 'market management'. Once again, pollution is a good illustration in that the risk of collateral damage to surrounding communities is a feature (if not *the* feature) of the market that precipitates 'failure'. If this is true (as the authors believe), it suggests an idea that is very important to this book:

Since the nature of certain risks is influential in making goods and services 'public', risk management would seem to be a central, rather than peripheral (or narrowly technical), function of government.

How, specifically, does publicness affect risks, and how does it influence the practice of risk management in public bodies? There seem to be two answers.

First, the exposure to risk is different. When a public body is exposed to a risk—what is known as an 'organisation risk'—that risk is public by definition: the risk of a fire in a local authority-controlled school is a public risk because the school building and contents are publicly owned. This sounds rather elementary, but it is an important point. Government's authority and the legal justification for its existence are based on powers derived from statute, and the explicit relationship a government has with its citizens is not duplicated in private organisations. It is tempting to compare the citizen with the shareholder of a publicly held company, but there are many differences, both obvious and subtle. There is no market for trading shares of citizen ownership, and the nature of the citizen's financial obligation is different, as also is the nature of legal liability.

Further, peripheral matters like intergovernmental relations complicate the situation. Thus, government risk management is different from private-sector risk management because the exposure to loss (or gain, for that matter) is politically, legally and socially unique.

Second, a public risk could be defined similarly to a public good. A risk moves toward publicness when a private market (or individual action) is incapable of managing or distributing efficiently the burden of the risk. More precisely, a market's failure to manage a risk would be attributable to:

- a market's inability to incorporate the cost of risk into the price of the good or service, due to nonappropriability, the presence of externalities, or other reasons;
- a market's inability to distribute the burden for risk-bearing to parties with the responsibility for and/or the capacity to bear the risk;
- a sufficiently high level of uncertainty to impair the ability of a market to function.

The preceding comments structure an analysis of the characteristic differences that arise as risks become more public. Risks move into the public domain when there is a high level of uncertainty and when the risk is either externality-producing or nonappropriable, and/or when the risk cannot be distributed privately to the responsible parties with the ability to bear the risk.

Broadening the scope from economics to political science would lead to a further extension in several key areas. Since government's functions include protecting rights, advancing politically agreed-upon values and purposes, and balancing interests, the definition of public risks would have to include recognition that:

Public risks are characterised as those pertaining to issues or processes that arise from the assertion of matters of public interest—those matters relating principally to the protection of rights, the balancing of interests, and the assurance of fairness in the political process.

Notably here, government's role in this regard may be passive or active in that it may decide either to act or not to act in a given situation. Often, as noted later, government becomes indirectly involved in public risks through the establishment of policy (mandates) which directs others to manage risks that fall within the public domain but outside the realm of direct government action. This area of public risk is known as 'social risk management' (as distinguished from organisation risk management), and although there are overlaps between the two, one represents the realm of policy while the other represents management practice.

Thus, somewhere in the territory where the private begins to become public, risks move to the public. Risks enter the public domain when they become characterised, to an increasing degree, by one or more of the following attributes:

- the risk cannot be distributed, with recognition for political equity, to responsible parties capable of bearing the risk;
- the risk produces externalities (or is imbued with externalities) that cannot be meaningfully captured in market pricing;
- the risk is made manifest by the political process (an extreme example being the risk of revolution);
- the risk imposes significant concerns with respect to the protection of individual rights;
- the risk, in addition to the characteristics above, has an associated high level of uncertainty; and/or
- the exposure is public.

Recently in the United Kingdom the Cabinet Office Strategy Unit has developed a slightly different perspective on the issue of publicness and risk (see *Risk: Improving Government's Capacity to Handle Risk and Uncertainty*, November 2002). The Strategy Unit says (page 9):

Governments have three clear roles in managing risk. Where individuals or businesses impose risks on others, government's role is mainly as regulator, setting the rules of the game. Where risks cannot be attributed to any specific individual or body, governments may take on a stewardship role to provide protection or mitigate the consequences. In relation to their own business, including provision of services to citizens, governments are responsible for the identification and management of risks ... In each of these areas there are no wholly reliable formulae for defining risk. Governments need to make judgements in as open a way as possible about the nature of risk and how responsibilities should be allocated, recognising that there will always be some unavoidable uncertainty.

The Strategy Unit's 'three roles' (regulator, steward, manager) in public risk management align with much of the discussion put forward in this chapter. Although this book focuses on only one of the three roles, that of manager, the Strategy Unit's framework is a reminder of that broader context—what is here called 'public risk management'—in which the management of public entity risks takes place. Further, most of the management principles established in this book are directly applicable to social (or regulatory, or stewardship) circumstances.

The entire preceding discussion, then, gives rise to three propositions that will be carried forward in the remainder of this book:

- Although governments do not address all public risks directly, the risks that fall ultimately under government's purview have particularly challenging properties.
- Public risks come in two broad forms: social risks (that affect society as a whole) and organisation risks (that affect particular public entities). Governments can have responsibilities in both areas—but other institutions also can occupy space in the public sector. This book is concerned mainly with organisation risk management.
- Since the nature of particular risks frequently contributes to the publicness of some good, activity, service or process, the management of public risks is a fundamental role of government.

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