

# Chapter 2

## Risk

Risk in our world is nothing more than uncertainty about the decisions that other human beings are going to make and how we can best respond to those decisions

Pickford, 2000: 9

The goal of wresting society from the mercy of the laws of chance continues to elude us. Why?

Bernstein, 1998: 330

## 2.1 Introduction

In the most general sense, any activity undertaken by a business entails some form of risk and ultimately every risk has the potential to impact the business (Academy for Healthcare Management, 1999: 2-5). Risk is a concept that is used to express concerns regarding the probable effects of an uncertain environment.

Since the future cannot be predicted with certainty, business has to consider a range of possible events that may take place. Each of these events could have a material effect on the private healthcare administrator's business objectives. The negative possibilities are called risks and the positive possibilities, opportunities (McNamee, 1996: 3-4).

To achieve these objectives, business management will lay assets at risk. The assets at risk include financial, physical, human and intangible assets (ibid.). It will be seen later in the chapter that uncertainty and randomness exist within the risk concept.

Managing risk is a key business function and a vital part of the private healthcare administrator's activities. It aims at ensuring that members' interests are protected and that suitable benefits are provided at reasonable cost (Academy for Healthcare Management, 1999).

Before embarking on defining a suitable risk management methodology for South African private healthcare it is necessary that the author define what risk is, how it has developed and the various natures it may portray within the business context.

On a final note the author will introduce the concept of internal auditing and the background regarding its professional governing body, viz. The Institute of Internal Auditors.

## 2.2 Aim

Issues to be addressed in this chapter include the origin of risk, mankind's perception of the risk concept, risk's philosophical components and the establishment of a plausible definition for risk. The concept of internal auditing is also discussed.

## 2.3 Origin of risk

The beginnings of risk have been traced as far back as 3500BC where the first game of chance was played (Bernstein, 1998: 13). Subsequent developments, which include the introduction of the numbering system and the development of the probability theory in 1654 were, however, the first milestones set in progressing the field of risk management. These subsequent developments were encouraged during the Renaissance and the Reformation, which brought about a change in the manner in which people perceived the future (Pickford, 2001: 6).

Fifty years after the development of the probability theory, the building blocks of statistical sampling, statistical significance and the application of probability theory to practical problems was noted (ibid.). Table 2.1 provides a chronological summary of the development of risk up until the 1970's. The following sources were referred to in preparing the summary:

- Bernstein, 1998: 13-56
- Pickford, 2001: 7

Table 2.1 - Chronological development of risk

<p><b>3500 BC</b> First form of gambling being a type of dice game using astragalus (i.e. animal knuckle bones).</p>	<p><b>1696</b> English mathematician and astronomer, Edmund Halley, shows how life tables may be used to price life insurance at different stages.</p>
<p><b>450 BC</b> Greeks devise an alphabetic numbering system using 24 letters of the Greek alphabet and three letters that subsequently became obsolete.</p>	<p><b>1713</b> Swiss mathematician, Jacob Bernoulli's, "Law of Large Numbers" is published, showing how probabilities and statistical significance may be identified from limited information.</p>
<p><b>1000-1200 AD</b> The Hindu-Arabic numbering system is devised with the invention of the abacus.</p>	<p><b>1733</b> French mathematician, Abraham de Moivre, proposes the normal distribution, the patterns in which a series of variables distribute themselves around an average, from which he also derives the concept of standard deviation.</p>
<p><b>1202</b> Leonardo Pisano suggests the replacement of letter usage in counting and calculations with a numeric system based on the Hindu-Arabic numbering system. The double entry bookkeeping system is also introduced.</p>	<p><b>1738</b> Jacob Bernoulli's nephew, Daniel, introduces the concept of utility: decisions relating to risk involve not only calculations of probability but also the value of the consequence of the risk taker.</p>
<p><b>1494</b> Luca Paccioli introduces the fundamentals of algebra and multiplication tables and extends on the double entry bookkeeping system suggested by Leonardo Pisano.</p>	<p><b>1885</b> English scientist, Francis Galton, discovers regression to the mean, the tendency of extremes to return to normal or average.</p>
<p><b>1525</b> Girolamo Cardano postulates the concept of chance, which would be the basis for future development of probability theory.</p>	<p><b>1944</b> In Theory of Games and Economic behaviour, US academics, John von Neumann and Oskar Morgenstern, apply the theory of games of strategy (in contrast to games of chance) to decision making in business and investing.</p>
<p><b>1654</b> French mathematicians, Blaise Pascal and Pierre de Fermat, analyse games of chance, providing for the first time a formal and mathematical basis for the theory of probability.</p>	<p><b>1952</b> US economist, Harry Markowitz, demonstrates mathematically that risk and expected return are directly related but that investors may reduce the variance on their investments by diversification without loss of expected return.</p>
<p><b>1662</b> English merchant, John Graunt, publishes tables of birth and deaths in London using innovative sampling methods. He estimates the population of London by the technique of statistical inference.</p>	<p><b>1970</b> US academics, Fischer Black and Myron Scholes, publish a mathematical model for calculating the value of an option.</p>
<p><b>1687</b> Edward Lloyd launches Lloyd's List, giving information on aspects of shipping from a network of European correspondents.</p>	

## 2.4 Human perception of the risk concept

Although the concept of risk the author applies in the remainder of this study focuses on the three key elements of uncertainty, future and the effect on organisation's goals, the human's perception of risk is considered to focus on an additional two components. These being the fear factor – the extent to which he dreads the outcome – and the control factor, i.e. the extent to which he is in control of the events (Pickford, 2001: 26-29). How each individual responds to the elements of risk is driven by his perception of loss and gain, cognitive biases and personality (ibid.).

D. Kahneman and A. Tversky in their work titled, *Prospect Theory* (Kahneman *et al.*, 1979: 262-290), showed that when people are in a position of gain, they become increasingly risk averse and unwilling to accept gambles because they wish to hold onto their fortunes. However, when people are in a position of loss and as losses increase, they become more risk keen since they stand to lose little. It is important to note, however, that personal perception of loss and gain is not straightforward and that each person has varying internal reference points that determine whether they will perceive an outcome as a loss or gain. These reference points have been known to shift over time.

Cognitive biases, often termed rules of thumb, enable people to reduce the time they spend processing information and make judgements at high speed rather than deliberate over each of the elements of the decision. However, such cognitive biases may oversimplify decisions, which require more in-depth deliberation. Common types of biases include (Pickford, 2001: 27-28):

- *Retrievability*: Basing risk decisions on information that is more easily available or most easily recalled.
- *Confirmation*: Accepting information that confirms established hypothesis and rejecting information that is to the contrary.
- *Illusion of control*: Believing that one has the ability to change risk factors when in fact the most appropriate action would be to either accept or avoid such exposures (Langer, 1975: 311-328).

Personality includes a number of inherent dispositions, feelings, biases and characteristics that tend to be manifested in preferences, sensitivities, habits and reactions. These elements may underlie the way in which each person approaches risk and whether a situation is seen as an opportunity, uncertainty or hazard. One of the most important elements of personality that is linked to risk is sensation seeking. Persons who do not have sensation seeking tendencies and people who by nature experience emotions that are more negative often focus on the potential for loss. They believe that any potential gains are no compensation for the losses that taking a change may entail (Soane *et al.*, 1998: 159-172).

It is the author's opinion that the management of risk within an organisation may be significantly improved when the abovementioned influences are adequately accounted for. A management ethos that acknowledges the individualistic and variable nature of risk perception and ensures the open discussion of such subjective elements will go a long way in increasing the effectiveness of overall decision making within the organisation.

## **2.5 Philosophy of the risk concept**

As seen above, people evaluate risks in incompatible ways and propose conflicting proposals for mitigating or litigating risk issues. The sources of contention are multiple. Sometimes people differ because they have different information; sometimes they differ because they have incompatible interests. The philosophical basis for contention over risk is most evident in the scholarly and scientific literature. As will be seen later, experts who study risk or risk issues are more likely to develop well-defined, internally consistent conceptions of risk than members of the lay public. Should distinct philosophical and linguistic presumptions underlie competing conceptions of risk, it should be possible to formulate the contentiousness over alternatives in terms of a principled philosophical debate with implications for risk analysis, risk evaluation and risk communication.

K. Shrader-Frechette offered a systematic classification for competing conceptions of risk in a 1991 book, which describes two positions in the philosophical debate over risk (Shrader-Frechette, 1991: 56). On one side, positivists believe that risk is a purely scientific concept admitting complete characterization and analysis through data collection and quantitative methods. Opposed are relativists who believe that risk is a purely subjective reaction to phenomena encountered in personal or social experience. Whereas the positivist interprets risk as referring objectively to the circumstances of the physical world, the relativist takes risk to a purely mental construct expressing emotional, moral or political reactions (ibid.).

In 1993, Hornig offered a dichotomous schema that was similar in many ways to Shrader-Frechette's classification process, however, in place of relativism Hornig offered a contextualist view. On this view, the social contexts in which issues or decisions arise determine which dimensions of risk are most important. Hornig does not propose, as one of Shrader-Frechette's relativists may, that lay assessments of risk are just as accurate as expert assessments but she does assert that lay assessments may be more sophisticated than scientific assessments. While expert assessment is quite likely to be more accurate in measuring dimensions of risk deemed important by the scientific community, experts may fail to recognise other dimensions such as voluntariness, which may be more relevant to the points of decision in a given context (Hornig, 1993: 56).

Instead of concluding that neither Shrader-Frechette's or Hornig's approach to risk is in diametrical opposition, the author suggests that these two approaches represent opposite ends of a continuum in which understandings of risk can be plotted between the poles of positivism and contextualism. Few, if any, truly hold the extreme views but several different options can be mapped out in between.

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Strictly speaking, the positivist takes probability to be the only essential characteristic of risk but even those closest to the probabilist pole usually presume that risk is also characterised by some element of negative or unwanted consequence. It is typical to hear positivists refer to risk in ways that permit direct substitution of the word probability without substantial transformation of meaning. The contextualist, on the other hand, claims that no single attribute is a necessary condition for the existence of risk. In this, the contextualist appears committed to the view that certain instances of risk involve no elements of probability or chance. It is, again, important to recall that the pole positions of the positivist and contextualist represent limited cases. The more important implication of the contextualist view is that there will be certain cases in which estimation and clarification of probabilities are largely irrelevant to understanding risk as well as to assessment, acceptability and even mitigation of risk (Thompson *et al.*, [s.a]).

It is quite likely that positivists and contextualists will also have rather divergent perspectives on risk communication (*ibid.*). Positivists are likely to believe that people are generally unaware of probabilities and that they need to know about such concepts to have adequate information regarding risk. Given this starting point, risk communication is largely a process of disseminating information about probability. On the other hand, contextualists are less likely to approach risk communication with any specific assumptions on what people need to know. For the contextualist, risk communication will be construed as bridging the gap between groups who share a particular social context and have evolved patterns for conceptualising and discussing risk within that context. The divergence between the positivist and contextualist approaches to risk communication is an example of a more general pattern in science communication studied by J. Zimon. Zimon describes three models for science communication (Zimon, 1992):

- *Deficiency model*: The deficiency model takes the general problem of science communication to be one of public ignorance, "which must by all means be overcome." (Zimon, 1992: 14). This view arises out of the assumption that the great majority of ordinary people have very little



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understanding of science and is typified by science communication efforts that stress knowledge of facts and theories. Zimon faults the deficiency model for presuming that scientific knowledge tends to be misrepresented and misunderstood outside the boundaries of the scientific community. He states, "Scientists themselves do not have a clear and consistent notion of what 'science' covers and often disagree profoundly on what it is telling us about the world." (Zimon, 1992: 16).

- *Rational choice model*: This focuses on those points where a particular piece of knowledge may be expected to play an important part in people's lives (ibid.). Here, the goal of science communication is to supply the missing piece of knowledge. Zimon notes the close association between the deficiency and the rational choice models but the problem of the rational choice model resides in the way it construes "need to know" situations. Certainly, there are circumstances in which a key piece of information (some facts about probabilities, for instance) are relevant although many problems of everyday life are better characterised as problems of information management. Knowing where to go for information and whom to trust is often more important than knowing key facts. It is this kind of information that comes to the fore in what Zimon calls the context model.
- *Context model*: This model recognises that a person's desire for information is shaped by their circumstances, that the credibility of a source depends heavily on its perceived interest in a particular context and that scientific information will be combined with broader values in forming any individual's personal beliefs (Zimon, 1993: 18-19).

In applying the above models to the role of the positivist, he is likely to perceive risk communication as the dissemination of information about probability and consequence when following Zimon's rational choice model. Facts about probability and consequence will be presumed to be what the ordinary person "needs to know," to make better decisions. Following the deficiency model, the positivist may also perceive risk communication as involving the promotion of a conceptual framework for utilising probability and consequence information in personal choice and public policy. When the two

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are combined, the positivist perceives risk communication as publicising facts about probability and consequence, correcting false perceptions, dissociating accidental dimensions from people's understanding of risk and as encouraging a choice procedure that interprets every choice as involving risk. The probabilist approach to risk communication, in other words, includes a broad philosophic commitment to a particular view of decision making and rational choice.

In applying the above to the position of the contextualist, it is clear that the word "risk" does not mean only one thing. Contextualists presume that people acting from different social or problem solving contexts have distinct notions of risk and demands for both factual knowledge and evaluative judgment on risky situations. Risk communication is, on Zimon's context model, a process of attempting to establish dialog between individuals and groups with very different conceptions of risk. Because of these differences, risk assessment is a process fraught with opportunity for confusion, distrust and even deceit. A successful risk communicator is one who succeeds at negotiating meanings and mediating diverse discourse communities who have some need to interact.

Hornig makes the case for the context model in risk communication by suggesting that scientists have a less sophisticated understanding of risk than the lay public (Hornig, 1993). It is true that positivist's conceptions of risk tend to presume Zimon's deficiency and rational choice models and that these models represent a somewhat unsophisticated understanding of communication. Yet, it is not unclear that scientists, as a group, are committed to the positivist conception of risk, nor is it obvious that positivist conceptions of risk are less sophisticated than the contextualist's perception.

The author can, therefore, conclude that risk positivism and risk contextualism represent the opposite ends of a continuum for conceptualising risk. Scientists and scholars who study risk and risk issues are likely to adopt conceptions of risk that fall somewhere along the axis between extreme positivism and extreme contextualism. Their relative positions will fix many of their methodological assumptions for risk analysis and risk communication

and will probably reflect other philosophic commitments such as their broader view of how science should play a role in public policy or in the personal decision making of ordinary people. Clearly, the continuum between positivism and contextualism does not map every contentious issue in risk studies. Even positivists who share the same general conception of risk may find much to dispute when choosing the particular quantitative representation of that conception and such controversies pale in comparison to those in which large commercial interests are affected by key choices in risk assessment methodology (Thompson *et al.*, [s.a.]).

## **2.6 Definition of risk**

No universal definition of the term risk exists (Skipper, 1998: 6). The word risk derives from the early Italian *risicare*, which means “to dare” (Bernstein, 1998:8). Since the general term, risk, is found within numerous disciplines ranging from insurance to actuarial science, it is understandable that such varying definitions of the term are found. Respective authors have been careful to qualify their interpretations based on the particular orientation of their research (Valsamakis *et al.*, 2000: 33).

The perception of risk is considered to be a complex and subjective process (Pickford, 2001: 25). Key sources identify risk as being inextricably linked to the term uncertainty (Valsamakis *et al.*, 2000: 30 and De Loach, 2000: 49).

Uncertainty is defined as “doubt about our ability to know”. This suggests that uncertainty is a state of mind whereas risk is a state of nature. Uncertainty often results from the absence of information although it may also be due to attitudes toward risk, which differs among individuals. Scholars from many disciplines study how humans behave under conditions of risk and uncertainty. Whereas economists tend to focus solely on the impact of risk on the individual’s quest to maximise satisfaction, psychologists argue that such maximisation is but one factor governing the attitude towards risk. Anthropologists on the other hand place a great degree of reliance in the

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notion that culture influences attitudes towards risk largely by imposing filters through which individuals broadly judge risks as being important or unimportant (Young, 2001: 7-10). Uncertainty includes two elements (De Loach, 2000: 49):

- Whether the event will occur, i.e. likelihood.
- What the outcome of the event will be should it occur, i.e. consequence.

Based on the above, the modern day trend is to interpret risk as the absence of certainty where certainty represents a situation where only one possible outcome exists. Valsamakis is of the opinion that due to the growth and emergence of risk management as a structured discipline, it is vital that earlier definitions of risk are expanded upon so that a consistent approach may be adopted (Valsamakis *et al.*, 2000: 30.).

In a separate research study, the establishment of a standard definition of risk within each organisation is considered one of the key foundations in developing an effective corporate risk management programme (De Loach, 2000: 48).

Below are some of the more recent definitions of risk:

- Uncertain future events that could influence the achievement of a company's objectives (King Committee, 2002: 76).
- Deviation from the expected value (Valsamakis *et al.*, 2000: 35).
- The area of uncertainty surrounding the event (Chong, 2000: 36).
- Any situation where there is uncertainty around which outcome will occur (Harrington *et al.*, 1999:3).
- Denotes the relative variation of the actual from the expected outcome (Skipper, 1998: 6).
- Risks are uncertain future events that could influence the achievement of the organisations strategic, operational and financial objectives. The dimensions of risk include the impact on an organisation's reputation and even the "loss of legitimacy" from activities deemed unacceptable to the community (IFAC, 1999:6).

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- Risk exists when there is uncertainty about the future (Academy for Healthcare Management, 1999:2-2).
- The variation in outcomes around an expectation (Young, 2001: 7).
- Is a concept used to express uncertainty around events and/or outcomes that could have a material effect on the goals of the organisation (McNamee *et al.*, 1998: 2).

Based on the aforementioned definitions, the following key elements are evident:

- Is an uncertainty;
- focuses on future events; and
- affects the achievement of the organisation's goals.

Based on these key elements the author will utilise the following as an acceptable description of risk:

*“A concept used to express uncertainty around all possible future events that could significantly influence the achievement of the organisation's business objectives.”*

It is generally accepted that risk should consider all significant eventualities that could have a material effect on the achievement of the organisation's key objectives. Accordingly, risk is most often subdivided into three distinct types. Table 2.2 below lists the three risk types and includes comment on their respective attributes. Practical examples are also included in the table. The following sources were adapted in preparing the table:

- Valsamakis *et al.*, 2000: 39
- IFAC, 1999: 15
- Harrington *et al.*, 1999: 5

Table 2.2: Different risk types

	<i>Risk Type</i>		
	<i>Inherent</i>	<i>Incidental</i>	<i>Systemic</i>
<b>Definition</b>	Risks that have a direct impact on the operating profit of an organisation, i.e. offensive in nature.	Risks that do not form part of the main business operations although they are necessary to ensure continuity of operations, i.e. hedging in nature.	Risks that have no potential for showing a profit, i.e. defensive in nature.
<b>Key Attribute</b>	Opportunity Significant control	Uncertainty/Variance Limited control	Hazard No control
<b>Examples</b>	<ul style="list-style-type: none"> <li>• New member markets</li> <li>• Information systems breakdown</li> <li>• Lack of qualified personnel</li> <li>• Research and development</li> </ul>	<ul style="list-style-type: none"> <li>• Liquidity</li> <li>• Credit</li> <li>• Currency</li> <li>• Interest rate</li> <li>• Inflation</li> <li>• Reputation</li> </ul>	<ul style="list-style-type: none"> <li>• Legislative</li> <li>• Damage to assets</li> <li>• Theft</li> <li>• Legal liability</li> </ul>

It is vital that the communicated definition of risk not only emphasise risk's nature of uncertainty or hazard but also the nature of opportunity (PricewaterhouseCoopers, 2000c). It is accepted that as management migrates from a fragmented to integrated approach, the focus of risk should change to one of maximising opportunity.

**Figure 2.1: Risk progression** (IFAC 1999: 14 & PricewaterhouseCoopers, 2000c)

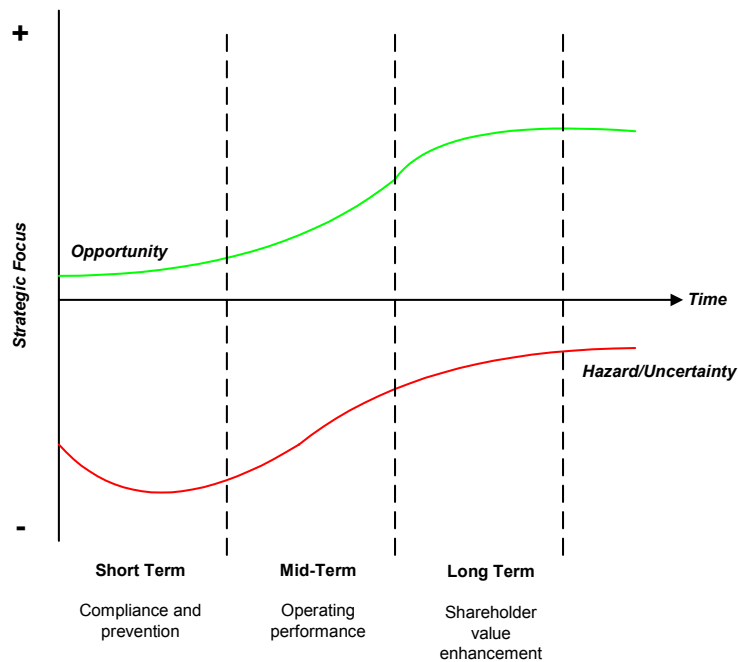


Table 2.3 defines the key natures of risk while figure 2.1 above provides a graphic depiction on how risk's strategic focus changes as management migrates towards corporate risk management.

The following sources were adapted in preparing the table 2.3:

- De Loach, 2000: 49
- PricewaterhouseCoopers, 2000c
- IFAC, 1999: 15

The strategic focus on both elements of opportunity, hazard and uncertainty will drive the choice of risk management strategy that will be applied by the board and management. These risk management strategies are discussed in section 8.5 of chapter 8.

Table 2.3: Natures of risk

<b>Risk Nature</b>	<b>Focus</b>
<b>Hazard</b>	<ul style="list-style-type: none"> <li>• Allocating resources to reduce negative impact and likelihood of events</li> <li>• Financial</li> <li>• Defensive</li> </ul>
<b>Uncertainty</b>	<ul style="list-style-type: none"> <li>• Reducing variances between anticipated outcomes and actual results</li> <li>• Focuses not only on financial issues</li> <li>• Operational controls</li> </ul>
<b>Opportunity</b>	<ul style="list-style-type: none"> <li>• Investment and achieving growth strategy</li> <li>• Offensive in nature</li> <li>• Aims to achieve positive gains</li> </ul>

## 2.7 Summary and conclusion

The beginnings of risk have been traced as far back as 3500BC where the first game of chance was played. The word risk derives from the early Italian *risicare*, which means “to dare”. Since the general term, risk, is found within numerous disciplines ranging from insurance to actuarial science, it is understandable that varying definitions of the term are found.

Although the concept of risk the author shall apply in the remainder of this study focuses on the three key elements of uncertainty, future and the effect on organisation’s goals, the human’s perception of risk is considered to focus on an additional two components, viz. fear and control. How each individual responds to the elements of risk is driven by his perception of loss and gain, cognitive biases and personality. A management ethos that acknowledges the individualistic and variable nature of risk perception and ensures the open discussion of such subjective elements will go a long way in increasing the effectiveness of overall decision making.



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With regard to the philosophy of the risk concept, two positions in the philosophical debate over risk are offered. On one side, positivists believe that risk is a purely scientific concept admitting complete characterisation and analysis through data collection and quantitative methods. Opposed are relativists who believe that risk is a purely subjective reaction to phenomena encountered in personal or social experience. Later developments in the field of philosophy replace relativism with a more contextualist view. In this more contextualist view it is proposed that lay assessments of risk are just as accurate as expert assessments since experts may fail to recognise other dimensions such as voluntariness, which may be more relevant to the points of decision in a given context. Issues relating to risk communication are also discussed.

The following definition for risk is set for the remainder of the study: *A concept used to express uncertainty around all possible future events that could significantly influence the achievement of the organisation's business objectives.*

Risk is unavoidable and present in almost every human intervention. It is present in all person's lives, public and private businesses.