Using risk appetite and risk attitude to support appropriate risk taking: a new taxonomy and model

David Hillson, Risk Doctor & Partners, UK
Ruth Murray-Webster, Lucidus Consulting, UK

Abstract

The term 'risk appetite' is used widely and increasingly, but there is no commonly accepted definition for it. This situation is exacerbated by confusion between risk appetite and other risk-related terms, especially risk attitude.

This paper offers a consistent and coherent taxonomy of these terms, showing how they relate to one another. This allows development of a rich model to explain the complementary and central roles of both risk appetite and risk attitude when individuals or organisations decide how much risk can be taken in a risky and important situation.

By progressively deconstructing the full model, we conclude that the key step is to set risk thresholds. We derive a three-stage approach to setting risk thresholds that ensures that the outcomes properly reflect organisational risk culture and the individual risk propensities of key stakeholders, and also clarifies the essential role of risk attitude as a control point. This enables individuals and organisations to choose the appropriate risk attitude in order to influence the amount of risk that is taken in any given situation, so that the achievement of objectives is optimised.

Keywords

risk appetite, risk attitude, risk thresholds, risk tolerance, emotional intelligence, triple strand

.

Defining risk appetite

Senior management teams and boards are constantly confronted with the need to answer one key question: 'How much risk is too much risk?'. This has led in the past decade to an emergent and extensive interest in the idea of *risk appetite* and its influence on organisational decision-making at all levels from the strategic to the tactical.

Recent research on risk appetite (Association of Insurance and Risk Managers 2009) has identified four ways in which an understanding and expression of risk appetite can be used within organisations:

1. To *support strategy-setting*, leading to a balanced risk profile and identification of which risks to avoid and which to take
2. To *support effective management of risk*, by ensuring that risk management resources are allocated optimally, and fostering a risk-aware culture across the organisation

©UTSePress and author (s)

3. To *set appropriate boundaries for risk taking*, by motivating decisionmakers to make better and more consistent decisions
4. To *maximise stakeholder value*, by enhancing organisational performance and delivery.

But what exactly is risk appetite? There have been a number of recent attempts to define risk appetite and outline its practical significance to business:

- International standard ISO Guide 73:2009 includes a normative definition of risk appetite as 'amount and type of risk that an organisation is prepared to seek, accept or tolerate'. This is reflected in other risk standards such as ISO31000:2009, BS31100:2011 and the UK Office of Government Commerce 'Management of Risk' (M_o_R) guidance (OGC 2010).
- Professional risk bodies such as the UK Association of Insurance and Risk Managers (AIRMIC), the Institute of Operational Risk (IOR) and the Institute of Risk Management (IRM) have each issued advice to their members aiming to clarify the meaning of the term and how it should be used in practice (AIRMIC 2009; IOR 2009; IRM 2011).
- Corporate governance guidelines refer to the need for organisations to define and communicate their risk appetite, with the new UK Corporate Governance Code stating that: 'The board is responsible for determining the nature and extent of the significant risk it is willing to take in achieving its strategic objectives' (Financial Reporting Council, 2010). Similarly, the US National Association of Corporate Directors (NACD) Blue Ribbon Commission issued their 'Report on Risk Governance: Balancing Risk and Reward' in October 2009, stating that 'The Board of Directors need to understand the organization's risk appetite and level of risk tolerance. The assessment of the company's risk appetite should be an ongoing process, considering that risks facing the company are constantly changing' (NACD 2009).
- Consultancy firms have undertaken research and offered guidance to clients on the subject (PricewaterhouseCoopers 2008; KPMG 2008; Towers Perrin 2009), perhaps seeing a new business opportunity to provide advice and support.

Academics have also been considering the topic, mostly in journals dedicated to economics and investment theory (see, for example, Kumar & Persaud 2002). This work builds on a rich vein of research from risk psychology and behavioural economics, to address the influence of risk perception on decision choices under uncertainty (for example, Kahneman & Tversky 1979; Tversky & Kahnemann 1981; Sitkin & Pablo 1992; Sitkin & Weingart 1995; Weber & Milliman 1997).

Despite the growing and continuing interest in the subject of risk appetite, there is still no consensus on its meaning or practical application. The situation is made worse by the loose use of other risk-related terms, some of which are used interchangeably with risk appetite. These include: risk attitude, risk capacity, risk culture, risk exposure, risk perception, risk preference, risk propensity, risk threshold and risk tolerance. Existing academic and practitioner sources do not clearly define how these terms might differ, overlap, replace or relate to each other.

This paper dispels the confusion by providing a clear definition of risk appetite and distinguishing it from related terms. We also have a broader reason for considering

risk appetite, namely, to explore how it influences decision-making in situations perceived as risky and important. Our previous work has addressed the role of *risk attitude* in such decision-making (Hillson & Murray-Webster 2007; Murray-Webster & Hillson 2008).

In this paper, we propose a new model in which both risk appetite and risk attitude act as mediating factors between a wide range of inputs and key outcomes. The model is supported by a consistent and coherent taxonomy of risk-related terms, and clarifies how these relate to each other. We also suggest practical ways in which people and organisations can work with these concepts to ensure that they make appropriate decisions in risky and important situations.

The centrality of risk appetite and risk attitude

There is one key decision to make in risky and important situations, namely, how much risk to take. This deceptively simple question is actually very complex to answer. It depends on a wide range of related factors, some of which are internal to the decisionmakers as individuals and groups, and others that exist externally and independently of people. In addition, some of those factors can be influenced or determined by the choices of the people involved, whereas others exist independent of human choice.

Within this complex set of interacting factors, our contention is that two play a key central role, namely *risk appetite* and *risk attitude*. We propose a model showing the central importance of risk appetite and risk attitude, the 'RARA Model', presented in Figure 1, which also illustrates the relationships between the other risk-related concepts in this space. This model is supported by a taxonomy of terms in the Appendix, which describes the key relationships between these concepts.

The following sections detail our explanation of the RARA Model, including the implications for appropriate risk taking.

Introducing the RARA Model

The RARA Model in Figure 1 is centred on the two key concepts of *risk appetite* and *risk attitude*. The left-hand side shows a range of inputs to these two central items, with outcomes shown on the right-hand side. Risk appetite and risk attitude appear as mediating factors between inputs and outcomes.

We distinguish in the model between factors that are held internally within people (shaded in Figure 1) and those that exist externally to people and can therefore be more easily observed and measured (unshaded).

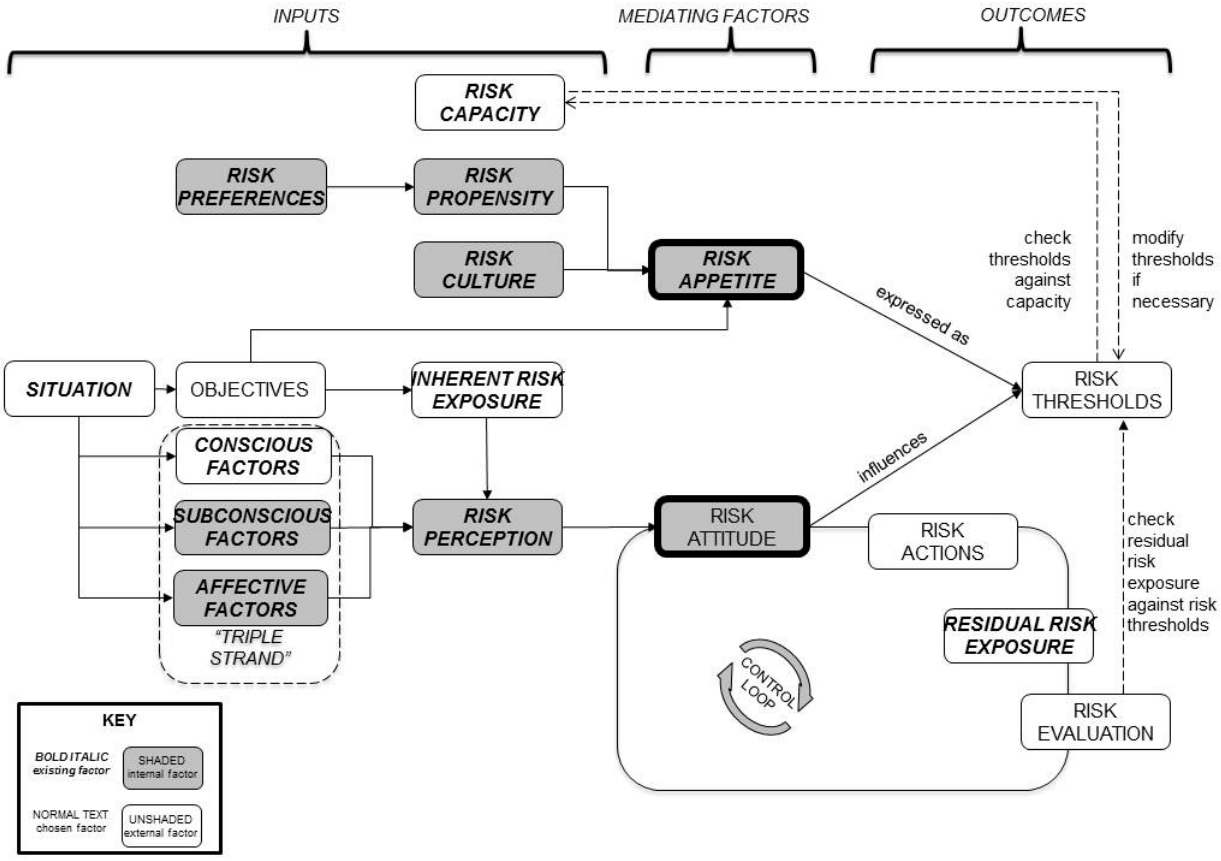

Figure 1. The Risk Appetite — Risk Attitude (RARA) Model

The RARA Model also separates factors that exist independently of human choice or decision (shown in bold italic text in Figure 1) and those that are (explicitly or implicitly) chosen (normal text). These distinctions are clarified in Figure 2.

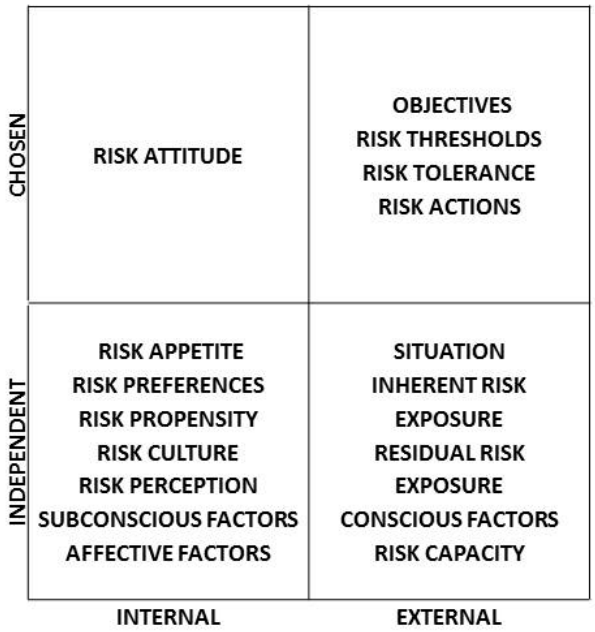

Figure 2. RARA Model concepts

To understand the RARA Model, it is necessary to start with risk appetite and risk attitude. These two concepts are often confused and seen as overlapping or even synonymous, but we argue that they are essentially different in nature. Both risk appetite and risk attitude are internal factors, i.e. they are held within people and can only be seen through some external expression or behaviour.

However, the fundamental difference is that the *risk appetite* of an individual or group exists as a *tendency* independently of human choice, but that the *risk attitude* of an individual or group is a *chosen response*.

It is important to remember that risk appetite and risk attitude do not and cannot exist in isolation. They both only exist in relation to an external *situation*, which is perceived as both risky and important, and which demands some sort of response by individuals and/or groups. As a result, the situation appears as the initiating trigger on the left-hand side of the RARA Model. The situation usually gives rise to a set of chosen *objectives* that an individual or group wish to achieve in that situation, although these objectives may be more or less well-defined or expressed. The *inherent risk exposure* associated with the situation and its objectives also exists independently of people; in other words, risk exists in the situation irrespective of whether anyone is aware of it or not.

The left-hand side of Figure 1 describes the input factors to risk appetite and risk attitude. All these input factors exist independent of human choice or decision, with the exception of the objectives to be achieved in a given situation, which are typically chosen consciously by individuals or a group.

Risk appetite is influenced by the external objectives of the situation in combination with two other factors. The first is the propensity of individuals to act in a certain way in the face of risk (*risk propensity*), driven by their risk-related personality traits (*risk preferences*). The second factor is the culture of the group or organisation in relation to risk (*risk culture*). Because all of these factors are pre-existing and uninfluenced, risk appetite arises inherently within an individual or group, without conscious intervention or choice, which is why we describe it as a tendency.

In contrast, risk attitude is a chosen response to the situation and its objectives, influenced by perception of the inherent risk exposure (*risk perception*) that, in turn, is influenced by a wide range of factors. The choice of risk attitude may be made consciously/explicitly or subconsciously/implicitly, but the ability to choose a different risk attitude always remains a possibility. In our earlier work (Hillson & Murray-Webster 2007; Murray-Webster & Hillson 2008), we categorised the influences on risk perception into three groups:

1. Conscious situational factors;
2. Subconscious mental shortcuts;
3. Affective feelings and emotions.

These three groups of factors are tightly interwoven in practice, forming a '*triple strand*' of influences that takes conscious effort and awareness to untangle. Without awareness, the perception of the risky situation will lead to an implicit or tacit choice of risk attitude that might generate inappropriate actions. Awareness of the triple strand, on the other hand, can produce an appropriate chosen risk attitude that

properly reflects the perceived level of risk and leads to suitable actions. In either case, risk attitude is a choice. This is a vital feature of the RARA Model, since it represents the first place in the model where conscious intervention is possible. We will return to this feature later to explore its significance for decision-making in risky and important situations.

The right-hand side of the RARA Model in Figure 1 presents outcomes that explain how risk appetite and risk attitude come together in practice as mediating factors to influence the decision on how much risk to accept in risky and important situations. We should note that all of the outcomes on the right-hand side are external factors (unshaded) that can, therefore, be observed and measured.

It is important to recognise that risk appetite is intangible and cannot be measured directly. It is, therefore, necessary to have some proxy by which this intangible tendency can be expressed. This is illustrated by the analogy of physical appetite or hunger, which cannot be directly quantified. Instead, we use figures of speech to express physical appetite. In response to the question 'How hungry are you?' we might answer, 'I could eat a horse' or perhaps 'I fancy a doughnut'. These quantified expressions are not direct statements of appetite, but instead allow us to assess it through a measurable proxy.

In the same way, risk appetite requires a proxy measure. The RARA Model gives this role to *risk thresholds*, which are the expression of a risk appetite in ways that can be measured externally and objectively. The RARA Model also indicates that risk thresholds are the point at which risk appetite meets risk attitude. This is an important intersection that we will return to below.

We define risk thresholds as the quantified measures that represent upper and lower limits of acceptable tolerance around objectives. Some organisations choose to use the term *risk tolerance* as an alternative to risk thresholds. Either is acceptable in our view, since risk tolerance indicates upper and lower limits of variability around a risk threshold.

We suggest that risk thresholds are derived from risk appetite (the tendency to take risk in the situation) and are influenced by the chosen risk attitudes of stakeholders (the chosen positioning in relation to the risk exposure inherent in that situation). For risk thresholds to be appropriate in a situation, they should be validated against *risk capacity*, which we define as the ability of an entity to bear risk, quantified against objectives.

The ideal situation is for risk thresholds to be set that properly reflect both the inherent risk appetite of the organisation and the chosen risk attitude in a given situation. This alignment will maximise the chances for the organisation to achieve its objectives by taking the right amount of risk consistent with the desired outcomes. What happens if risk appetite and risk attitude are not aligned? We argue that in these circumstances a control loop is required in order to support the necessary corrective behaviour. Lack of alignment will lead to inappropriate risk thresholds, with the organisation eventually taking on too much or too little risk. This, in turn, is likely to lead to unacceptable risk exposure or inadequate performance because actions are

inconsistent with the objectives of the situation. But where can remedial control be exercised within the RARA Model presented in Figure 1?

There is only one control point in the model, which is to modify risk attitude. This is because risk attitude is chosen and that choice leads to action. Therefore, the control mechanism to judge whether the chosen risk attitude is appropriate in a situation is to check the effect of risk actions and the residual risk exposure against the risk thresholds and then to adjust the choice of risk attitude as necessary to create the necessary alignment for the action to lead to appropriate outcomes in the situation.

Risk appetite and risk attitude in action

In this section, we demonstrate how risk appetite and risk attitude function within the RARA Model. They can be considered as separate constructs since each has a particular influence on the final outcomes, yet they must be addressed in combination if they are to have a positive effect on individual and organisational decision-making in risky and important situations. The best way to illustrate the contribution of risk appetite or risk attitude is to consider how the RARA Model might work in their absence. In particular, we explore how an organisation might set its risk thresholds in three different scenarios:

1. *Unmanaged*, where risk thresholds are set by the organisation with no reference to risk appetite or risk attitude.
2. *Constrained*, where risk thresholds are consciously modified by the inherent risk appetite.
3. *Informed*, taking account of the chosen risk attitudes of key stakeholders as well as wider organisational factors when setting risk thresholds.

These three scenarios are outlined below, together with an illustrative example that is based on a real case but one that has been modified for simplicity.

The Unmanaged Scenario

Figure 3 shows what happens when both risk appetite and risk attitude are removed from the RARA Model, which we call the Unmanaged Scenario. A situation arises that is perceived as risky and important and, from this situation, one or more objectives are derived by key individuals, or by a decision-making group. There is, of course, a certain level of inherent risk exposure associated with this situation, but this is not explicitly considered in the Unmanaged Scenario. Having set objectives, the organisation then proceeds to set risk thresholds to quantify how much risk is acceptable in the given situation in order to optimise the chances of achieving the objectives. These risk thresholds are validated against the overall risk capacity of the organisation and modified if necessary. Risk actions may be implemented to control the perceived level of residual risk exposure, and the results of these actions are compared with the risk thresholds to determine whether they are working adequately.

At first sight, there appears to be nothing wrong with the sequence of events in the Unmanaged Scenario. It describes a set of actions that most decision-making groups would recognise as familiar. However, there is a problem with following this scenario to set risk thresholds. Since inherent risk exposure is not explicitly considered in the Unmanaged Scenario, there is no way of determining whether the selected risk

thresholds are appropriate. The organisation recognises that it needs to set risk thresholds in order to indicate how much risk the organisation is prepared to accept in the given situation, and so they are set somehow, perhaps intuitively. But it is not possible to know if the chosen risk thresholds are appropriate, without considering the wider context of the decision. It is possible that the unmanaged approach might result in suitable risk thresholds being set, but this outcome would be more the result of good luck than good judgement, and is not guaranteed.

In Figure 3 all the boxes are unshaded, indicating that these are external factors that exist independent of people. In the Unmanaged Scenario, inputs result in outcomes, but without the mediating factors that take explicit account of the internal workings of individuals or groups. Instead, this approach is only influenced by what can be seen and measured.

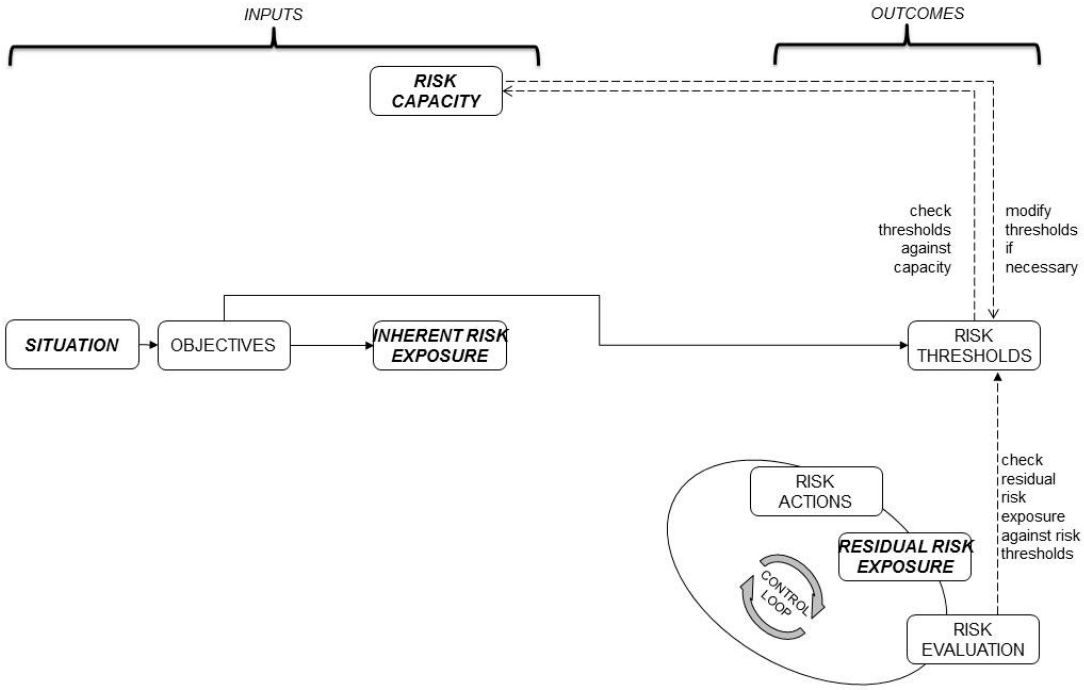

Figure 3. The Unmanaged Scenario

As an example of this scenario, consider the behaviour of an analyst who recently joined a leading oil company to conduct economic appraisals. The analyst developed an economic value model for a new exploration prospect using current industry norms and established algorithms, and the model returned a positive result that exceeded all the company's hurdle rates. As a result, the analyst recommended that the company should proceed with the investment. The analyst proposed risk thresholds set at the standard values used for previous similar prospects, and suggested a routine and proven development strategy that was expected to maintain an acceptable level of risk exposure.

The analyst's recommendations were submitted to an investment appraisal panel for approval. We might expect that they would be accepted, since due process was followed in a transparent and traceable manner. However, there is no guarantee that simply following a proven analytical approach produced the right outcome. Other factors need to be considered if the optimal result is to be achieved.

The Constrained Scenario

This scenario is shown in Figure 4, which adds risk appetite back into the picture, together with its influencing inputs.

In the Constrained Scenario it is clear that risk thresholds are not just choices made in isolation from their context, determined only by the desired objectives in a given situation. Instead, there is a range of internal factors that should influence the chosen risk thresholds. These are required to ensure that the amount of risk considered acceptable by the organisation properly reflects both the risk culture of the organisation and the risk propensity of key stakeholders. Both risk culture and risk propensity come together in the internal tendency that we call risk appetite. As an internal factor, risk appetite is intangible and cannot be measured explicitly, unless and until it is expressed via risk thresholds.

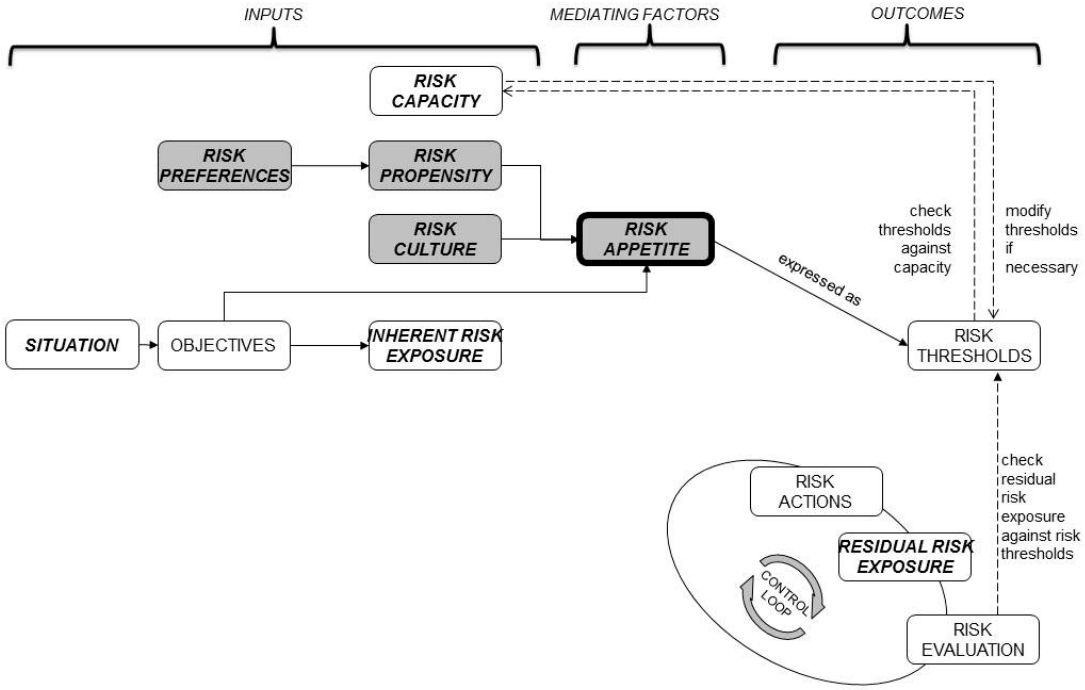

Figure 4. The Constrained Scenario

We can illustrate this by returning to our oil company analyst's recommendations for the exploration prospect. When these were submitted to the investment appraisal panel, the panel members challenged the risk thresholds that had arisen from the analysis. On closer inspection, it appeared that these failed to take account of the company's position on safety and environmental issues, and consequently the risk thresholds were too high. These issues were the result of previous incidents in the company's history that had led to changes in company culture of which the newly appointed analyst was unaware.

Simple analysis of a situation in isolation is not sufficient to determine how much risk should be taken by an organisation in a given situation that is risky and important. Instead, it is necessary to take account of organisational risk culture and personal risk propensities, which shape the risk appetite of the decision-making group. These are

commonly expressed as ‘The way we do things here’, and they form an important overlay to the unmanaged calculation of risk thresholds.

The explicit inclusion of risk appetite in the process of determining risk thresholds avoids the problem of setting levels of acceptable risk that are inconsistent with company values, history or norms and which are, therefore, inappropriate in the organisational context. It does not, however, take account of the desire of the organisation or key stakeholders to take risk, since risk appetite is an internal tendency driven by other intangible factors. As a result, the setting of risk thresholds is still intuitive and unmanaged. In the Constrained Scenario, risk thresholds are influenced by risk appetite, and can later be modified consciously by reference to risk capacity, but there is no point in Figure 4 at which intervention is possible to influence where the risk thresholds are initially set. Something else is required.

The Informed Scenario

It is clearly important to take proper account of risk appetite when setting risk thresholds, which the Constrained Scenario does, but this is not the whole story. In every case, it is people who take decisions on what level of risk exposure is appropriate, working either as individuals or in groups. Despite claims to the contrary, people are not dispassionate rational actors who make decisions based on perfect economic utility calculations. Instead we bring a range of overt and hidden influences to our decision-making, including subconscious cognitive biases and psychological heuristics, as well as affective emotional factors. It is not possible to set appropriate risk thresholds without considering these influences on our perception of risk that, in turn, affect individual and group risk attitude. It is, therefore, necessary to add risk attitude back into the picture, producing the Informed Scenario, which brings us back to the full RARA Model (see Figure 4, repeating Figure 1).

In the case of our oil company example, the exploration and development opportunity was pursued following the investment appraisal panel, and a project team was appointed with clear objectives and a set of well-defined risk thresholds. However, as the project proceeded, it became clear that the team’s actions were in danger of breaching the risk thresholds. On investigation, a range of subtle influences were uncovered that led to risk-taking behaviour, including the previous experience of key team members, peer pressure to perform, the financial incentive of potential bonus payments for successful delivery, and a strong macho, can-do culture among the team. This led to a risky shift in the way the team operated, with an inappropriate level of risk seeking. A new project leader was appointed, who had strong interpersonal skills and well-developed emotional literacy, and who was able to modify the team’s attitude and approach to risk taking and bring the project back into line.

This illustrates the importance of hidden sources of bias in this area. If these remain unmanaged, they can lead to adoption of risk attitudes that hinder achievement of the desired objectives. Instead, we need to aim for managed risk attitudes to align behaviour and actions with the risk thresholds that have been set for a given situation.

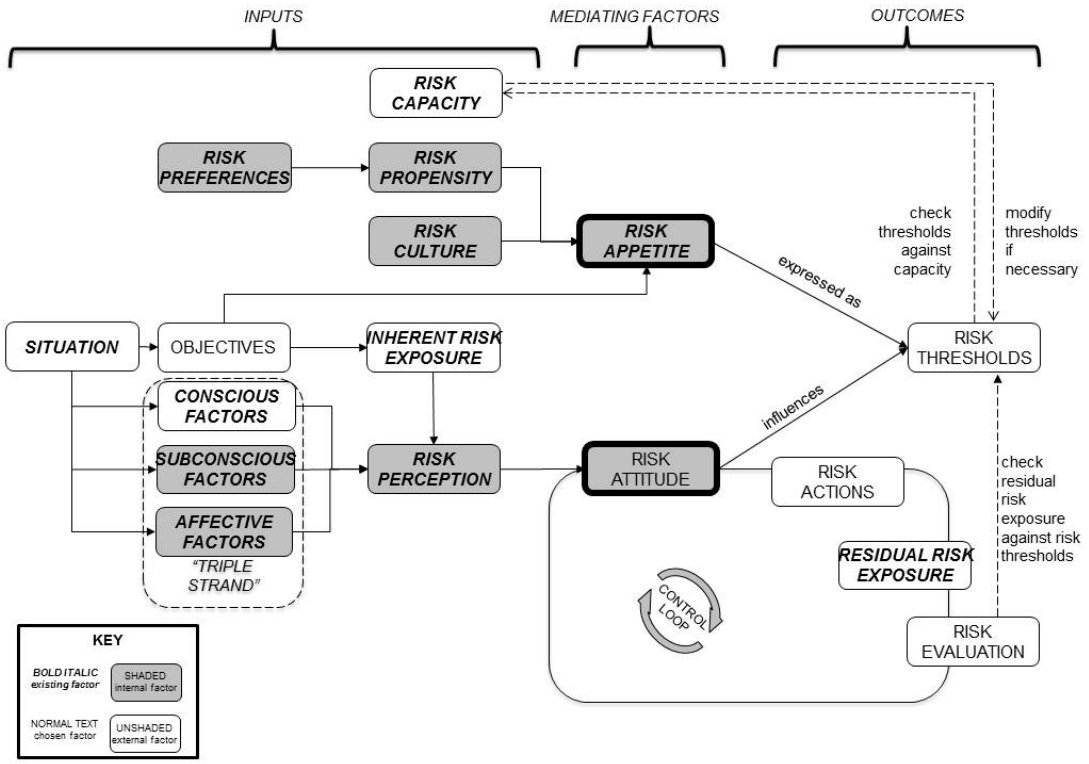

Figure 5 (repeating Figure 1). The Informed Scenario

The Informed Scenario (Figure 5) illustrates the full RARA Model, which includes the influence of risk attitude alongside risk appetite, showing how managed risk attitude offers a point of choice and intervention in the decision-making process. The 'risk attitude–risk actions–risk evaluation' control loop allows the chosen risk attitude to be changed in order to keep actions in line with risk thresholds. As a result, we can reach optimal alignment of risk thresholds with objectives, internal coherence with risk culture and maximum effectiveness of risk actions.

So what? Implications for practice

So far in this paper, we have defined a range of risk-related constructs and shown how they relate to each other, as well as describing the part they each play in decision-making in risky and important situations. The RARA Model provides a holistic and integrated framework for individuals, teams and organisations to use when answering questions such as 'Is my behaviour appropriate in this risky situation?', 'How much risk should we take?' or 'Does our risk culture support our strategy and objectives?'.

This section expands our description of the RARA Model in order to make it useful to practitioners. We particularly elaborate on two key assertions:

1. Some risk-related constructs exist independently outside people and in the external environment, and hence can be observed and/or measured.
2. Other risk-related constructs are intangible and they cannot be measured directly; they can only be observed through actions or proxy measures.

As above, we achieve this expanded discussion by considering the three possible scenarios in turn, incrementally adding risk appetite and risk attitude back into the unmanaged version of the RARA Model. In doing so, we expose further how the

loose use of nomenclature has created confusion in knowing what can be objectively defined and measured, and what cannot.

We then build further on this analysis in the penultimate section by suggesting a practical process for making appropriate risk-informed decisions.

The Unmanaged Scenario: only tangible factors

As shown in Figure 3, all the variables in the Unmanaged Scenario are external factors, existing outside of individual people or a collective group. Some of these are pre-existing un-chosen factors (the situation itself, the risk capacity of the organisation and the inherent risk exposure associated with the situation). Others are chosen by people (the objectives in the situation, the risk thresholds and tolerances selected, risk evaluation criteria and risk actions). All the factors in the Unmanaged Scenario can be explicitly observed or articulated. Risk actions can be observed; objectives, risk thresholds, risk tolerances and risk evaluation criteria can be expressed in tangible terms; and risk capacity can be calculated based on the assets of the organisation.

Because all the factors in the Unmanaged Scenario are visible and measurable, it appears deceptively simple to set risk thresholds using this approach. However, the failure to take proper account of the other factors in the RARA Model, particularly the central mediating factors of risk appetite and risk attitude, means that the resulting risk thresholds are likely to be flawed. If the 'right result' is achieved, then it probably arose more by good luck than good judgement.

The Constrained Scenario: factors with proxy measures

The Unmanaged Scenario is developed into the Constrained Scenario by the addition of risk appetite and its precedents (risk preferences, risk propensity and risk culture), as described in Figure 4. These factors put the Unmanaged Scenario into its proper context, allowing a link to be made between the risk thresholds and factors that exist independent of the specific situation.

Existing work on risk preferences, risk propensity and risk culture indicate how these might be assessed and/or measured.

Risk preferences of individuals (as innate motivations) can be determined through personality tests, such as the Spony Profiling Model (Spony 2003), or the Myers-Briggs Type Indicator (Briggs-Myers 1980). Such instruments allow an individual to diagnose and reflect upon their likely starting point when faced with a risky and important situation. Although some decision scientists argue that risk taking is a rational, economic process, by which human beings are able to compute potential gains and losses and decide objectively (e.g. Dyer & Sarin 1982; Davies 2006), others argue that there are other, more subjective, situational influences on risk propensity (e.g. Sitkin & Pablo 1992; Lopes 1987; Sitkin & Weingart 1995). There is certainly no single, reliable diagnostic that can be used to determine the risk preferences or propensity of individual decisionmakers; indeed, the fact that these constructs are tendencies should warn us against trying to be overly analytical about them.

Risk preferences and risk propensity apply to individuals, yet individuals rarely make decisions in a vacuum. Individuals form decision-making groups such as families, project teams, company boards, and so on. Groups, particularly long-established ones such as companies, will tend to adopt tendencies of how to respond to risk and this collective tendency is referred to as the group's risk culture. For example, one organisation's risk culture might always be to consider how avoid loss, while another might view risk as an opportunity to maximise value. Again, some diagnostics exist that attempt to measure risk culture, although even in the better diagnostics, risk culture is often used interchangeably with risk attitude, incorrectly in our view (e.g. Underwood & Ingram 2010).

Risk preferences, propensity and culture are important influential factors when considering risk appetite, but they are not directly observable. Instead, they are internal tendencies that can be assessed to some degree through the use of diagnostics at an individual or group level. Rather than trying to measure these tendencies per se, it is more important to consider how each may be affecting risk appetite and the resulting risk thresholds.

The Informed Scenario: factors understood and controlled with hindsight

In the Constrained Scenario, externally measurable factors in the RARA Model are supplemented by an understanding of the factors that influence risk appetite. Although diagnostics exist that seek to evaluate such tendencies, these have use only insofar as they can alert the decisionmaker. In the Informed Scenario, by contrast, the mediating factor of risk attitude is introduced. We define this term very precisely as a *chosen response* to risk, influenced by perception. Crucially, risk attitude is a situational phenomenon. It cannot be measured directly, but it can be understood and judged as appropriate or inappropriate during decision-making in a specific, risky and important situation. The triple strand of influences on risk perception and risk attitude shown in Figure 1 can all be reflected upon and understood, either in isolation or, more importantly, as a combined effect, but this is not meaningful out of the context of the specific situation. In a specific situation, risk attitude (how a person or group will respond to the perceived risks) can be evaluated and modified using the Six As model (Murray-Webster & Hillson 2008), shown in Figure 6 below.

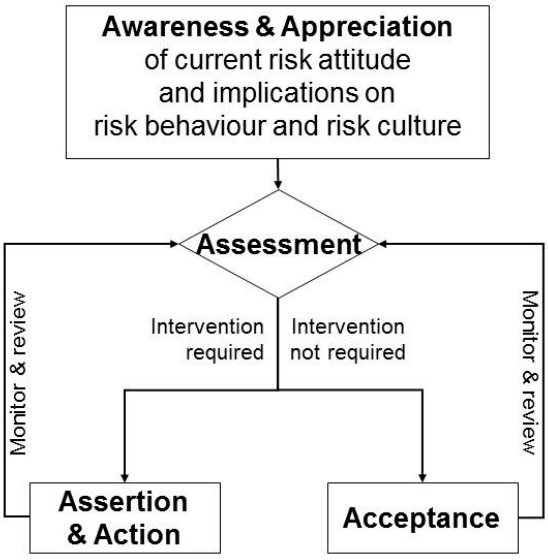

Figure 6. The Six As Model

Based on Murray-Webster & Hillson 2008, used with permission

The Six As model provides a structured framework to help individuals and groups adopt an appropriate risk attitude in any given risky and important situation. The model is described in detail elsewhere (Murray-Webster & Hillson 2008), but it can be summarised as follows:

- First, there is a need for *awareness and appreciation* of the current risk attitude adopted by an individual or a group, including the 'triple strand' key influences.
- Next comes *assessment*, to determine whether the unmanaged risk attitude is likely to lead to an acceptable outcome or not.
- Where the assessment step indicates that intervention is required to modify the prevailing risk attitude, *assertion and action* are employed to make the necessary change.
- If, on the other hand, assessment shows that the existing risk attitude is appropriate, the current risk attitude can be *accepted*.
- Whether the unmanaged risk attitude is accepted or modified, the ongoing situation must be monitored and reassessed periodically to determine whether intervention may be required at a later time.

Each of these steps involves a range of underlying actions, and this paper cannot cover the full detail. Instead, we have shown how 'chosen risk attitude' works alongside the other risk-related elements of the RARA Model to provide a control loop that can be activated to modify risk attitude where necessary, influencing both the level at which risk thresholds are set and the nature of future risk actions. Since risk appetite is an internal and independent tendency not influenced by human choice, it cannot act in this modifying way, leaving our ability to choose an appropriate risk attitude as the sole control point available to us.

As we have seen, some risk-related constructs exist independently outside people and in the external environment, and hence these can be observed and/or measured. These constructs are those that make up the starting point when considering how much risk

is too much risk: the elements of the Unmanaged Scenario. The other risk-related constructs that allow the Unmanaged Scenario to progress through to an informed judgement are intangible and they cannot be measured directly; they can only be observed through actions or proxy measures.

We argue that the control point in the process is achieved by comparing the objective expression of risk thresholds with the evaluation of residual risk, and modifying risk attitude as necessary to ensure that residual risk is matched with thresholds so that the situation poses neither too much nor too little risk.

Using the RARA Model for risk-informed decisions

This section uses the RARA Model in order to demonstrate how individuals and groups in risky and important situations can make appropriate risk-informed decisions. This is achieved by considering the three possible scenarios in turn, starting with the outcome arising from the unmanaged version of the RARA Model, then incrementally adding risk appetite and risk attitude.

Moving through the scenarios

There is one key question for any individual, organisation or decision-making group facing a risky and important situation. Which is the best approach to adopt in order to determine the 'right' risk thresholds? Clearly, it is not safe to rely on the Unmanaged Scenario (Figure 3), since this produces risk thresholds based on gut reaction and intuition, taking no account of the organisational risk culture or the risk propensities of key stakeholders. As a minimum, we need to consider the norms of 'the way we do things here', as illustrated in the Constrained Scenario (Figure 4). But we have shown that even this is not sufficient to ensure that risk thresholds are set in an appropriate level. Instead, we need to actively adopt a risk attitude that reflects our chosen response to the perceived risk exposure which will, in turn, influence where we decide to set our risk thresholds, as shown in the Informed Scenario (Figure 5).

In order to make this process explicit, we recommend that risk thresholds should be set in a progressive manner, moving through the three scenarios. Initially, risk thresholds are produced and recorded without reference to any factors other than what can be described and measured (Unmanaged). These risk thresholds are then modified to take account of the risk appetite that arises from the organisational risk culture and the risk propensities of key stakeholders (Constrained). A final refinement to the risk thresholds is then made to reflect the chosen risk attitude (Informed). This final step can be achieved by recognising that risk attitude is a central mediating factor, alongside risk appetite. We have also seen that the ability for individuals and groups to choose a risk attitude provides a vital control point in the process of setting risk thresholds, and the Six As model (Figure 6) provides a practical approach to facilitate the appropriate choice of risk attitude.

Conclusions

Our previous work together has focused on the promotion and encouragement of 'appropriate' risk-taking (Hillson & Murray-Webster 2007; Murray-Webster & Hillson 2008). The understanding of what is meant by 'appropriate' is of course both

subjective and situational, and it depends on the people involved as well as the circumstances. Behaviour towards risk is determined by the underlying risk attitude, which itself is dependent on risk perception, and there is a range of factors that influence perception of risk (the 'triple strand' of conscious, subconscious and affective factors). We have shown previously that risk attitude is a choice, and that it is possible to use a managed approach to choose appropriate risk attitudes in order to optimise both the decision-making process and the decision outcome.

This paper extends our earlier work on risk attitude, to put these ideas of managed choices in risky and important situations into the wider context, particularly in terms of risk appetite. In showing how risk appetite and risk attitude are separate yet complementary ideas, we have also produced a complete and integrated taxonomy and framework of a wider set of risk-related concepts and terms (summarised in the Appendix below).

Most importantly for practitioners, the RARA Model indicates how both risk appetite and risk attitude influence the setting of risk thresholds. Progressively deconstructing this model has revealed a three-step process that allows informed risk taking when determining what risk thresholds are appropriate in a given situation. This process starts by taking account of external and visible factors to generate an initial set of risk thresholds, without conscious consideration of the hidden influences (the Unmanaged Scenario). This is then augmented and modified by taking account of the pre-existing tendencies of the individual and the organisation in relation to risk (risk propensities and risk culture), which produces an intangible risk appetite that modifies the first-cut risk thresholds (the Constrained Scenario). Finally, a further refinement of risk thresholds is achieved through active adoption of the desirable risk attitude in order to optimise the achievement of objectives given the level of risk exposure (the Informed Scenario), using the Six As framework to manage risk attitude proactively.

Our exploration started by considering the ill-defined concept of risk appetite, but it has led to a framework that clearly defines the different roles of a range of risk-related factors and how they interact. Applying the approach outlined in this paper offers individuals and organisations a practical way of ensuring that they take the right risks safely, setting measurable risk thresholds that reflect the inherent risk appetite while also adopting the most appropriate risk attitude.

References

Association of Insurance and Risk Managers 2009, *Research into the Definition and Application of the Concept of Risk Appetite*, AIRMIC, London, UK.

Briggs-Myers, I. & Myers, P.B. 1980, *Gifts Differing: Understanding Personality Type*, Consulting Psychology Practice, California, USA.

British Standard BS 31100:2011 2011, *Risk Management — Code of Practice*, British Standards Institution, London, UK.

Davies, G.B. 2006, Rethinking risk attitude: aspiration as pure risk, *Theory and Decision*, vol. 61, no. 2, 159-190.

Dyer, J.S. & Sarin, R.K. 1982, Relative risk aversion, *Management Science*, vol. 28, no. 8, 875-886.

Financial Reporting Council 2010, *UK Corporate Governance Code*, Financial Reporting Council, London, UK.

Hillson, D.A. & Murray-Webster, R. 2007, *Understanding and Managing Risk Attitude*, 2nd ed., Gower, Aldershot, UK.

Institute of Operational Risk 2009, *Operational Risk Sound Practice Guidance Part 1: Risk Appetite* (version 1, December 2009). Available at: http://www.ior-institute.org/education/sound-practice-guidance/8-sound-practice-guidance-part-1. Accessed 31 January 201.
Institute of Risk Management 2011, *Risk Appetite and Risk Tolerance*, Institute of Risk Management, London, UK. Available at: http://www.theirm.org/publications/risk_appetite.html
International Organization for Standardization Guide 73:2009 2009, *Risk Management — Vocabulary*, International Organization for Standardization, Geneva, Switzerland.
International Organization for Standardization ISO 31000:2009 2009, *Risk Management — Principles and Guidelines*, International Organization for Standardization, Geneva, Switzerland.
Kahneman D. & Tversky A. 1979, Prospect theory: an analysis of decision under risk, *Econometrica*, vol. 47, no. 2, 263-297.
Kahneman, D., Slovic, P. & Tversky, A. (eds) 1986, *Judgement Under Uncertainty: Heuristics and Biases*, Cambridge University Press, Cambridge, UK.
KPMG 2008, *Understanding and Articulating Risk Appetite*, KPMG, Sydney, Australia.
Kumar, S.M. & Persaud, A. 2002, Pure contagion and investors' shifting risk appetite: analytical issues and empirical evidence, *International Finance*, vol. 5, no. 3, 401-436.
Lopes L.L. 1987, Between hope and fear: the psychology of risk, *Advances in Experimental Social Psychology*, vol. 20, 255-295.
Murray-Webster, R. & Hillson, D.A. 2008, *Managing Group Risk Attitude*, Gower, Aldershot, UK.
National Association of Corporate Directors 2009, *Report on Risk Governance: Balancing Risk and Reward*, NACD, Washington DC, USA.
PricewaterhouseCoopers 2008, Risk appetite — how hungry are you? *The PwC Journal*, Special Risk Management Edition, PwC, London, UK.
Sitkin, S.B. & Pablo, A. 1992, Reconceptualizing the determinants of risk behaviour, *Academy of Management Review*, vol. 17, no. 1, 9-38.
Sitkin, S.B. & Weingart, L.R. 1995, Determinants of risk decision-making behaviour: a test of the mediating role of risk perception and risk propensity, *Academy of Management Journal*, vol. 38, no. 6, 1573-1592.
Spony G. 2003, The development of a work–value model assessing the cumulative impact of individual and cultural differences on managers' work–value systems, *International Journal of Human Resource Management*, vol. 14, no. 4, 658-679.
Towers Perrin 2009, *Risk Appetite: The Foundation of Enterprise Risk Management.* Towers Perrin, London, UK.
Tversky, A. & Kahneman, D. 1981. 'The framing of decisions and the psychology of choice'. *Science*, 211 (4481), 453-458
UK Office of Government Commerce 2010, *Management of Risk: Guidance for Practitioners*, 3rd ed., The Stationery Office, London, UK.
Underwood, A. & Ingram, D. 2010, The full spectrum of risk attitude, *The Actuary*, vol. 7, no. 4, 26-32.
Weber, E.U. & Milliman, R.A. 1997, Perceived risk attitudes: relating risk perception to risky choice, *Management Science*, vol. 43, no. 2, 123-144.

About the authors:

Dr David Hillson is an international risk management consultant, and Director of Risk Doctor & Partners (www.risk-doctor.com). He is a leading thinker and expert practitioner in risk management, and has made several innovative contributions to the field. He consults, writes and speaks widely on the topic and has received several awards for his work. David has over 25 years' experience in risk consulting and has worked in more than 40 countries, providing support to clients in every major industry sector. David has been honoured as a Fellow of the Project Management Institute and has also received the PMI Distinguished Contribution Award. He is also an Honorary Fellow of the UK Association for Project Management, a Fellow of the Institute of Risk Management, a Fellow of the Royal Society of Arts, a Chartered Manager and a Fellow of the Chartered Management Institute. Email: david@risk-doctor.com

Ruth Murray-Webster is an organisational change consultant, Director of Lucidus Consulting Ltd (www.luciduscconsulting.com), and a Visiting Fellow at Cranfield School of Management. Her professional interests and experience centre on the competences required for individuals to manage change and the capabilities that organisations need to improve and advance. Ruth attained her MBA from Henley Management College. She is currently studying for a Doctorate at Cranfield School of

Management, researching planned change to organisational routines from the perspective of the change recipients. She is coauthor of a number of books, including *Starting Out in Project Management* for Association for Project Management, *Management of Risk* for the Office of Government Commerce and three books focused on human factors in risk management — *Understanding and Managing Risk Attitude*, *Managing Group Risk Attitude* and *Facilitating Risk Management*.
Email: ruth@luciduscconsulting.com

Appendix: Taxonomy of risk-related terms

DEFINITIONS

Risk: Uncertainty that matters
Risk actions: Actions taken to respond to risk exposure.
Risk appetite: Tendency of an individual or group to take risk in a given situation.
Risk attitude: Chosen response of an individual or group to a given risky situation, influenced by risk perception.
Risk capacity: Ability of an entity to bear risk, quantified against objectives.
Risk culture: Shared beliefs, values and knowledge of a group about risk.
Risk exposure: A measure of the overall effect of identified risks on objectives. Risk exposure may be expressed quantitatively or qualitatively. **Inherent risk exposure** is the level of risk exposure that exists before risk actions have been implemented. **Residual risk exposure** is the level of risk exposure remaining after agreed risk actions have been implemented.
Risk perception: View of risky situation by individual or group, influenced by 'triple strand' (conscious, subconscious and affective) factors.
Risk preference: Those aspects of an individual's personality and motivation that influence their risk propensity.
Risk propensity: Tendency of an individual to take risk in general, informed by inherent risk preferences.
Risk thresholds: Quantified measures that represent upper and lower limits of acceptable tolerance around objectives.
Risk tolerance: The acceptable variance around a risk threshold, expressed as upper and lower limits, measured against an objective.

RELATIONSHIPS

Individuals are characterised by a general propensity to take ***risk*** (***risk propensity***), reflecting their inherent ***risk preferences***.
Organisations have a shared ***risk culture*** reflecting their shared approach to ***risk***.
A ***situation*** arises within which individuals and groups choose one or more ***objectives*** that they wish to achieve. Individuals and groups develop a perception of the ***risk exposure*** associated with this situation (***risk perception***), influenced by the ***triple strand*** of conscious, subconscious and affective factors.
Risk attitude is a chosen response of individuals or groups to a specific ***situation*** and the associated ***objectives***, influenced by ***risk perception***. Risk attitude influences the choice of ***risk thresholds*** and the nature of ***risk actions***.
Risk appetite is an inherent characteristic of an individual or group developed in relation to a specific ***situation*** and the associated ***objectives***, influenced by the individual's ***risk propensity*** and/or the organisational ***risk culture***.
Risk appetite is expressed via one or more measurable ***risk thresholds***, which are quantified in terms of ***objectives***. The span between the upper and lower limits of the risk threshold can be expressed as ***risk tolerances***.
Risk thresholds are derived from ***risk*** appetite and influenced by the chosen ***risk*** attitudes of stakeholders. They are validated against the overall ***risk capacity*** of the organisation, to ensure that it is not exceeded. If the total theoretical maximum of all risk thresholds is greater than the overall risk capacity, risk thresholds should be reviewed and modified.
Risk actions are taken in response to the perceived level of ***risk exposure*** associated with the situation, driven by the chosen ***risk attitude***. The results of those actions are evaluated against the defined ***risk thresholds*** to ensure that residual risk exposure remains below the threshold and within tolerance limits. If necessary the chosen risk attitude may be modified to support different risk actions, in order to maintain an acceptable risk exposure.