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Aller au sommaire du numéro

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Marsh Technical Studies

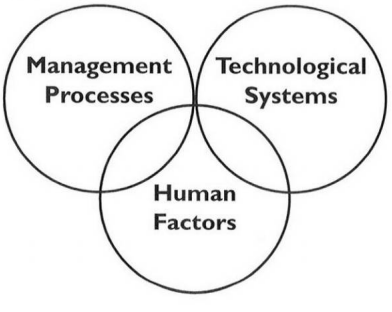
under the responsibility of James Greenhill

PSYCHOLOGICAL FACTORS IN RISK MANAGEMENT

1. Introduction

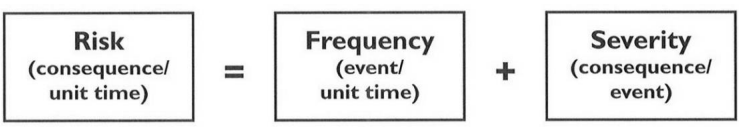
A successful enterprise risk management (ERM) program depends on the seamless integration of three components: management processes, technological systems and human factors (Figure 1). The first two have been extensively dealt with in business literature, while the influence of human factors on ERM program development and implementation has not attracted as much attention. This article aims to provide a practical classification of the main human psychological biases affecting rational ERM decision making, their description, illustration, and relevance as well as suggestions to lessen their impact.

FIGURE 1
COMPONENTS OF RISK MANAGEMENT SYSTEM



In the traditional business view the human factor was immeasurable, thus a negligible influence. The engineering model's definition of risk (Figure 2) dominated any ERM discussion that sought to develop rational decision based ERM programs. However, there are a number of cases where the programs have not performed as well as expected due to human factors.

FIGURE 2
ENGINEERING DEFINITION OF RISK (RASMUSSEN, 1981)



The flawed assumption of a logical, rational, and objective process underlying the estimates of frequency and severity of risk is due to the focus on numbers rather than on what they represent. Research into behavioral economics and, in particular, the psychology of risk, has demonstrated that the measurement of both frequency and severity can be affected by individual perception, understanding and response to risks.

When designing an ERM program, we are most interested in the probability of an event occurring in the future, thus the frequency and the severity are often estimates of what we consider to be the average or worst case scenarios based on currently available data and trends. These are, therefore, educated opinions about the likelihood and impact of an event. However, they are still human opinions that are influenced by sets of thinking patterns, past experiences, and perceptual filters.

These mental simplifications, shortcuts, and biases were developed during human evolution as survival tools that allowed us to quickly assess and respond to dangers or opportunities. Yet there are situations, like ERM programming, where they can be more of a liability than an advantage. They can lead, for example, to a false sense of security which could encourage taking greater risk than appropriate, or erroneous valuations of the risk that could lead to errors of omission where too much focus is placed on one risk while others receive little or no attention.

The review of available literature reveals that some of the most frequently encountered psychological factors are a combination of

how risk data is perceived and how it is processed. Erroneous perception is due to either inaccurate presentation of the data or incorrect interpretation of the data's value. Flaws in data processing can be either errors in experiential thinking (judgmental responses people build over time as they accumulate experiences), or analytical thinking (assessments that make use of quantitative methods). The matrix below (Figure 3) categorizes a number of commonly observed psychological phenomena which are then reviewed in greater detail in the following sections.

FIGURE 3
CLASSIFICATION OF PSYCHOLOGICAL FACTORS MATRIX

DATA PROCESSING	DATA PERCEPTION	
	Presentation Bias	**Interpretation Bias**
Experiential Thinking Errors	• Anchoring • Perspective	• Groupthink • Herding • Optimism • Prudence • Sunk Cost
Analytical Thinking Errors	• Availability • Framing	• Confirmation • Representativeness • Satisficing • Status Quo

2. Experiential Thinking-Presentation Errors

Anchoring

This bias occurs when an irrelevant piece of information provides the base or 'anchor' for value estimation. This effect has been replicated a number of times in both controlled and real world situations.

In one study based on mock trials there was strong evidence that the amount of compensation requested acted as an anchor that influenced whether the defendant was found to be liable and the amount awarded.

Anchors can also be past experiences. For example, if the last computer, purchased three years ago, costs $3,000, the estimated cost for a replacement may be high given how changes in technology have driven down prices. The old price is so out of date, it serves as an irrelevant anchor.

Salesmen use this effect by asking a buyer's budgeted price for an item. This sets an anchor for negotiation that is probably above and draws focus away from the lowest possible sale price. Alternatively the salesman can anchor the buyer by opening with a high price, hoping the buyer will think that a concession is being made when the price is lowered during the negotiation.

While anchoring has become a commonly used tactic in advertising and negotiation, it can also set the perception of the level of risk an organization faces. For example, given a question, "The budget of the company is $200 million. What is the greatest single loss the company could suffer?", the answers given will probably be colored by the first unrelated number.

Ways to counter an anchoring bias are:

- observing risk issues from different perspectives (dollar value, percentage of budget, etc.);
- asking neutral open questions instead of leading questions when gathering information;
- recognizing anchoring information for what it is and dismissing it as irrelevant.

Perspective

The intensity or immediacy of a risk may cause it to be given a greater attention than other potentially more hazardous risks. Aristotle first developed this point, as described by Plato in "*Protagoras*", when discussing the art or measurement where "The same magnitudes appear larger to your sight when near and smaller when at a distance". The end result is a tendency to focus on issues or information that is of immediate consequence.

One tragic example of this was Eastern Air Lines Flight 401. While on a night-time approach into Miami, the crew became engrossed with a cockpit light which indicated that the landing gear had not extended properly. With their perspective focused on the possibility of a faulty gear, both pilots lost situational awareness. As they were trying to change the gear indicator light, the aircraft impacted 3 miles short of the runway, killing 100 passengers and crew.

This perspective bias can be controlled by objectively measuring potential risks and focusing on the higher priority ones.

3. Experiential Thinking-Interpretation Error

Groupthink

In cases where consensus is need, there is a danger of 'groupthink'. In this case the group develops a false consensus without allowing meaningful dissention by individual members. This can lead to the members of a group taking greater risk than they would as individuals.

This phenomenon has been observed in a wide range of social groups including high level management and government. One well documented case is the Bay of Pigs expedition by the Kennedy administration. The operation was allowed to go ahead despite contrary information that was acknowledged only in the post disaster analysis. This group driven behavior was also noted in the post accident investigation of the space shuttle *Challenger*, when a number of safety concerns about the infamous 'O-rings' were ignored.

Characteristics of this situation include:

- sense of invulnerability of the group;
- once a consensus is developed, a tendency to ignore or not draw attention to contrary information;
- establishment of self-censorship by the group of those who go against the status quo.

Ways to counter the issue of groupthink include:

- designating an individual at the start of project to act as facilitator of issues and objections by other group members;
- establishing separate smaller groups to review relevant information and comparing their results;
- removing possible influences that could lead to groupthink, for example department heads or other senior management, in order to create an environment where team members are more comfortable in raising objections.

Herding

This refers to the aspect of human nature that does not want to 'be left behind'. Even when individuals have their own evidence that a project or investment is unwise, they continue with it for fear that, if they do not, they may miss out on an opportunity or seem unsophisticated and foolish in front of their peers.

In medicine, physicians are often inclined to prescribe the most advanced antibiotic to treat infections, even though an older drug may be just as effective. The risk is that over-use of the stronger antibiotic encourages new strains of 'super-bugs' that are then more difficult to treat.

For countering the herding instinct, as much information as possible should be gathered on an issue, allowing the formation of an informed position, even if it is contrary to the one held by the general population.

Optimism

Human nature leans towards optimism, maintaining a belief that we will achieve our goals and desires no matter what the odds. This is what has motivated us to start new ventures, explore new areas and generally take risks. Without this we would tend to bypass a number of opportunities leading to a path of stagnation.

At the same time unrealistic optimism can lead to excessive risk taking with adverse consequences. Optimism bias, also referred to as overconfidence bias, colors both the expected outcome as well as our impression of the accuracy of our prediction. While there is a tendency to be self regulating as expectations are adjusted after repeated failures, many organizations may not be inclined or have the capability to absorb the cost of these learning experiences.

Some of the steps an organization can take to control the effect of overly optimistic human nature are:

- testing the results in a number of expected, extreme worst and best case scenarios;
- challenging estimates and their underlying assumptions;
- limiting the amount of risk that can be taken through the application of previously established standards;
- gathering information from a variety of sources;
- increasing the potential amount of loss in a worst case scenario, possibly by 20 to 25 %.

Prudence

The reverse of optimism bias, the prudence bias occurs after repeated failures or in cases of high-stakes or first-time ventures. Many organizations respond by coming up with over-cautious estimates, thereby by-passing valuable opportunities.

Over-cautiousness can also lead to an over-application of resources, for example over-expenditure on loss control systems or insurance.

Acknowledging the existence of the prudence trap allows a better assessment of opportunities and risks. The use of a realistic case scenario in addition to the best and worst case scenarios can lessen the impact of the tendency to be overcautious.

Sunk Cost

Sunk costs are those efforts in time, money or other resources that have already been expended in a project and cannot be recovered. If a project becomes uneconomical or unsuitable people may continue to provide resources because of the unwillingness to 'write-off' the value of the sunk costs. This issue can become exacerbated as the participants become even more reluctant to end a project as the weight of the sunk costs become greater.

For example, investors will often 'double down' their position on a stock that is losing money by purchasing more of it with the hope that a slight upswing in price would allow them to recoup their losses. The end result is often an even greater loss.

Precautions for countering sunk cost biases include:

- executing a project with an acceptance that if prospective returns on investment are not adequate, the project will be abandoned and sunk costs accepted;
- limiting the exposure by breaking the project down into distinct phases, and only allocating successive resources once the performance goals of each phase are met;
- reassigning the project to another individual if any significant problems arise that require further investment in resources – the new person is more likely to provide an unbiased view on the advantage of continued investment;
- placing an absolute ceiling on the resources allocated to a project and accepting whatever returns it brings.

4. Analytical Thinking-Presentation Errors

Availability

The availability bias is when individuals formulate their estimates based on the ease with which past information comes to mind whether due its recentness of presentation or its vividness. For example,

if someone had recently passed a car accident, they are more likely to assign a higher probability of traffic accidents on that route than they normally would. On a larger scale, individuals are often able to recall more vivid media information about plane crashes than car accidents, thereby feeding the untrue perception that there is a greater chance for an individual to be in a plane crash than a car accident.

In terms of risk management this can result in cases where an organization becomes over-focused on certain risk issues while other, equally serious, risks may be ignored.

To counter this, the organization should ensure that it obtains as much information on risk issues as possible rather than using only information that is at hand. The measurement of risks should be done on absolute and relative scales on an impartial basis in order to decrease the influence of availability biases.

Framing

Depending on how risks are presented or 'framed' can influence how they are evaluated. The landmark study done by Kahneman & Tversky (1984) exemplified the framing bias in its most frequent form namely "gain vs. loss". The two researchers asked physicians to select between two medical treatments for an infected population of 600 people. The possible outcomes were: *"If program A is adopted, 200 people will be saved. If program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved."* In this case, 72 % of the participants chose program A.

With another group the same outcomes were framed in the following negative manner. *"If program C is adopted, 400 people will die. If program D is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die."* In this case, 78 % of the physicians chose program D, the 'all or nothing' alternative.

It is apparent that Plan A is exactly equivalent to Plan C, and Plan B to Plan D, yet the different presentations led to dramatically different responses. The choices reflect the fact that people are risk averse when faced with definite gains however small, but risk tolerant when the alternative appears to be a greater loss. This study as well as the numerous other studies done in the medical and business world show repeatedly that the majority of people are blind to the frame bias and tend to adopt the frame as it is presented to them rather than restating the problem in their own way.

In terms of managing risks this emphasizes the need to be careful how a risk is presented to avoid influencing how it is evaluated.

5. Analytical Thinking-Interpretation Errors

Confirmation

In cases where a theory or hypothesis on an issue is developed, there is a tendency in human nature to seek out information that provides confirmation of the existing point of view. Unfortunately there is often a tendency to not use the same amount of energy in seeking contrary information.

For example, an organization wanting to invest in new equipment may support its position by information on improved efficiencies and immediate and long term returns on investment. However, the same efforts must be applied to review information that may provide arguments against the investment such as secondary costs, for example training and servicing, and other factors such as the risk of obsolescence.

The confirmation bias not only affects the kind of information one tends to gather, but more significantly how it is interpreted. Even when provided with equal amounts and quality of information about two options, the confirmation bias tends to lead us to judge the merits of the information in light of the decision we favor, whether this decision is subconscious or based on past experience or personal preference. For example, studies have shown that people will often unconsciously ignore a section in the newspaper that is in conflict with their beliefs.

To avoid this, an organization should:

- test all hypotheses by looking for disconfirming evidence or view points and following them through to their logical conclusion;
- examine all the evidence with equal rigor and avoid the tendency to accept confirming evidence without question;
- focus on asking neutral questions that do not lead to automatically confirming the evidence;
- ensure that assumptions, measurements and decisions made have followed a rigorous process of challenge and testing.

Representativeness

This is where the characteristics of a sample are mistakenly assumed to represent those of the total population. For example, if

ten tosses of a fair coin result in 'heads' eight times, a false conclusion would be that there is always an eighty percent chance that result would be 'heads' on a single toss. The same issue could occur in terms of assessing risks. Drawing inferences from a small or skewed sample size could lead to an incorrect assessment about the probability or severity of a risk event.

To avoid this, an organization should ensure that the sample measured is of statistically significant size or that its differences from the total population being observed are accounted for. As well a concerted effort should be made to obtain all available historical data and metric information available.

Satisficing

This is the trend to look for the first hypothesis or solution that fits a situation and not to seek further alternatives. Stressful or time sensitive situations as well as insufficient resources can exacerbate the issue as they create pressures that discourage research of other information or alternative solutions. In the case of risk management this can result in the selection of a non-optimal response to a risk issue or the potential increase of risk taken by an organization due to overlooked information.

Responses to this issue include making it standard procedure to develop two or three alternatives to a hypothesis or response. If time or resource pressures prevent this, a note of the possibility of this bias ought to be made and the issue rapidly revisited as part of a continual improvement process.

Status Quo

There is a strong human bias for maintaining the status quo for on-going programs, even when there is strong evidence that it would be beneficial to change. The familiarity with what is currently in place, switching costs and the fear that new systems will not perform are strong psychological drivers for maintaining the status quo which often leads us to erroneously believe that this is the safer alternative. As well there is a greater responsibility attached to action as opposed to inaction, with the greater possibility of negative consequences in case of failure of the action rather then the result of the inaction.

One famous case of maintaining the status quo was in the construction of RMS *Titanic*. Despite the compromises to safety of having fewer life-boat positions than number of passengers and a hull with a limited number of bulkheads that extended only a few

feet above the water line, no issues were raised as this was considered to be normal practice. It was not until after the disaster that the practices were changed.

Given this issue organizations should:

- not only consider what the cost/benefit risk is when introducing a new processes or project, but also make periodic reviews of what the risk is of maintaining the status quo;
- encourage members to challenge current systems in order to determine if there are better ways to manage risk.

6. Managing Psychological Factors

Maintaining an awareness and understanding of potential psychological pitfalls are the first steps in managing human factor impact on ERM development and implementation. When evaluating risks and how to respond to them, there are the above mentioned systematic strategies that can be introduced to ensure that the described phenomena do not reduce the effectiveness of the risk management process.

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