"THE ROLE OF PROJECT RISK MANAGEMENT IN THE SUCCESS OF SELECTED OLD MUTUAL PROJECTS"

by

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Declaration

I hereby declare that the contents of this thesis represent my own work, and that the opinions contained herein are my own and not necessarily those of the Cape Peninsula University of Technology.

Having been specifically produced to satisfy the requirements of this course, the thesis has not previously been published or presented to any academic or other institution.

Charles Thomas
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February 2005

Acknowledgements

Some two millennia past, Aristotle declared, *"We are what we repeatedly do. Excellence, then, is not an act, but a habit."* This most certainly applies in the case of my supervisor, Professor André Slabbert, whose guidance throughout the preparation of this thesis was consistently inspiring and insightful. In other words, nothing short of excellent. For this, he has my eternal gratitude.

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Summary

Project risk management is concerned with identifying, assessing and responding to uncertainties which could impact project outcomes. These impacts might be positive or negative, although the tendency in business has been to focus on the negative – or downside – risks, i.e., those risks which could be potentially detrimental to project outcomes.

Risk management requires an investment in time, effort and cost. For this reason, it has to be efficient if it is going to make business-sense. If it can be shown that risk management plays a positive role in supporting successful project delivery, then the case for investing in risk management will be validated.

This study focuses on two projects within Old Mutual, to investigate the link between risk management and project success.

Both projects had been approved by the company's Strategic Investment Committee (SICOM), which required that they conform to various governance criteria, including that their risks be managed according to a specified process. One of the projects – CRAFT – was deemed by its stakeholders to have delivered successfully, while the other – SSA – was perceived to have had mixed results.

As a precursor to the study, an extensive review of the current literature on project risk management was undertaken. The literature was found to be largely consistent in its definition of project risk management, and to be concerned mainly with developing the processes and techniques for improving risk management in the live project environment. Based on the literature, it was possible to develop an analytical framework for use as a generic tool in evaluating the role which effective risk management practice could have on

project success. This tool was used as the basis for studying the CRAFT and SSA projects.

A critical part of the study was directed at understanding the policy-underpinnings supporting project delivery, since policy is assumed to be the articulation of *management's requirements. The simple logic is that if strong policy guidelines* on risk management exist – and are enforced – then one can reasonably infer that risk management is important to the organisation's management. In the case of both CRAFT and SSA, SICOM registration ensured that they were run within strict policy guidelines, so it could easily be concluded that a key prerequisite for project success was met.

However, even though policy is a necessary condition for project success, it is not a *sufficient* condition. Equally important is how well project *success criteria* are defined. In the case of CRAFT, the success criteria were found to be unambiguously defined, and thus a major contributor to the ultimate outcome. In the case of SSA, however, different stakeholders had different expectations of what the project should have delivered, and were thus divided on their assessment of the final outcome.

The analytical framework also provided a means for studying how effectively the two projects implemented risk management 'best practice' in regard to the identification, assessment and responding to of project risk. One of the general conclusions was that checklists could be a useful aid to the identification of project risks, since they act as prompts to management, thereby ensuring that key risks might not be inadvertently overlooked.

The overall conclusion drawn was that project risk management practice *does* support project success – which is not to say that *no* risk management practice leads to project failure, since risk implies probability, not certainty.

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Note to the reader

All direct quotations in the text are provided in bold font and without quotation marks.

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Chapter 1. Introduction

1.1 Project Risk

Project risk is described in the PMBOK Guide (2000: 127) as **an uncertain event or condition that, if it occurs, will have a positive or negative effect on a project objective.**

Two key elements of this description include:

- *Uncertainty:* This means that even if an event or condition can be foreseen and thus, planned for, its occurrence is not *bound* to happen. In other words, occurrence is contingent on a range of probability factors
- *Positive or negative effects:* Risks could be negative (eg: the risk of failure to deliver within cost parameters), or positive (eg: the opportunity to achieve a greater return on investment if, say, the cost of capital were to drop below an anticipated level)

A number of authors distinguish between "risk" and "uncertainty." For example, according to Correia *et al* (2003: 3 – 2), ***Uncertainty* implies either that all the alternative possible outcomes cannot be identified or that no probability can be attached to the alternative possible outcomes. *Risk* implies that it is possible to attach probabilities to identified expected outcomes."**

Field & Keller (1998: 48-49) provide a similar distinction:

> **Risk represents the *chance* of adverse consequences or loss occurring. Generally, risks can be identified and once identified, the probability of the risk occurring needs to be assessed. However, there may also be doubt about the *validity* of qualitative or quantitative data: this is called *uncertainty*. [my emphasis]. We can also use the term uncertainty to mean a state where too**

little is known about something, and the very lack of knowledge represents a danger that can only be addressed by gathering more information.

They go on to provide the following example to illustrate the difference:

Your company is asked to store some substance you know nothing about. What risks are associated with this request? They are difficult to determine until you find out whether, for example, the substance is explosive, flammable, corrosive, poisonous, and so on. If you find that the substance is explosive, you now know that there is a risk of explosion in storing the substance. Further investigations of the uncertainty surrounding the substance might reveal to you that it is only explosive if heated above a certain temperature. You now know not only the risk, but can make a probabilistic assessment of whether temperatures in your storage area are likely to be within the safe limits during the time you need to store the substance. (The knowledge also allows you to plan actions that might reduce the risk of explosion further, for example, by installing air conditioning or refrigeration.)

Although the elimination of uncertainty about a risk does not in itself reduce that risk, it nevertheless assists the project manager better to understand the risk, and therefore, better to manage it.

The above definitions emphasise the importance of *probability* in project risk determination. In addition, a sense of *impact* cannot be ignored. As Keown *et al* (1985: 350) point out, the *range* of possible outcomes plays a role in determining the riskiness of a project. To illustrate: If one bets R1.00 on the flip of a coin, the probability is 0.50 that one will lose. If one bets R1000.00, the probability does not change, but the range of outcomes does. In projects involving cash flows, the range (or dispersion) of expected returns is a material factor – or *impact* – in deciding whether a project is feasible or not.

Although risk management is about acting today to avoid the downside effects of an uncertain future (or to leverage the possible opportunities – ie, acting to leverage the upside effects), Smith (1999: preface) reminds us that

Risk management is not about predicting the future. It is about understanding a project and making a better decision regarding the management of that project, tomorrow. Sometimes the decision may be to abandon the project – which could avoid failure or bankruptcy, or save the various parties from wasting time, money and skilled human resources. In order to reach such an important decision a rational, repeatable, justifiable risk methodology and risk interpretation are essential.

1.2 Risk Management

Risk management is defined in the PMBOK Guide (2000: 127) as **the systematic process of identifying, analysing, and responding to project risk.** It refers to how the project manager manages (negative or positive) uncertainty – for project success.

Implicit in the notion of *good* risk management is the effective matching of identified risks to what is defined as project success, for this implies *focused* attention. As Chapman and Ward (1997: 34) point out, risk management is a project cost, and if unnecessary risks are managed, then unnecessary costs are incurred.

1.3 Project Success

Kerzner (1998: 6) accepts the definition of project success **that has pertained for the past twenty years,** as **completion of an activity within the constraints of time, cost, and performance.**

However, he adds that **today, the definition of project success has been modified to include completion:**

- **Within the allocated time period**
- **Within the budgeted cost**
- **At the proper performance or specification level**
- **With acceptance by the customer/user**
- **When you can use the customer's name as a reference**

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- **With minimum or mutually agreed upon scope changes**
- **Without disturbing the main work flow of the organization**
- **Without changing the corporate culture.**

Kerzner's list could be disputed – for example, *changing the corporate culture* might be the whole point of a particular project. Similarly, *disturbing the main work flow of the organisation* might be unavoidable. Nevertheless, the value for risk management of a detailed listing such as Kerzner's is that for each item in the list, matching risk-clusters can be specifically identified.

1.4 The Old Mutual Context

In August 2002, Old Mutual's Group Programme Support Office (GPSO) commissioned some research which found that, within the sample of Old Mutual projects selected:

- Less than 10 percent of these projects could be categorised as "successful."
- As many as 42 percent of them overran schedule, and 25 percent, cost
- Over 50 percent delivered less than 100 percent of their functionality

These findings were supported by the audit report released in August 2003 (2003: 8), which stated that:

> **At the time of our audit (October - November 2002), we found that the control environment (in OMSA) relating to the strategic projects portfolio management process was unsatisfactory and that there is actual exposure as key controls have either broken down or are absent, and risks have materialised or losses have been incurred.**

Against this background, Old Mutual stands to benefit materially from improved project risk management practice. Research into the role of effective risk management practice could thus make a real difference in Old Mutual's project management effort.

1.5 Problem Statement

Old Mutual has a sizeable and growing investment in the delivery of business results through projects. In the year 2001 alone, its project spend was estimated at R850 m – a quarter of its total operating budget at the time. On this figure, improving returns by a mere one percent would have resulted in a saving of some R8 m to R9 m.

The **essential purpose of risk management**, according to Chapman and Ward (1997: 9), **is to improve project performance via systematic identification, appraisal and management of project-related risk.**

The key question is: How effectively does project risk management practice contribute to project success? Conversely, how does the *absence* of risk management – or its *deficient* application – contribute to project failure?

The aim of this study was to identify the role of risk management in project success. The implied hypothesis is that there is a contingent relationship between project risk management and project success – the more effectively a project manages its risks, the more likely it is to achieve success.

The study was restricted to *downside* risks (i.e. risks which could harm project success).

1.6 Approach

For the purpose of this study, two Old Mutual projects were selected. One of them – the *CRAFT* Project, which was implemented in the company's Group Schemes business unit – was deemed to have delivered successfully on its mandate, while the other – the *Secure Services Authentication* (or, *SSA)* Project – was considered "successful, but problematic."

Both projects were regarded as strategically important, and were, accordingly, registered with the company's Group Programme Support Office. As such, they were subject to the company's governance requirements for strategic projects, and were therefore – both – required to be managed with the special rigour stipulated for strategic projects. Yet, one of them – the SSA Project – did not produce unequivocally successful results.

Does this imply that CRAFT managed its project risks more effectively than SSA?

Based on a close examination of the risk management practices applied on both projects, the aim of this study was to determine whether risk management practice played a role in the successes of the projects in question.

The findings of the study are presented after a consideration of the current literature on project risk management.

Chapter 2. Literature Study

Human progress demands risk-taking – in the past, risk takers were the ones who explored new lands, led the hunt, and fought off the enemy (Webster, 1999: 24)

2.1 Introduction

Project risk is a fact of life. All projects involve risk – the zero risk project is not worth pursuing (Chapman & Ward, 1997: foreword). The issue for people in business, according to Kindler (1990: 1) is not whether to take risks, but how to take reasonable risks. Wideman (1992: I-5) cautions that **a risk should only be taken when the potential benefit and chances of winning exceed the remedial cost of an unsuccessful decision...** He goes on to advise against launching a project at all in the following circumstances (page I-7):

- The organisation cannot afford to lose
- The exposure to the outcome is too great
- The situation or project is just not worth it
- The cdds are not in the project's favour
- It is no more than a "fair" bet
- The benefits are not identified
- There appears to be a large number of acceptable alternatives (the greater the number, the more the uncertainty)
- The risk does not achieve a project objective
- The expected value from the baseline assumptions is negative
- The data is unorganised
- There is not enough data to compute the results
- A contingency plan for recovery is not in place should the results prove less than satisfactory.

2.2 Attitude and Capability in Project Risk Management

2.2.1 Subjective Factors

Personal and corporate attitudes to project risk-taking are influenced by a number of factors – for example, professional experience, the quality of one's judgement, one's knowledge of subjective information, and one's attitude to the problem under consideration (Raftery, 1994: 57), objective constraints such as limited resources, and personal preferences (McConnell & Brue, 1999: 428).

Decision science, which involves using computer models for forecasting, estimating probabilities of particular outcomes, and generally, making sound decisions about the future, is an attempt to **take the human element out of risk analysis**, and assist in avoiding the **various biases that humans [bring] to decision-making**. (The Economist January 24, 2004: 5). Daniel Kahneman, Nobel laureate and Princeton professor has identified a number of **roots of poor decisions**, (The Economist January 24, 2004: 5) including the following:

- Over-optimism (a tendency to exaggerate the possibilities of a preferred outcome)
- Stubbornness (a refusal to admit that the initial decision was wrong)
- Fear of failure
- Misplaced priorities (eg, spending more time and energy on less important problems and issues)
- Counterproductive regret (ie, "crying over spilt milk.")

According to Piney (September 2003: 26) the literature identifies 3 self-explanatory tolerances or attitudes to risk:

- An aversion to risk
- A desire for risk
- An indifference to risk.

The difference can be illustrated by means of the situation shown in table 2.1, as described by Drury (1992: 326):

Table 2.1 Drury's Expected Monetary Value (EMV) for different States of the Economy. (1992: 326)

State of Economy	Probability	Outcome: Project A (R m)	Outcome: Project B (R m)
Recession	3.3	90	0
Normal	3.3	100	100
Boom	3.3	110	200
Expected Monetary Value (EMV)		**100**	**100**

As can be seen, there is an equal likelihood – or probability – of each of the three states of economy occurring. In addition, the expected monetary value (EMV) for both projects is R100 million, which means that a rational decision maker (ie, one who seeks to maximise his return) will achieve the same outcome irrespective of which project he chooses. Drury (1992: 326) explains that a risk-*seeker* is one who, given a choice between more or less risky alternatives with identical expected values, prefers the riskier alternative. In the given example, this would be Project B. Faced with the same choice, a risk-*averter* would select the less risky alternative (ie, Project A), while the person who is indifferent to risk (ie, risk *neutral*) would be indifferent to both alternatives, because both have the same expected value.

Drury goes on to say that **studies of the securities markets provide convincing evidence that the majority of investors are risk-averse.**

But Nicholson (2000: 30) challenges this perceived wisdom by asserting that it is a myth that **most people are risk averse and resist change**. Rather, he says, **People are *loss*-averse** (my emphasis) **but will actually seek out risk and embrace change, especially if they can see how they stand to gain or how they might avoid future loss.** He goes on to argue that **It is quite easy to get people to take *big* risks"** (my emphasis) **if they can be convinced that:**

- **They could gain substantially**
- **Their downside is protected**
- **Their current position or status quo is poor**
- **If something goes wrong, they will be able to recover from it.**

(Nicholson, 2000: 142).

By the same token, **...people will avoid risk or resist change when they believe that**

- **Gains are uncertain**
- **The status quo is comfortable**
- **Change has a potential downside**
- **They will lose control if they move into new territory.**

(Nicholson, 2000: 146).

Finally, he concludes that **People will take risks to recover from past losses and avoid future losses**, but, **where losses are unavoidable, immobility (ie, doing nothing) is the best option... Our aversion to loss is one of the strongest of our survival instincts in a dangerous world, and it operates more powerfully than our desire for gain**. (2000: 148). In this regard, Wisniewski (1994: 147) cites the example of a manufacturer foregoing the chance to gain $55 000 from an investment, because of the equal probability of a loss of $15 000. He observes that, **If the company's cash flow is poor or it already has large debts it might decide – on a risk basis – not even to consider this option but to play safe and take another decision which leads to a surer – if smaller – profit.**

2.2.2 Utility Theory

From the above, it can be inferred that rational decision makers will not *invariably* seek to maximise their EMV. As Raftery (1994: 63) points out, **Utility theory suggests that instead of maximising expected monetary value, people maximise their own utility.** *Utility* is a broader concept than

EMV. It measures more than just monetary value, it measures *satisfaction.* According to Piney (September 2003: 27), **The utility of a gain or loss is measured by the degree of pleasure... or pain... that the amount gained or lost generates.** He goes on to identify four ranges or *zones* (or states) in which gain or loss would maximise the decision maker's utility.

- The *Dead* Zone: This is a zone in which the impact of a decision is largely neutral, that is, the gain or loss arising from the decision would be negligible. Thus, the expected attitude of the decision maker would tend largely towards indifference, since the gain or loss to be derived from the decision is neither-here-nor-there.
- The *Rational* Zone: In this zone, a specific decision would give rise to a definite outcome, predictable on the basis of probability. Piney states that, in this zone, **The project manager can reasonably use the EMV of the risks and the corresponding responses to evaluate the response strategy that best addresses the corresponding risk...**
- The *Sensitive* Zone: In this zone, the impact of the decision will be disproportionately greater, according to the stakeholders' perception of the situation. Thus, for example, a community might reject the (considerable) economic benefits which a nuclear power plant would bring, because of the perception of a (relatively remote) pollution risk.
- The *Saturation* Zone: This is an extreme version of the sensitive zone. Piney refers to one typical saturation loss type of project as a **bet-the-business** project. In other words, negative consequences in the saturation zone are deemed totally unacceptable, whatever their probabilities. Similarly, for positive impacts, no amount of additional benefit will markedly increase the decision maker's utility. A simple example might be the decision not to open for business over the weekend, even though this would result in a considerable increase in revenue flows, because the additional income would not add to the business owner's utility.

2.2.3 Signal Detection Theory (SDT)

According to signal detection theory (SDT) perception is influenced by two main factors: one's *sensitivity* and one's *criterion.* According to Atkinson *et al* (1996: 122) **sensitivity** refers to one's ability to accurately interpret signals in the real world, for example, when a project manager notes the initial signs of slippage on his project, how well does he interpret whether this is just a temporary deviation of no particular consequence, or whether it is the beginnings of a major slide? One's **criterion** refers to the subjective expectation with which one approaches the decision of interpreting the stimulus or signal. An example from Atkinson *et al* (1996: 123) illustrates the concept of SDT:

> **Consider the job of a radiologist who has to inspect X ray images for signs of lung cancer. The radiologist has to distinguish weak signals (the true signs of lung cancer) from background noise (other anomalies in the X ray). The radiologist will be more likely to say "yes" ("it looks cancerous") the more she expects a true signal, that is, the more she expects the patient to have cancer (based on other tests); and she will be less likely to say "yes" the higher the cost of a false alarm, that is, the more the patient will be severely disturbed by hearing a tentative cancer diagnosis. Hence, when the expectancy and motivational factors are varied, radiologists' frequency of reporting cancerous X rays will change in the expected directions – when cancer is expected, the radiologist will be more likely to interpret an ambiguous aspect of the X ray as a sign of cancer.**

In regard to project risk management, McGrew and Bilotta (2000: 293) see the implications of SDT in terms of two possible tendencies (or response-biases) on the part of project managers:

- *Nay-saying* – that is, denying the presence of risk or minimizing the assessment of it;
- *Yea-saying* – tending to over-state the possibility of risk.

The dangers of nay-saying are obvious: project teams with a tendency to nay-saying would have a blinkered approach to danger-signals in their environment, and would be inclined to take less trouble about proactively managing the probability of risk.

Yea-sayers, on the other hand, would create the risk of over-spending on project risk management, as they would tend to be overly cautious about taking chances.

SDT was developed in the communications industry to provide a tool for determining whether a signal could be accurately separated from background noise (McGrew & Bilotta, 2000: 295). It has also been extended beyond the realm of sensory discrimination,

> **... to describe the interaction between a person's understanding of the world and the world as it actually exists... Used in this way, it provides a method to separate an individual's situation from his/her biases about the situation. In the context of risk management, it can separate a team's ability to accurately detect and intervene in risks from its tendency to nay-say or yea-say.**

McGrew and Bilotta's framework for a typical signal detection analysis is shown in table 2.2 below. It is a tool which enables one to analyse the response-bias of a project team.

Table 2.2 McGrew and Bilotta's SDT Analysis Framework. (2000: 297)

	Tasks that Failed	**Tasks that did not Fail**	**Row Totals**
Tasks estimated to be high risk	Hits	False Alarms	
Tasks estimated to be low risk	Misses	Correct Rejections	
Column totals			

- If a task, which is estimated to be a high risk, fails, it means that the risk was *correctly* identified in the first place. Presumably, at the time of estimation, some contingency would have been put in place, so that when the task failed, the failure could be (successfully) addressed. Thus, correctly estimating failure of a high risk task is regarded as a **hit**.

- A **miss** means that a task which the project team dismissed as a low risk actually failed, meaning that the risk happened. Thus, the team **missed** it in their estimation. (if there are a large number of misses, this could point to a nay-saying tendency on the part of the team).
- A task estimated to be high risk but which does not fail is seen as a false alarm. A large number of false alarms could mean over-sensitivity on the part of the project team (they are seeing signals which do not exist or they are having difficulty in accurately separating real signals from background noise). Too many false alarms could indicate resource-wastage, ie: the risk plan is costing more than it should.
- Tasks which are expected to be of low risk and which subsequently do not fail indicate correct estimation on the part of the project team.

A variation in the above table could be to substitute column and row totals with percentages. This will show the ratio of **hits to false alarms, correct rejections to misses, hits to misses**, and **correct rejections to false alarms.**

Clearly, from McGrew and Bilotta's framework, to maximise efficiency in the area of risk identification, a project team should score most of it points as **hits** and **correct rejections.**"

2.2.4 Project Risk Management Maturity

Being able to accurately identify and assess project risk is one thing. But how *able* is an organisation to manage such risk? A critical factor in any organisation's ability to manage its performance is its *capability*. In regard to an organisation's ability to manage its projects successfully, Kent Crawford

(2002: 279-302) has devised the so-called **Project Management Maturity Model** based on the Software Engineering Institute's **Capability Maturity Model**, which identifies the areas of expertise necessary for an organisation to consistently produce quality software products.

The Project Management Maturity Model identifies five general levels of process maturity applicable to all business processes:

- Level 1 Initial Process (this is the most elementary level)
- Level 2 Structured Process and Standards
- Level 3 Organisational Standards and Institutionalised Process
- Level 4 Managed Process
- Level 5 Optimising Process

Thus, for example, if an organisation is *optimising* a particular process, it could be regarded as an industry leader in that respect, as its process will reflect best practice.

For each of the following project management processes, Kent Crawford has set out a description of what constitutes process maturity, and hence, performance capability:

- Project *scope* management
- Project *time* management
- Project *cost* management
- Project *quality* management
- Project *human resource* management
- Project *communication* management
- Project *risk* management
- Project *procurement* management

The usefulness of this framework is that it enables one to assess one's existing level of process competence/maturity according to clear, specific criteria, and then to set tangible goals for improvement or growth to the next level.

Kent Crawford's guidelines for project *risk* management maturity are summarised in table 2.3 on page 18.

2.3 The Project Risk Management Process

2.3.1. Introduction

The range of potential risk on any project is wide; it is any point on the continuum between total certainty and total uncertainty. Thus, it would not be practical to try to control every conceivable risk faced by a project. Risks must be prioritised, as Carey (2001: 24-27) points out, **by means of assessing the likelihood of their occurring and the extent of their impact – *high* likelihood and *high* impact suggesting *high* priority for action**. (my emphasis). Implicit in Carey's injunction are the three fundamental elements of PMBOK's risk management process:

- *Identifying* project risk
- *Analysing* it, and
- *Responding* to it.

2.3.2. Identifying Project Risk

Burke (2001: 235) observes that risk identification is **probably the hardest and most important part of the risk management process, because if you cannot identify a risk, it will be excluded from further analysis and therefore you will probably not respond to it** (at least not proactively).

Table 2.3. Organisational Project Risk Management Maturity: J Kent Crawford's Guidelines (2002)

Maturity Level Descriptor	Maturity Level Definition	Project Risk Management Processes in the Organisation
Level 1: Initial Process	Although there is a recognition that there are project management processes, there are no established practices or standards, and individual project managers are not held to specific accountability by any process standards. Documentation is loose and *ad hoc*. Management understands the definition of a project, that there are accepted processes, and is aware of the need for project management. Metrics are informally collected on an *ad hoc* basis.	There is recognition of the need for accepted processes, but there are no established practices or standards. Individual teams or parts of the organisation may have their own way of doing things in an ad hoc, informal fashion. Documentation of the processes is loose, making it difficult to repeat the activities elsewhere. Management is aware that risk management has importance.
Level 2: Structured Process and Standards	Many project management processes exist in the organisation, but they are not considered an organisational standard. Documentation exists on these basic processes. Management supports the implementation of project management, but there is neither consistent understanding, involvement, nor an organizational mandate to comply for all projects. Functional management is involved in the project management of larger, more visible projects, and these are typically executed in a systematic fashion. There are basic metrics to track project cost, schedule, and technical performance, although data may be collected/correlated manually. Information available for managing the project is often a mix between summary level data and detailed level data.	Risk management processes are developed and documented for identifying, and quantifying risks, developing a risk response, and reporting risks. Project team members generally understand macro- and some detail-level risks, and most projects are expected to determine strategies for dealing with the risks. Teams use a structured approach to quantify the impact of the risks in an effort to rank their importance. Risk lists are compiled to track and monitor progress. The risk management processes are considered standard practice for large, visible projects, and recommended for all other projects. All documented processes are repeatable. At least 50% of all projects are using the processes. Management supports risk management, but is only consistently involved on large, visible projects and gets involved in other projects if the risk is critical and of great magnitude. Risks are examined and controlled on a project-by-project basis.

Table 2.3. Organisational Project Risk Management Maturity: J Kent Crawford's Guidelines (2002) – continued

Maturity Level Descriptor	Maturity Level Definition	Project Risk Management Processes in the Organisation
Level 3: Organisational Standards and Institutionalised Process	All project management processes are in place and established as organisational standards. These processes involve the clients as active and integral members of the project team. Nearly all projects use these processes with minimal exception. Management has institutionalised the processes and standards with formal documentation existing on all processes and standards. Management is regularly involved in input and approval of key decisions and documents and in key project issues. The project management processes are typically automated. Each project is evaluated and managed in light of other projects.	The risk processes are considered an organisational standard and are being utilised by nearly all projects. The risk identification process is expanded to include efficient ways for teams to identify risks (eg, checklists, automated forms, etc). in addition, teams are asked to identify symptoms of risk (risk triggers) for incorporation into the historical database. The risk quantification process is expanded to identify more advanced procedures for quantifying risks and multiple criteria to prioritise risk items. The risk response development process is enhanced with templates. All processes are repeatable. A risk control system is developed and established. Systems are becoming more integrated: risk information and status is provided to project integration. Metrics are collected and analysed, such as the types of risks and success rate in mitigating the items. Management fully supports the risk Management fully supports the risk management processes and has institutionalised the procedures and standards. Risks are examined and controlled on a program basis.

Table 2.3. Organisational Project Risk Management Maturity: J Kent Crawford's Guidelines (2002) – continued

Maturity Level Descriptor	Maturity Level Definition	Project Risk Management Processes in the Organisation
Level 4: Managed Processes	Projects are managed with consideration to how the project performed in the past and what is expected for the future. Management uses efficiency and effectiveness metrics to make decisions regarding the project and understands the impacts on other projects. All projects, changes, and issues are evaluated based upon metrics from cost estimates, baseline estimates, and earned value. Project information is integrated with other corporate systems to optimise business decisions. Processes and standards are documented and in place to support the practice of using such metrics to make project decisions. Management clearly understands its role in the project management process and executes it well, managing at the right level, and clearly differentiating management styles and project management requirements for different sizes/complexities of projects. Project management processes and standards are integrated with other corporate processes and systems.	All processes are in place, documented, and being utilised by at least 90% of all projects. Processes and standards are integrated with other corporate processes and systems. Integration management includes the risk management process with the project office, cost management, time management, finance/accounting, and strategic planning processes. There is a mandate to comply with the organisational risk management processes and procedures. Management takes an "organisational view" of projects.

Table 2.3. Organisational Project Risk Management Maturity: J Kent Crawford's Guidelines (2002) – continued

Maturity Level Descriptor	Maturity Level Definition	Project Risk Management Processes in the Organisation
Level 5: Optimising Process	Processes are in place and actively used to improve project management activities. Lessons learned are regularly examined and used to improve project management processes, standards, and documentation. Management and the organisation are not only focused on effectively managing projects, but also on continuous improvement. The metrics collected during project execution are used to understand the performance of not only a project, but also for making organisational management decisions for the future.	Improvement procedures are in place and utilised. Lessons learned are regularly examined and used to improve documented processes. Projects are managed with consideration of how similar projects performed in the past and what is expected for the future. Management uses efficiency and effectiveness metrics to make decisions regarding the project. All projects, changes, and issues are evaluated based upon metrics from cost estimates, baseline estimates, and earned value. The metrics are used to understand the performance of a project during execution for making management decisions for the future.

2.3.2.1. Risk Identification Tools/Techniques

Moby and Parker (2002: 202-208) distinguish between risk identification tools which may be based on **intuitive, inductive or deductive techniques**. They add that **traditionally the focus has been on inductive methods with quantitative risk analysis based on estimating probabilities and probability distributions for time and cost analysis... Other techniques, such as sensitivity analysis, probability analysis, Monte Carlo simulation, multiple regression, decision tree analysis, etc are based on quantitative assessment. Conversely, there are qualitative methods such as scenario and contingency planning and Delphi techniques.**

Ward and Chapman (1997: 96) identify the following practical techniques for searching for the sources of risk: pondering, interviewing, brainstorming and checklists. The search exercise should result in the compilation of **a risk list, log, or register, indicating at least one assumed response for each identified risk, a generic 'do nothing' response being one option.**

Burke's starting point for risk identification is similar to Kerzner's. Both see *project objectives* as the source. Burke (2001: 235–236) has developed a simple tool for, firstly, listing the project objectives, then, identifying the cause (and its effect) of the risks associated with each objective. He goes on to list the following techniques for identifying risk:

- Analysing historical records
- Structured questionnaires
- Structured interviews
- Brainstorming
- Structured checklists
- Flow charts
- Judgement based on knowledge and experience
- System analysis
- Scenario analysis

According to Smith (1999: 31), **Social psychologists have put some effort into specifying the ideal size of problem-solving groups and conclude that: 'groups of *five* are the most effective for dealing with mental tasks in which group members collect and exchange information and make a decision based on the evaluation of this information.'** (my emphasis).

2.3.2.2. Categories of Risk

Writing about risks affecting I T projects, Remenyi (1999: 49) warns against **long lists of detailed risks, as they tend to dilute one's focus rather than inform.** Thus, he considers risk in terms of only three broad groupings, **business risks**, **development risks**, and **architecture risks.**

Ingebretson (2002: 31) describes a similar process (which he ascribes to David Hillson) – the so-called **risk breakdown structure**, in terms of which specific risks are identified within each of a set of named categories. Examples are cited on page 23 (table 2.4).
Dey (2001: 634-639) describes an application of a similar risk breakdown structure in a cross-country petroleum pipeline project in India (see table 2.5 on this page). He comments: **the risk factors and sub-factors were identified with the involvement of executives working in projects with more than 15 years of experience through brainstorming sessions.**

Table 2.4. Hillson's Risk Breakdown Structure. (2002: 31)

Technical Risks	Management Risks	Commercial Risks
• Requirements specification • Technology • Complexity and Interfaces • Performance • Reliability • Quality • Safety • Security	• Strategy • Organisation • Project management • Resources • Communication • Information • Health, Safety and Environment	• Contractual • Financial • Regulatory • Consents • Reputation

Table 2.5. Dey's Risk Breakdown Structure. (2001: 634-639)

Technical Risks	Acts of God	Financial, Economic, Political Risks	Organisational Risks	Statutory Clearance Risks
• scope change; • technology selection; • implementation methodology selection; • equipment risk; • materials risk; and • engineering and design change.	• natural calamities normal; and • natural calamities abnormal.	• inflation risk; • fund risk; • changes of local law; • changes in government policy; and • improper estimation.	• capability risk of owner's project group; • contractor's failure; • vendor's failure; and • consultant's failure.	• environmental clearance; • land acquisition; • clearance from chief controller of explosive (CCE); and • other clearance from government authorities

The starting point for Kindlinger & Darby (2000) in identifying project risks is to divide the full spectrum of project risks into four broad categories, shown in table 2.6.

Table 2.6. Kindlinger & Darby's Project Risk Categories. (2000: 2)

Project Risk Category	Example of Project Risk
Technical Risk	• Technology maturity • Design data availability • Infrastructure needs
Schedule Risk	• Productivity uncertainty • Personnel availability • Equipment/material availability
Cost Risk	• Escalation sensitivity • Labour rate uncertainty • Estimate completeness
Budget Risk	• Funding constraints • Prioritisation uncertainty • Under-funding potential

Table 2.7 shows the so-called **systems and project management risk assessment framework** developed by Barnes, Seamour and Xu (2000: 429-

430) as a guide to internal auditors. The framework goes beyond simply categorising and listing the risk types to including a description of each.

Table 2.7. Barnes, Seamour and Xu's Project Management Risk Assessment Framework. (2000: 429 – 430)

Risk Type	Description/Examples
Inherent Risk Risk that an organisation is subject to because of the nature of its business and its environment, eg: poor trading and market conditions, disasters, theft, mismanagement, etc.	• Disaster – outside the control of the organisation, eg: fire, flood, economic recession • Errors, as a result of human or machine problems, eg: computer system failure, miscalculation of payments • Mismanagement, eg: failure to identify opportunities to expand markets, expansion into unprofitable products • Misappropriation of resources, physical assets or tangible assets, eg, theft, fraud, personal use of company property
Control Risk Risks related to controls not working: if controls in the system do not work or are not complied with. Control systems will degenerate over time if they are not reviewed, and control risks will therefore increase.	• override of password access control, eg: by sharing or disclosing passwords • non-compliance with procedures, eg: paying on a duplicate invoice without authorisation when desk instructions forbid this • failure to take up references before employment is offered • amount of cash held in the safe exceeding the insurance limit • tail-gating, ie, holding a restricted-access door open for an unauthorised person • discrepancies identified by reconciliations, eg: bank reconciliation, not investigated.
Residual Risk The scope for system errors and other faults developing in systems after adequate controls have been implemented is referred to as residual risk.	Residual risk cannot be completely eliminated. This is because things change before the system does, so • the control system can be out of date; • people and their performance are unpredictable; • the cost of the benefit must outweigh the cost of control. Management has to decide whether the level of this residual risk is acceptable.
Audit Risk the risk that auditors' work will not detect control failures and/or unwanted outcomes	Audit work cannot offer 100 percent assurance on the operation of the organisation's systems.

While the risk-types listed in table 2.7 above would appear to be more applicable in an operational than project management environment, it should be borne in mind that projects are often the vehicles for delivering outcomes for use in the operational environment. Thus, a framework such as this will be useful to project managers wishing to avoid the pitfall of delivering flawed systems to operations.

J Rodney Turner (1993: 237-239) also attempts to define an all-embracing framework for the classification of risks. After establishing two basic categories of risk (business risk and insurable risk) he goes on to list the following 5 risk classifications:

1. external: unpredictable
    - beyond the control of managers/organisations
    - mainly insurable
2. external predictable but uncertain
    - beyond the control of managers
    - 2 major types: activity of the market for raw materials or finished goods (which determine prices and supply and demand) and fiscal policies affecting currency, inflation and taxation. Secondly: operational requirements, such as maintenance, environmental factors and social impacts. These are all business risks
3. Internal: Technical – arising from technology, design, construction or operation of facility, or design of the ultimate product. Business or insurable risks.
4. Internal: Non-technical – within the control of managers. Usually arise from a failure of the project organisation or resources (human, material or financial) to achieve their expected performance, eg: schedule delays, cost over-runs, interruption to cash flow. Usually business risks.
5. Legal – arising from contractual arrangements with clients, contractors or third parties.

A risk assessment workshop described by Frosdick (996: 24-33) stimulates participants to identify potential risks from both the external and internal environments. According to Frosdick, **The mnemonic PESTLE [is] used in the workshop to facilitate the identification of political, economic, social, technological, legal and ecological risks arising from threats in the external environment**, [and] **Risks arising from weaknesses in the internal environment [are] generated through consideration of the core business areas of infrastructure, human resources, finance, technology, logistics and marketing**.

Without specifically criticising the **checklist approach** to identifying project risks, Matta and Ashkenas (2003: 109) suggest an approach to risk identification that attempts to avoid the pitfall that **some required activities won't be identified in advance** (ie, what they call **white space risk**). They contend that

> **Managers use project plans, timelines, and budgets to reduce what we call 'execution risk' – the risk that designated activities won't be carried out properly – but they inevitably neglect these two other critical risks – the 'white space risk' that some activities won't be identified in advance, leaving gaps in the project plan, and the integration risk that the disparate activities won't come together at the end.**

Their proposal to avoid **white space** and **integration** risks is for projects to form so-called **rapid-results teams**, which – in the lifespan of a given project – will actually deliver similar results to the overall project objectives, but in miniature. Per Matta and Ashkenas (2003: 110) the key is to inject into the overall plan a series of mini-projects, **each staffed with a team responsible for a version of the hoped-for overall result in miniature and each designed to deliver its result quickly.**

> **Team members would probably draw on all the activities [in the project lifecycle] ... but to succeed at their goal, the microcosm of the overall [project] goal, they would be forced to find out what, if anything, is missing from their**

> **plans as they go forward....When they've ironed out all the kinks on a small scale, their work would then become a model for the next teams.**

This is very similar to *prototyping* – producing a small-scale model of the real thing, and testing it in an environment which simulates the real world.

Noting that risks may be classified in a number of different ways, Wideman (1992: 111-3) advocates the PMBOK approach, which divides project risks into the following categories:

- External, but unpredictable (eg, regulatory, natural hazards)
- External, predictable (eg, market risks, currency changes)
- Internal, non-technical (eg, cash flow, schedule)
- Technical (eg, sheer size or complexity of the project, changes in technology)
- Legal (eg, licences, contracts)

Datta and Mukherjee (2001: 46) distinguish between risks in the **external** environment and in the **immediate** environment:

- External project risks: technological risks, political risks, risks associated with the economic climate, risks associated with the domestic climate, and social risks.
- Immediate project risks: large and complex project risks, risks associated with conceptual difficulty, risks of managing projects by an external agency, risks associated with mode of contract, and risks of failure by contractors.

Smith (1999: 5) identifies the following three all-embracing categories:

- Known risks (eg, minor variations in productivity and swings in material costs)
- Known unknowns (ie, predictable and foreseeable – either their probability or their likely effect is known)

- Unknown unknowns (unpredictable, unforeseeable – force majeure)

While Field and Keller (1998: 49) also quote a number of different categories of risk (eg, Crockford's 1980 list, cited below) they place particular emphasis on *project size* as a risk factor: **The larger the project is the greater the risk. Increase in size usually means an increase in complexity, including the complexity of administration, management, [and] communication amongst the participants, and so on.**

- Fire and natural disaster
- Accident
- Political and social risk (war, civil disturbance, theft and vandalism)
- Technical risk
- Marketing risk
- Labour risk (stoppages and strikes, turnover of personnel)
- Liability risks (product liability, safety)

Old Mutual's business case template (2002: 29) identifies the following categories of business and project risk:

- Technical
- Process
- People
- Financial

In addition, the following "prompts" to risk identification are listed in the template (2002: 28):

- Brand, franchise risk
- Business continuity
- Disaster recovery
- Service risk
- Electronic transfer risk

- Product risk
- Pricing risk
- Knowledge management risk
- Economic risk
- Credit risk
- Financial risk
- Legal risk
- Technology risk

A disadvantage with a list such as this is that it resembles a shopping list, in that the details lack structure.

In much the way that (downside) risks can be categorised for more effective analysis and management, so can upside risks - or opportunities. Forsberg, Mooz and Cotterman (1996:179) provide an example (see table 2.8 below):

Table 2.8. Forsberg *et al's* Categories of Project Opportunities (1996: 179)

Project Opportunities	
Strategic Opportunities	**Tactical Opportunities**
• New market • New product • New approach • Repositioning	• Shorten schedule • Reduce cost • Improve processes • Eliminate unnecessary activities • Leverage R & D

Smith (1999: 41) cites the following checklist of **project risk drivers** specifically applicable in a construction environment:

- Financial risks
- Legal risks
- Political risks
- Social risks

- Environmental risks
- Communication risks
- Geographical risks
- Geotechnical risks
- Construction risks
- Technological risks
- Demand/product risks

Smith also lists a range of financial risks which could affect construction projects (1999: 143):

- Interest: type of rate, fixed, floating or capped, changes in interest rate, existing rates
- Payback: loan period, fixed payments, cash flow milestones, discount rates, rate of return, scheduling of payments
- Loan: type and source of loan, availability of loan, cost of servicing loan, default by lender, standby loan facility, debt/equity ratio, holding period, existing debt, covenants
- Equity: institutional support, take-up of shares, type of equity offered.
- Dividends: time and amounts of dividend/coupon payments.
- Currencies: currencies of loan, ratio of local/base currencies, depreciation and devaluation of currencies
- Market: changes in demand for facility or product, escalation of costs of raw materials and consumables, recession, economic downturn, quality of product, social acceptability of user pay policy, marketing of product and consumer resistance to tolls
- Reservoir: changes to input sources
- Currency: convertibility of revenue currencies, fluctuation in exchange rates, devaluation.

Recently, an ambitious project was undertaken to develop **an authoritative list of common risk factors** in respect of software project risks. The list was produced by Schmidt, Lyytinen, Keil and Cule in 2001. Their concern was that no validated lists were available (2001: 6) and that although **several lists of risk factors have been published in the literature, our understanding of the typical risk factors is still inadequate**, and **most of the published lists are relatively old and vary too much in their level of detail and scope....** (2001: 7).

In an attempt to transcend the cultural biases which they expected would harm the exercise if they conducted it in only one country, they used the findings of three simultaneous surveys from three different settings: Hong Kong, Finland and the United States. (2001: 7). Using the Delphi survey process, the study **was designed to elicit the opinion of a panel of experts through iterative controlled feedback.** (2001: 10). The ultimate result is the following list of 53 factors organised into a set of 14 groups (see table 2.9 below):

Table 2.9. Schmidt *et al's* Full List of Risk Factors (2001: 15)

1	Corporate Environment
1.1	A climate of change in the business and organizational environment that creates instability in the project.
1.2	Mismatch between company culture and required business process changes needed for new system. A mismatch between the corporate culture and the changes required for the new system.
1.3	Projects that are intended to fail: Projects started for political reasons that carry no clear business value, but serve to divert the organization's focus from actual needed change. Such projects are underfunded, not supported, and are not intended to succeed. Projects have no business value and are used as diversionary tactics to avoid facing the real change needs.
1.4	Unstable corporate environment: Competitive pressures radically alter user requirements, sometimes making the entire project obsolete.
1.5	Change in ownership or senior management: New owners and/or managers set new business direction that causes mismatch between corporate needs and project objectives.
2	Sponsorship/Ownership

Table 2.9. Schmidt *et al's* Full List of Risk Factors (2001: 15) - continued

2.1	Lack of top management commitment to the project: This includes oversight by executives and visibility of their commitment, committing required resources, changes to policies as needed.
2.2	Lack of client responsibility, ownership, and buy-in of the project and its delivered system(s).
2.3	Failure to gain user commitment: Laying blame for "lack of client responsibility" on the project leader rather than on the users.
2.4	Conflict between user departments: Serious differences in project goals, deliverables, design, etc, calls into question concept of shared ownership.
2.5	Failure to get project plan approval from all parties.
3	Relationship Management
3.1	Failure to manage end-user expectations: Expectations determine the actual success or failure of a project. Expectations mismatched with deliverable – too high or too low – cause problems. Expectations must be correctly identified and constantly reinforced in order to avoid failure.
3.2	Lack of adequate user involvement: Functional users must actively participate in the project team, and commit to their deliverables and responsibilities. User time must be dedicated to the goals of the project.
3.3	Lack of cooperation from users: Users refuse to provide requirements and/or refuse to do acceptance testing.
3.4	Failure to identify all stakeholders: Tunnel vision leads project management to ignore some key stakeholders in the project, affecting requirements definition, implementation, etc.
3.5	Growing sophistication of users leads to higher expectations: Users are more knowledgeable, have seen sophisticated applications, apply previous observations to existing project.
3.6	Managing multiple relationships with stakeholders: Some "clients" are also "partners" in producing deliverables in other projects. Leads to confusion of roles and responsibilities.
3.7	Lack of appropriate experience of the user representatives: Users assigned who lack necessary knowledge of the application or the organization.
4	Project Management
4.1	Not managing change properly: Each project needs a process to manage change so that scope and budget are controlled. Scope creep is a function of ineffective change management and of not clearly identifying what equals success.
4.2	Lack of effective project management skills: Project teams are formed and the project manager does not have the power or skills to succeed. Project administration must be properly addressed.

Table 2.9. Schmidt *et al's* Full List of Risk Factors (2001: 15) – continued

4.3	Lack of effective project management methodology: The team employs no change control, no project planning or other necessary skills or processes.
4.4	Improper definition of roles and responsibilities: Members of the project team and the organization are unclear as to their roles and responsibilities. This includes outsourcers and consultants.
4.5	Poor or nonexistent control: No sign-offs, no project tracking methodology, unaware of overall project status, "lost in the woods."
4.6	Poor risk management: Countering the wrong risks.
4.7	Choosing the wrong development strategy: eg, waterfall, prototyping, etc
5	Scope
5.1	Unclear/misunderstood scope/objectives. It is impossible to pin down the real scope or objectives due to differences or fuzziness in the user community.
5.2	Changing scope/objectives: Business changes or reorganizes part way through the project.
5.3	Scope creep: Not thoroughly defining the scope of the new system and the requirements before starting, consequently not understanding the true work effort, skill sets and technology required to complete the project.
5.4	Project not based on sound business case: Users and developers ignore business requirements, develop system for sake of technology.
5.5	Number of organizational units involved: Increased number of lines of communication and conflict potential expands the scope of the system.
6	Requirements
6.1	Lack of frozen requirements. Because the needs of the users change, the requirements change. Consequently the system will never be moved into production because none of the requirements are ever completed. Alternatively, freezing a subset of the functionality and delivering it allows for the completion of the system and update releases as required.
6.2	Misunderstanding the requirements. Not thoroughly defining the requirements of the new system before starting, consequently not understanding the true work effort, skill sets and technology required to complete the project.
6.3	New and/or unfamiliar subject matter for both users and developers: lack of domain knowledge leads to poor requirements definition.
7	Funding

Table 2.9. Schmidt *et al's* Full List of Risk Factors (2001: 15) – continued

7.1	Underfunding of development: Setting the budget for a development effort before the scope and requirements are defined or without regard to them (ie, picking a number out of the air).
7.2	Underfunding of maintenance: Support for products in the maintenance phase. If the customer is unprepared or does not budget for this, the project can be judged a failure even if successful in all other aspects.
7.3	Bad estimation: Lack of effective tools or structured techniques to properly estimate scope of work. Unrealistic cost estimates cause illogical or suboptimal planning, strategy, and decisions.
7.4	"All or nothing". Requires budgeting entire project at the outset, leading to under funding in later years of project.
8	Scheduling
8.1	Artificial deadlines. Presence of unrealistic deadlines or functionality expectations in given time period. "Crash projects" in which test time or training time is reduced – using something other than work effort required to determine when the new system should move into production.
8.2	"Preemption" of project by higher priority project: Management unable to resolve conflicting schedule demands.
9	Development Process
9.1	Lack of effective development process/methodology: Leading to quality problems – Documentation, Software and Testing – poor estimating – insufficient time for up-front work, for example, design – little flexibility for change – insufficient testing.
9.2	Trying new development method/technology during important project.
10	Personnel
10.1	Lack of required knowledge/skills in the project personnel, for example, technology, business knowledge, and experience.
10.2	Lack of "people skills" in project leadership: PM tries to "manage" schedules, technology, requirements, etc, ignoring that management is dealing with people on the team.
10.3	Poor team relationships: Strains existing in the team due to such things as burnout or conflicting egos and attitudes.
11	Staffing
11.1	Insufficient/inappropriate staffing: Not enough people or people with wrong skills/insufficient skills assigned to project, regardless of availability.

Table 2.9. Schmidt *et al's* Full List of Risk Factors (2001: 15) – continued

11.2	Staffing volatility: At some point in the project, losing the key project manager, analysts or technicians (especially in new technology).
11.3	Excessive use of outside consultants: Can lead to a conflict of interest, for example, billable hours vs budget, or resulting in the internal staff not having significant involvement.
11.4	Lack of available skilled personnel: People with the right skills are not available when you need them.
12	Technology
12.1	Introduction of new technology: Using new, or "bleeding edge," technology that has not been used successfully at other companies, or major technological shift occurs during the project.
12.2	Stability of technical architecture: Has to be done before comparable applications.
13	External Dependencies
13.1	External dependencies not met: The project's consultants or vendors do not deliver, go out of business, or are unclear as to their roles and responsibilities.
13.2	Multi-vendor projects complicate dependencies: Integration of packages from multiple vendors hampered by incompatibilities and lack of cooperation between vendors.
13.3	Lack of control over consultants, vendors and sub-contractors: Schedule or quality problems beyond control of project manager. No legal recourse due to poor contract specification.
14	Planning
14.1	No planning or inadequate planning. Attitude that planning is unimportant or impractical.

The Department of Information Resources for the State of Texas (2003: 10) has produced a **Risk Factor Table** for identifying potential risks to a project and for recording lessons learned about risks to projects. Its value lies in the fact that it is designed as a dynamic, adaptable tool, to be populated and updated as experience develops: **As an organization encounters new areas of risk, it extends the table with new factors and/or categories. As processes and methods improve to remove specific risks, factors related to those risks may be removed from the organization version of a table like this.** (2003: 10-11).

Table 2.10 below shows a sample of the Department's Risk Factor Table.

Table 2.10. Sample of the DIR (Texas) Risk Factors Table. (2003: 11)

ID	Risk Factors	Low Risk Cues	Medium Risk Cues	High Risk Cues	Rating
Mission and Goals Category					
1	Project Fit to Customer Organization	Directly supports customer organization mission and/or goals	Indirectly impacts one or more goals of customer	Does not support or relate to customer organization mission or goals	
2	Work Flow	Little or no change to work flow	Will change some aspect or have small effect on work flow	Significantly changes the work flow or method of organization	
Project Characteristics Category					
3	Requirements Stability	Little or no change expected to approved baseline	Some change expected against approved set	Rapidly changing or no agreed-upon baseline	
4	Customer Expectations	Expectations aligned with those of project team	Expectations not explicitly reviewed; appear to be in sync	Expectations of user differ from those of project team	
5	Completion Criteria	Completion criteria are agreed on with customer	Completion criteria have not been explicitly addressed	Completion criteria are in dispute between project team and customer	
Project Deployment Category					
6	User Training Needs	User training needs considered; training in progress or plan in place	User training needs considered; no training yet or training plan is in development	Requirements not identified or not addressed	
7	Customer Service Impact	Requires little change to customer service	Requires minor changes to customer service	Requires major changes to customer service approach or offerings	
		Total Categories	**3**		
		Total Factors	**7**		

The DIR's website provides a tool for identifying Generic Project Risk Factors, listing a total of 77 factors sorted according to 14 categories. These are as follows (see table 2.11 below):

Table 2.11. The Texas DIR's tool for identifying Generic Project Risk Factors (1999: 1) - continued

7. Product Content	7.1 Requirements Stability 7.2 Requirements Completeness and Clarity 7.3 Testability 7.4 Design Difficulty 7.5 Implementation Difficulty 7.6 System Dependencies
8. Deployment	8.1 Response or other Performance Factors 8.2 Customer Service Impact 8.3 Data Migration Required 8.4 Pilot Approach
9. Development Process	9.1 Alternative Analysis 9.2 Commitment Process 9.3 Quality Assurance Approach 9.4 Development Documentation 9.5 Use of Defined Development Process 9.6 Early Identification of Defects 9.7 Defect Tracking 9.8 Change Control for Work Products
10. Development Environment	10.1 Physical Facilities 10.2 Tools Availability 10.3 Vendor Support 10.4 Contract Fit 10.5 Disaster Recovery
11. Project Management (PM)	11.1 PM Approach 11.2 PM Experience 11.3 PM Authority 11.4 Support of the PM
12. Team Members	12.1 Team Member Availability 12.2 Mix of Team Skills 12.3 Team Communication 12.4 Application Experience 12.5 Expertise with Application Area (Domain) 12.6 Experience with Project Tools 12.7 Experience with Project Process 12.8 Training of Team 12.9 Team Spirit and Attitude 12.10 Team Productivity

Table 2.11. The Texas DIR's tool for identifying Generic Project Risk Factors (1999: 1) - continued

13. Technology	13.1 Technology Match to Project 13.2 Technology Experience of Project Team 13.3 Availability of Technology Expertise 13.4 Maturity of Technology
14. Maintenance and Support	14.1 Design Complexity 14.2 Support Personnel 14.3 Vendor Support
Total Categories	**14**
Total Factors	**77**

2.3.2.3 Conclusion

From the above review, it can indeed be seen that a wide and rich variety of options exists for identifying project risk, and, without a systematic approach, projects run the risk of exposing themselves to "analysis-paralysis" if not complete confusion. Ultimately, this could result in the incurring of excessive cost in the risk management process. Yet, to focus too narrowly increases the probability of exposure to unforeseen risk. As Kerzner (1998: 870) points out: **There is no single textbook answer on how to handle risk. The project manager must rely upon sound judgement and the use of appropriate tools in dealing with risk.**

Clearly, there is a great need for efficiency in this stage of the overall process, to ensure that a comprehensive view is taken (such that no material risks are excluded from consideration) but at acceptable cost in terms of time, effort and money. In other words, there is a trade-off, in terms of which **risk can only be reduced by increasing cost, and cost can only be reduced by increasing risk**. (Chapman & Ward (1997: 32).

Computer-assistance offers a practical solution, as is illustrated by the Texas DIR's toolset, above. Organisations could meaningfully consider the following approach:

- Based on the organisation's experience, and using a solution-generating technique such as the Delphi Technique, use expert teams to construct structured lists of project risks, using fully clarified terminology, and offering guidelines for assessment. These lists can be provided in the form of computer applications.
- These structured lists should be made available to project teams as prompts for identifying risks unique to their projects.
- In addition, project teams should be required to identify any additional risks over-and-above those checked off the structured lists.

2.4 Analysing Risk: Qualitative Techniques

The second major element of PMBOK's risk management process is that of analysing or assessing project risk. Key questions are **which of the identified risks should receive attention?** and **which of them should receive *more* attention?** According to Wideman (1992: IV-2) **no risks should be entirely ignored, but many of the lesser risks can be provided for by the conventional contingency allowance approach. Clearly, the risks that should receive the closest attention are those that could have both the greatest *impact* on the project as well as those with the greatest *probability* of occurrence.** (my emphasis).

"Impact" and "probability" are dimensions for project risk assessment widely identified in the literature (see, for example, Chadbourne: 2001, Jiang: 2002, Carey & Turnbull: 2001, Barnes, Seamour & Xu: 2000) As an aid to assessment, many writers propose a simple quantification process to rank the identified risks in priority order.

Burke's **Probability/Impact Matrix** (2001: 237) (see Figure 2.1 on page 42) proposes the following quantification categories:

- Low risk (scores 1 – 2)

- Medium risk (scores 3 – 4)
- High risk (score 6)
- Extreme risk (score 9).

(Note: Since the quantification categories are weightings rather than numberings, there is no need for the scores to follow sequentially – thus, the absence of numbers 5, 7 and 8 is not anomalous). This creates a matrix with nine possibilities, as shown in Burke's Probability/Impact Matrix in figure 2.1.

Figure 2.1. Burke's Probability/Impact Matrix (2001: 237)

Probability		Impact 1	Impact 2	Impact 3
High	3	3	6	9
	2	2	4	6
Low	1	1	2	3

Old Mutual uses the *X-Pert™* project management methodology (1995: 6) which quantifies probability and impact as follows:

- The probability of each risk identified is assessed on a scale from 1 to 10, where 1 indicates the lowest probability of occurrence, and 10 the highest.
- Impact is assessed on a similar scale (ie, 1 – 10).
- The ratings for probability and impact are then combined, to produce a risk factor score of between 1 and 100. (For example,

probability = 4, impact = 8, total risk factor = 32). These are interpreted as follows:

- 1 – 30: Low Priority
- 31 – 39: Medium Priority
- 40 –100: High Priority

The management guideline for high priority risks (ie, those with a risk factor score of 40 or higher) is for the project team to develop at least 4 specific action plans to address each risk.

Preyssl, Atkins and Deak (1999: 2) describe a model which in principle resembles Burke's and X-Pert's models (see Figure 2.2 below). The model refers to:

- The magnitude of risk severity (ie, "impact") times the probability score, which creates a risk index.
- The risk index is divided as shown in figure 2.2 below:

Figure 2.2. Preyssl, Atkins and Deak's Risk Index Model (1999: 2)

Risk Index	Magnitude and Acceptability of Risk Scenario
>20	Maximum – unacceptable
15 - 20	High – unacceptable
10 - 15	Medium – acceptable
<5	Low – acceptable

The risk ranking model proposed by Barnes, Seamour & Xu (2000: 431) is in principle similar, although no ranking scores are allocated (see figure 2.3 below).

Figure 2.3. Barnes, Seamour and Xu's Risk Ranking Model (2000: 431)

	Low Impact	High Impact
High Likelihood	Risks to be managed perhaps by reduction or avoidance, ie, reducing the vulnerability	Risks to be actively and immediately managed and controlled
Low Likelihood	Risks that might be accepted after consideration	Risks to be managed perhaps by transfer or reduction

Variations on the "risk matrix theme" are proposed by others. For example, Datta and Mukherjee's "Risk Management Matrix" (2001: 55) also produces nine possible scenarios but without quantifying or ranking the segments, and without overtly referring to "probability" and "impact." (see Figure 2.4 below):

Figure 2.4. Datta and Mukherjee's "Risk Management Matrix (2001: 55)

External Project Risk / Immediate Project Risk	High	Medium	Low
High	Segment 1 • Abandon the Project at this stage	Segment 2 • Abandon the Project at this stage • Reconsider the project proposal	Segment 3 • Reconsider the project proposal • Develop alternatives • Transfer the risks
Medium	Segment 4 • Abandon the Project at this stage • Reconsider the project proposal	Segment 5 • Reconsider the whole project proposal • Develop alternatives • Transfer the risks	Segment 6 • Transfer the risks • Defer the risks • Reduce the risks • Assign contingencies and go for the project
Low	Segment 7 • Reconsider the project proposal • Develop alternatives • Transfer the risks	Segment 8 • Transfer the risks • Defer the risks • Reduce the risks • Assign contingencies and go for the project	Segment 9 • Plan for contingencies and go for the project

An interesting variation is proposed by Knipe *et al* (2002: 344-347) who identify *three* dimensions, namely,

- Severity
- Frequency
- Probability

Their **severity** and **frequency** categories are set out in the following tables (tables 2.12 a and 2.12b):

Table 2.12a. Knipe *et al's* Severity Categories (2002: 344-347)

Severity Categories	Description of Category	Value
1. Catastrophic	May cause death or loss of property. A single event would threaten the existence of the project	5
2. Critical	May cause severe injury/illness or serious property damage. A single loss is likely to have a serious effect on the overall budget of the project	4
3. Serious	May cause moderate to serious injury or moderate property damage. A single loss event is likely to have a moderate impact on the project's budget	3
4. Marginal	May cause minor injury/illness or property damage. Individual losses will not significantly affect the project.	2
5. Negligible	Likely not to result in injury/illness or measurable property damage.	1

Table 2.12b. Knipe *et al's* Frequency Categories (2002: 344-347)

Frequency Category	Description of Category	Value
1. Frequent	Loss event occurs frequently or is continuously experienced	5
2. Probable	Loss event occurs at least on an annual basis	4
3. Occasional	Loss event is likely to occur sometime in the lifetime of the project, ie occurs once in a 25-year time period.	3
4. Remote	Loss event is not likely to occur within the average lifetime of a project, or is unlikely to occur but is possible	2
5. Extremely remote	Likelihood of a loss occurrence is improbable; cannot be distinguished from zero.	1

The steps for analysing severity and frequency involve assigning categories to each, then multiplying the scores. Thus, for example, if a project is seen to be of "serious" severity, but only of "remote" frequency, then its score will be (a low) 6, whereas, a risk of, say, "critical" severity with, say, a "probable" frequency will score (a high) 16. Clearly a combined score of 25 indicates the highest priority.

Once the combined score for severity-frequency has been determined, the next step proposed by Knipe *et al* (2002: 347) is to calculate the *probability* of the risk materialising. To determine a probability rating, the framework provided by Waring & Glendon (1998: 26-28), which is shown in table 2.13, is used:

Table 2.13. Waring & Glendon's Probability Categories. *Source*: Knipe *et al* (2002: 347)

Probability Category	Description of Category	Value
1. Very unlikely	Loss event is very unlikely to occur or will never be experienced	1
2. Unlikely	Loss event is unlikely to occur but could take place once during the lifetime of a project	2
3. Likely	Loss event is likely to occur sometime in the lifetime of the project (ie, it occurs once in a 25-year time period)	3
4. Very likely	Loss event is very likely to occur within the average lifetime of a project	4
6. Inevitable	Likelihood of a loss occurrence is inevitable and a clear risk	5

Thus, the formula for determining risk by this means is: **R = S x F x P**, which would yield a maximum score of 125 (5 x 5 x 5) for any one risk identified.

Finally, Knipe *et al* provide the following guidelines for action once the risks have been scored (see table 2.14):

Table 2.14. Knipe *et al's* Guidelines for Action (2002: 344-347)

Risk		Urgency of action required
High	75 or over	Top priority, act **now**!
Medium	27 - 74	Deal with it over the next few months
Low	Below 27	Deal with it if attention is warranted

Field and Keller (1998: 117) suggest that risks be prioritised in the following order, which effectively assigns greater importance to impact than probability:

- High-impact, high-probability
- High-impact, lower-probability
- Lower-impact, high-probability

Where risk checklists are created, it is useful to design the checklist as a probability/impact scoring aid. Field and Keller (1998: 115-116) describe three variations of how this could be done, and in effect, provide the project manager with 3 handy tools (see tables 2.15 – 2.17 below):

Table 2.15. Field and Keller's example of a risk assessment checklist with probability and impact weighting columns. (1998: 115-116)

Risk Description	Probability (1=low, 5=high)	Impact (1=low, 5=high)
• Problems due to system interface with other systems?		
• System more complex than planned?		
• System less reliable than required?		
• System larger than estimated?		
• System requirements subject to change?		
• Likelihood of major changes after project started?		
• Likelihood of minor changes after project started?		
• Mechanisms for introducing change inadequate?		
• Difficulties in defining parameters?		
• Data definition tool not available on time?		
• Data definition and dictionary tools unavailable?		
• Hardware platform subject to change?		

Table 2.16. Field and Keller's example of a risk assessment checklist (risk-factor style): (1998: 115-116)

Risk Factor	Risk Description	Score	Impact
Complexity: Interface to other systems	The system must interface with 0 other systems		Low
	1 to 5 other systems		Medium
	> 5 other systems		High
System type	The system is Batch processing		Low
	Real-time (not safety-critical) or interactive		Medium
	Real-time, safety-critical or distributed		High
System size	The system will consist of approx 1 to 10 modules		Low
	11 to 25 modules		Medium
	> 25 modules		High
System requirements	The system requirements are Agreed and signed off		Low
	Minor changes remain to be made		Medium
	Major changes are possible		High
System data	The data and relationship of items as defined is: Simple		Low
	Moderately complex		Medium
	Very complex		High

Table 2.17. Field and Keller's example of a risk assessment checklist (questionnaire style) (1998: 115-116)

A. Project structural risks

For each question, tick the answer that most closely applies to the project you are assessing. The risk score for each answer is contained in square brackets on the right. Add all risk scores for each category and refer to Section 3.3 ("Risk Assessment") in the Standards and Procedures Manual for guidance in interpreting the results

1. Is this project:

☐	A modification to an existing system/existing equipment?	[1]
☐	A replacement for an existing system/existing equipment?	[2]
☐	A new system/new equipment?	[3]
☐	A pilot study or pilot project?	[5]

2. Who identified most of the requirements?

☐	The client	[1]
☐	The project team expected to undertake the project	[2]
☐	Another group within this company	[3]
☐	Other, specify	[4]
☐	Requirements not fully identified	[5]

3. Is completion of this project defined as these items to be reviewed and signed off separately?

☐	Standard deliverables for project of this type	[1]
☐	Non-standard but agreed deliverables	[2]
☐	Non-standard deliverables	[4]
☐	Deliverables not identified	[6]

4. Are project planning, tracking and reporting methods and techniques committed to this project?

☐	Yes, tried and tested	[1]
☐	Yes, but new to this team	[2]
☐	No	[5]

5. Has the client been briefed on change control and status reporting methods and:

☐	Agreed?	[1]
☐	Disagreed?	[4]
☐	Not been briefed?	[5]

Like Knipe *et al*, Rodney Turner also goes beyond the probability-impact basis for analysing project risk. He includes **public perception** as the third factor: He illustrates his point with the following example (1993: 242): **Perhaps the consequences of an earthquake under a nuclear power station would not be as severe as suggested, but the *public perception* is that it would** (my emphasis). This gives rise to the following project risk assessment formula:

Likelihood x consequence x public perception.

In sensitive projects (eg, projects with ecological impacts or those launched in the face of strong opposition) a factor like public perception would certainly be critical to project success. Thus, it would need to be factored in, as Rodney Turner suggests. Kirkwood (1994: 1) makes the same point: **Some issues become the subject of immense public debate. In some cases this can result in outright rejection, or in delays and costs associated with public inquiries, for projects which a scientific evaluation indicates as being of low risk.**

Billows (2003: 6) also introduces a third factor in addition to probability and impact – **data precision.** According to Billows, the **data precision score (1-100) is reflective of the accuracy and validity of the data used in identifying project risk. It reflects our understanding of the risk, the amount of information we have available about it, and the reliability and integrity of that data.** Table 2.18 below illustrates:

Table 2.18. Billows' 3-Factor Tool for Project Risk Assessment (2003: 6)

Risk Event	Data Precision Score (1-100)	Probability (1-10)	Impact (1-10)
1. Customers will not utilize the new procedure for trouble reports	10	8.75	9.00
2. Turnover among our problem-solvers increases because of the need to provide 24/7 coverage	89	8.4375	8.75
3. A decrease in quality on new products or services increases the number of trouble reports more than 10% above the present level	80	5.1875	4.75

As can be seen in the abovementioned examples, a wide variety of options exists for the qualitative analysis of project risks, once they have been identified. As a number of the illustrated tools show, it is possible for the project manager to combine identification and analysis techniques (see, for example, Billows' 3-Factor Tool shown in table 2.18 above). Also, a variety of analysis criteria are available to the project manager, to customise according to organisational or project needs. For example, the analysis criterion of **data precision** (cited in Billows' 3-Factor Tool) might be less relevant to a given project manager's requirements, than, say, Knipe *et al's* categories of **severity**, **frequency**, and **probability.** It will then be up to the project manager to select what best serves his specific needs.

2.5 Analysing Risk: Quantitative Techniques

2.5.1 Introduction

According to Correia *et al* (2003: 9-29) there has in recent times been a growth in the use of quantitative methods for assessing project risk, with the following methods being the most popular:

- Sensitivity Analysis
- Decision Trees
- (Monte Carlo) Simulation
- Scenario Analysis

Each of the above methods is discussed in turn in the following sections.

2.5.2 Sensitivity Analysis

Sensitivity analysis is concerned with measuring how sensitive a project's Net Present Value (NPV) or profit is to a change in any of the project's input variables. An example (see table 2.19) adapted from Raftery (1994: 74) illustrates:

Table 2.19. Raftery's Sensitivity Table. (1994: 74)

Input Variable	Original Value of the Variable	Change Required in the Variable to Eliminate Profit	New Value of the Variable
Unit Costs	R89.00	37%	R122.00
Finance Rate	18.5%	302%	74.4%
Scheduled Period	12 months	350%	54 months

It can readily be seen in the above (hypothetical) example that unit costs would have to rise by 37% for profit to be entirely eroded. Similarly, the finance rate and the scheduled period would each have to increase by more than 300% before they will endanger profitability. One could therefore conclude that these variables do not present serious risks to the project.

To undertake a sensitivity analysis, the analyst would usually set each of the input variables in turn at its pessimistic, optimistic and expected, values, and calculate the effect on the project's NPV. An adapted example from Brealey & Myers (1991: 217) illustrates (see tables 2.20a and b below):

Sensitivity Estimates:

Table 2.20a. Brealey & Myers' Sensitivity Estimates. (1991: 217)

Input Variable	Pessimistic	Expected	Optimistic
Market Size	9 million	10 million	11 million
Market Share	.004	.01	.016
Unit Price	R3500.00	R3750.00	R3800.00
Unit Variable Cost	R3600.00	R3000.00	R2750.00
Fixed Cost	R40 million	R30 million	R20 million

Impact on NPV (R million):

Table 2.20b. Brealey & Myers' Sensitivity Estimates. (1991: 217)

Input Variable	Pessimistic	Expected	Optimistic
Market Size	+ 11	+ 34	+ 57
Market Share	- 104	+ 34	+ 173
Unit Price	- 42	+ 34	+ 50
Unit Variable Cost	- 150	+ 34	+ 111
Fixed Cost	+ 4	+ 34	+ 65

Thus, if market size turns out to be 9 million rather than the expected 10 million consumers (and all the other variables are as expected), then NPV will be R11 million rather than R34 million. If fixed costs are R20 million (and all the other variables are as expected), then NPV will be R65 million. Of concern should be the fact that a pessimistic scenario for three of the four variables (market share, unit price and unit variable cost) will each reduce NPV to below zero, effectively meaning a loss to the project.

As can be seen, the Sensitivity Analysis is relatively easy and inexpensive to use, and is capable of producing meaningful results. As Ross *et al* (2001: 285) point out, [it] **is useful in pinpointing the areas where forecasting risk is especially severe.** However, there are a number of limitations to its use, including the following:

- Only one variable is changed at a time, which is somewhat of an oversimplification, as variables in reality are usually interrelated. As Drury points out, **...management is more interested in the combination of the effect of changes in two or more key variables**. (1994: 407).
- The method does not take into account the probability or likelihood of this or that variable changing, nor of the degree of the possible change.
- **Pessimistic** and **optimistic** are seen as subjective terms, which represent extremes that seldom arise in practice. (Raftery, 1994: 94).

2.5.3 Decision Trees

A decision tree (sometimes also referred to as a "probability tree") is a tool which helps the decision maker to logically structure the decision problem. It displays in a graphical format, all the alternative decisions and their outcomes, thus facilitating selection of the best alternative. Certain key concepts are involved in the construction of a decision tree:

- *decision* or *decision alternative*: this is the option or choice facing the decision maker when confronted with a problem. It is depicted in the decision tree diagram by a box, from which lead all the relevant options. For example, **build new warehouse** versus, **hire warehouse space**. Decisions are within the decision maker's control.
- *state of nature*: this is the possible event which could arise from a decision. For example, the decision might be, **test new system,** and a possible state of nature could be, **system fails test**. This would then set up a situation where a subsequent decision will be required, eg, **re-test the system**. A state of nature, being the consequence of a decision, is beyond the decision maker's direct control. It is depicted in the diagram by a circle.
- *probability*: this is the likelihood of a particular state of nature arising from a given decision. Thus, for example, if the decision maker decides to invest in a particular project, what is the probability that it will succeed, versus the probability that it will fail?
- *Payoff*: The payoff is the profit or loss (or NPV) arising from a particular decision. It is also known by various other names, eg: **conditional value**, and **end value.**
- *Expected (monetary) value/EMV*: This is the sum of all the payoffs x their probabilities. A typical example of how this is arrived at is shown in table 2.21 below:

Table 2.21. Hypothetical EMV Table

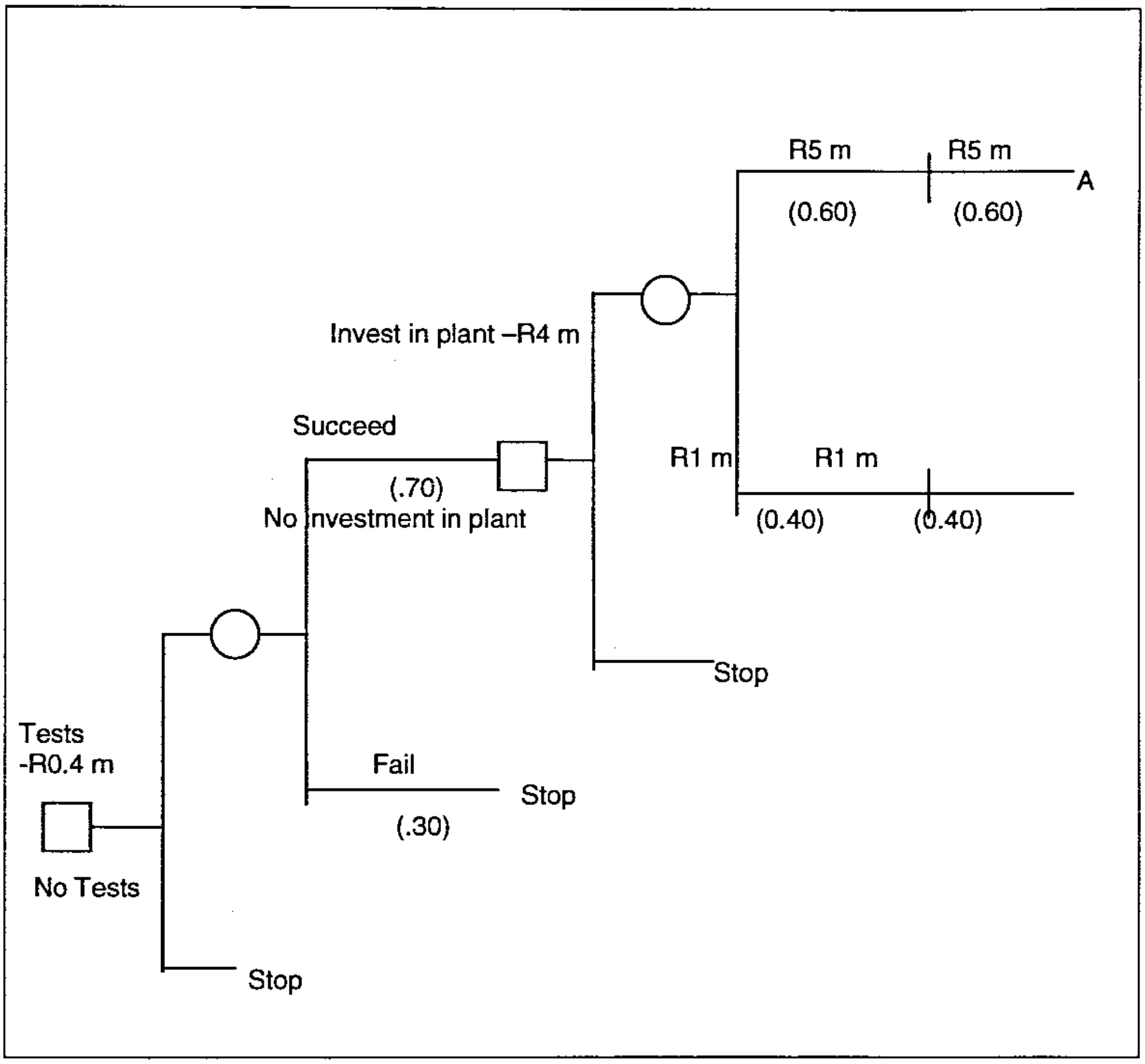
State of Nature	Probability	Payoff	Weighted Amount
High Demand	0.3	R10 000	R3 000
Intermediate Demand	0.4	R7 500	R3 000
Medium Demand	0.2	R5 000	R1 000
Low Demand	0.05	R2 000	R100
Negative Demand	0.05	-R500	-R25
	1.0	**EMV**	R7 075

Heizer & Render (2001: 724) provide the following steps for analysing problems with the use of decision trees:

1. Define the problem.
2. Structure or draw the decision tree.
3. Assign probabilities to the states of nature.
4. Estimate payoffs for each possible combination of decision alternatives and states of nature.
5. Solve the problem by computing expected monetary values (EMV) for each state-of-nature node. This is done by working *backward* – that is, by starting at the right of the tree and working back to decision nodes on the left.

To illustrate the decision tree process, an example is taken from Correia *et al* (2003: 10 – 10), see figure 2.5 on page 56 below:

Figure 2.5. Decision Tree Example. *Source:* Correia *et al* (2003: 10 – 10)



The NPV for each event sequence is as follows:

Sequence	Calculation	NPV
A	(-0.4m-4m/1.14)+(5m/1.14²)+(5m/1.14³) =	R3 313 423
B	(-0.4m-4m/1.14)+(1m/1.14²)+(1m/1.14³) =	-R2 464 333
C	=	-R400 000

The EMV is as follows:

NPV	Joint Probability	EMV
R3 313 423	0.70 + 0.60 = 0.42	R1 391 638
-R2 464 333	0.70 + 0.40 = 0.28	-R690 013
-R400 000	0.30	-R120 000
	(Total = 1.0)	R580 625

If the decision is to be based on EMV, then it should be to go ahead with the development, as the EMV is positive. However, as Correia *et al* (2003: 10 – 11) caution: **the figure is an average; we know that there is a 42% chance... that the net present value will be R3 313 423. There is a 28% chance that the project will result in a negative net present value of R2 464 333. If the development tests fail, the loss is limited to R400 000. The important question is whether it is worth investing R400 000 now in order to have a 42% chance of earning a positive net present value of R3 313 423.** Is 42% high enough? Or is it too risky?

2.5.4 Monte Carlo Simulation

Sensitivity analysis tests the impact on project outcomes of a change in one input variable at a time, whereas *Monte Carlo Simulation* enables the analyst to test the impact of change in a number of variables simultaneously. *Simulation* is a quantitative method which constructs a model of a particular process, then uses the model to imitate the functioning of that process over a specified period of time in order to forecast the behaviour of the actual process (Redelinghuis *et al*, 1994: 415). Monte Carlo simulation is a tool for considering *all* possible combinations (of variables). It therefore enables one to inspect the entire distribution of project outcomes (Brealey & Myers, 1991: 223).

Monte Carlo simulation takes its name from Monte Carlo, Monaco, after the casinos which contain games of chance. Games of chance (eg, the roulette wheel) are based on random behaviour. This is the major feature of Monte Carlo simulation.

The technique is illustrated by means of the following hypothetical example (see table 2.22 below):

The first step in the process is to determine probability factors for all the key project variables, for example:

Table 2.22. Illustration of the Monte Carlo Simulation Method (Hypothetical)

Variable		Probability Impact on Variable			
Market Share	Value:	15%	17%	21%	22%
	Probability	0.2	0.4	0.3	0.1
Market Growth Rate	Value:	2%	5%	-1%	-3%
	Probability	0.1	0.5	0.3	0.1
Investment Required	Value:	R25 m	R32 m	R37 m	
	Probability	.05	0.7	0.25	
Variable Costs	Value:	R100	R114	R124	
	Probability	0.2	0.6	0.2	
Fixed Costs	Value:	R3 m	R4 m		
	Probability	0.5	0.5		
Useful Life of Facilities	Value:	< 2 yrs	5 yrs	7 yrs	> 7 yrs
	Probability	0.05	0.7	0.2	0.05
Product Life Cycle	Value:	2 yrs	3 yrs	5 yrs	7 yrs
	Probability	0.1	0.2	0.4	0.3

Then the computer randomly selects one value from each of the probability distributions, according to its chance of actually occurring in the future. These values are combined and a net present value or internal rate of return figure is calculated. The process is repeated as many times as desired, until a representative distribution of possible future outcomes is assembled. The decision maker is thus in a position to base his decision on the full range of possible outcomes, and, for example, can easily see what percentage of possible scenarios result in a negative NPV (Ross *et al*, 2001: 286).

Advantages of using simulation analysis techniques such as the Monte Carlo method include:

- Probably the most obvious advantage is that one has the opportunity to **try out** a possible solution without using the existing system (Redelinghuis *et al*, 1994: 415). In addition, with the aid of a computer, one has the results within a much shorter time than it would take to collect data in the real world.
- Decision makers are compelled to examine all the relationship between the numerous factors affecting cash flows and NPV's (Drury, 1992: 405), and to **face up to** uncertainty and interdependencies (Brealey & Myers, 1991: 227).

- If used correctly, the technique can play a big role in identifying and assessing project risk (Redelinghuis, 1994: 415).

Some of the disadvantages include:

- It is **costly and complicated** (Brealey & Myers, 1991: 227).
- It does not provide a solution, **but merely indicates how an actual situation will change in various circumstances** (Redelinghuis, 1994: 416).

2.5.5 Scenario Analysis

The starting point for scenario analysis is to ask **what if?** questions. For example, **What if the war in Iraq should lead to an escalation in the price of oil?** How would a sudden (but plausible) change in the expected reality affect my project? The technique involves building insight into the future through the construction of scenarios based on well-defined assumptions.

The **worst case** scenario **will tell us the minimum NPV of the project. If this were positive, we would be in good shape** (Ross, *et al*, 2001: 284). Similarly, our **best case** scenario would indicate what the most was which could be expected if conditions moved strongly (but unexpectedly) in a favourable direction. Obviously, if the best case were below stakeholder expectations, this would seriously jeopardize the project's chances of support and acceptance.

Worst and **best** are terms which could be substituted by, **pessimistic** and **optimistic**, without losing the point. Of course, between these extremes, one might wish to consider any number of intermediate scenarios, as well.

2.5.6 Conclusion

As can be seen, quantitative methods aim to identify how changes in project variables impact the project's NPV – in other words: how the likelihood or probability of a given change will affect the financial outcome of the project. If the change in the affected variable leads to a positive outcome, the risk is taken to be low, and conversely, if the NPV is negatively impacted, then the risk is seen as high.

Quantitative methods do not offer direct guidelines to action; they broaden the project managers insight about expected outcomes, thereby enabling him to consider appropriate courses of action either to mitigate or eliminate downside risk, or, alternatively, to exploit the opportunities inherent in upside risks.

Combined, quantitative and qualitative project risk techniques provide a comprehensive assessment process. Thus, for example, one might be persuaded as a result of a quantitative analysis that a given project presents a significant business opportunity (eg, NPV is strongly positive), but conclude – through an application of qualitative analysis – that the organisation lacks the capability of delivering the project successfully. In such a case, the decision would be to forego the opportunity and not launch the project.

This particular example highlights the value of quantitative risk assessment techniques as a tool not only in project risk management, but in project selection as well. In the case of Old Mutual, quantitative techniques form part of the business case/project feasibility process (that is, the project selection process) (2002: 17-19) while qualitative techniques (such as the *X-Pert™* risk assessment approach described in section 2.4 above) are the main project management risk assessment technique.

2.6 Responding to Project Risk

2.6.1 Introduction

Generally, companies' enthusiasm for implementing risk management strategies is low, according to a recent survey by Deloitte and Touche which included such leading companies as Edcon, Investec, Liberty, Nedcor, IDC, Old Mutual and Woolworths (reported by Adele Shevel in the Sunday Times Business Times, October 19, 2003).

This appears to be a universal phenomenon. McGrew & Bilotta (2000: 293) note that although the delivery record of software projects in the US is relatively poor, **... yet the implementation of risk management programs is rare in commercial business.**

> **The reasons for not implementing risk management include cost, benefits, and expertise... the most common rationalisations are that the project is too small (or too large) to justify the time and expense of a review; that the benefits cannot be determined and, therefore, the costs are assumed to outweigh the benefits; and that the effort is unlikely to uncover anything that is not already well known to everyone involved in the project.**
>
> **It is difficult to argue against the objection that the benefits of risk management cannot be demonstrated. If a team assesses the risks associated with a project and intervenes to minimize them and the project succeeds, was the intervention program successful – or would the project have succeeded anyway? The act of intervention may have altered the outcome in ways we cannot separate out – or it may not have altered it at all. The act of intervention confounds any effort to quantify the effectiveness of a risk management program.**

Often, the reasons offered mask the *true* reasons for a particular course of action. In the discussion on Utility Theory in section 2.2.2 above, it was noted that utility or **satisfaction** – the degree of pleasure or pain – is a key motivator of human or organisational behaviour. Thus, the motivation to proceed with a project without a proper examination of the risks entailed might be an indication of how much it matters to the organisation to proceed. Offering rationalisations, therefore, would simply be a way of justifying the action *post hoc*.

On the other hand, a decision to go ahead without proper examination of the risks or consequences might be the result of poor judgement. As signal detection theory (SDT) warns, one's interpretation of reality can sometimes be distorted by one's biases or expectations (see section 2.2.3 above).

Kent Crawford's Project Risk Management Maturity Model also offers some insight into why managers might avoid the rigours of appropriate risk management strategies: it might simply be through a lack of project management process maturity. Like the lack of good judgement, a lack of maturity points to a want of competence.

2.6.2 Risk Management Plan

Knipe *et al* (2002: 357-360) provide a comprehensive template for a **risk management plan** (see table 2.23 below). According to them, **this plan should be kept throughout the project and will probably change over time. All changes should be costed and presented to the project steering committee for approval, to ensure that the risks are being monitored at an appropriate level.**

Table 2.23 Knipe *et al's* Template for a Risk Management Plan. (2002: 357-360)

RISK MANAGEMENT PLAN

1. INTRODUCTION	**1.1 Overview**	Overview of the plan, including an overview of the contents, with substitutions where appropriate for the correct project name, manager name, and so on. Includes the project descriptive paragraph, entered when defining the new project
	1.2 Applicable documents/ definitions	Contains the list of reference documents and definitions relevant to the project.
	1.3 Management organisation/ responsibilities	Contains descriptions of the organisational overview and of risk-related responsibilities entered when defining the new project (SWOT analysis)
	1.4 Scheduled milestones/reviews	Contains the dates and descriptions for the scheduled project milestones and reviews that were used when defining the new project.
2. IDENTIFICATION AND ASSESSMENT	**2.1 Risk management process**	Contains a summary of the risk management process that was followed
	2.2 Risk areas of concern	Contains a summary and comparative information about the project risk areas
	2.3 Identified uncertainties	Contains a summary and comparative information about the project uncertainties considered to be risks to the project
	2.4 Dependencies between uncertainties	Contains information as per the risk management WBS
3. ANALYSIS AND REDUCTION	**3.1 Risk mitigation actions**	Contains a summary and comparative information about risk mitigation actions
	3.2 Risk reduction options	Defines risk reduction options that were considered
	3.3 Risk reduction plan	Presents a summary, detail and comparative information about the selected risk mitigation plan, including mitigation actions that will be taken and uncertainties that are considered worth watching
	3.4 Risk management Gantt chart	Presents a Gantt chart of uncertainties, showing when they are considered a factor and showing timelines for executing risk mitigation actions
	3.5 Risk management WBS	Contains a detailed work breakdown structure for risk-related work, including all uncertainties that must be monitored and all risk mitigation actions that must be taken. Can be prepared in MSProject©

Table 2.23. Knipe *et al's* Template for a Risk Management Plan. (2002: 357-360) – continued

4. APPENDICES	**4.1 Risk information sheets**	A single page risk identification sheet for each uncertainty considered a risk to the project. This sheet contains the following data fields: • **ID** (unique project identifier) • **Identified** (date when identified) • **Description** (description of the risk) • **Origin** (person who identified the risk) • **Priority** (priority ranking of the risk) • **Probability** (probability of the risk) • **Impact** (impact, both overall and by activity or task) • **Timeframe** (timeframe in which the risk will occur or action is needed) • **Responsible person** (who is responsible for this risk) • **Actions** (list of candidate actions and those selected) • **Trigger event** (risk trigger event) • **Contingency plan** (contingency plan for this risk) • **Status** (current status) • **Status date** (date of last status change) • **History** (history of risk status and risk-related event log) • **Closing date** (date that this risk was closed) • **Closing rationale** (rationale for closing this risk) In addition, all other entered uncertainty data that was previously defined should be included on this form
	4.2 Risk reporting form	A single page form that can be used by project team members to report unanticipated risks which arise during the project. This form includes a qualitative value for impact, probability and timeframe. It also includes a statement of the risk and recommendations for dealing with the risk.
	4.3 Risk summary spreadsheet	This spreadsheet contains all risks, sorted by timeframe and priority. It includes a risk ID, a description of the risk, who the risk is assigned to, a list of actions that pertain to this risk, and a list of history comments

2.6.3 Timing of Response

Quoting Gray & Larson (2000: 139) Knipe *et al* (2002: 335-336) refer to the importance of *timing* in the risk management intervention process:

> **The chances of a risk occurring, for example an error in the cash flow, time estimates, cost estimates or design technology, are greatest in the concept, planning and start-up phases of a project. The cost impact of a risk event in a project is less if the event occurs earlier rather than later in a project. The early stages of a project represent the optimal period for opportunities to minimise the impact of or work around a potential risk. Conversely, as the project passes the halfway mark, the cost of a risk event occurring increases rapidly. For example, the risk event of a design flaw occurring after a prototype has been made has a greater cost or time impact than if the event occurred in the start-up phase of the project. Clearly, identifying project risk events and deciding on a response before the project begins is a more prudent approach than not attempting to manage risk.**

Even though, for Knipe *et al*, the important time for project risk management is in the early phases of the project life cycle, they advocate a *continuous* focus, as the potential for damage *varies* along this life cycle.

Knipe *et al* (2002: 339) also consider the baselined work breakdown structure (WBS) of the project to be the starting point for risk identification, as this, according to them, **provides us with a detailed breakdown of all the tasks that need to be accomplished in order to complete the project.** However, the WBS stage might be a bit late if the **business case stage** is deemed to be the proper starting point in the project life cycle.

Smith (1999: 19) also favours an approach that links management focus to project phase:

> **A project is divided into a number of separate phases. At the end of each phase an appraisal can be made and assessment of the risk involved in proceeding with the project. The management of risk is therefore a continuous process and should span all the phases of the project. Since project risks are dynamic, that**

is to say they can change continuously, a risk assessment must be carried out at the end of each phase prior to proceeding to the next phase.

Referring to construction projects, Smith (1999: 19) adds that

Risks may also change during a phase. Broadly speaking, the earliest phases of the project are concerned with value management to improve the definition of design objectives; the design stage is concerned more with value engineering to achieve necessary function at minimum cost; and the construction phase is centred around quality management to ensure that the design is constructed correctly without the need for costly rework.

Similarly, Gerosa *et al* (2001: 3), with regard to financial risk in the commercial satellite venture industry, identify the following links between project phase and project risk type (see table 2.24 below):

Table 2.24. Gerosa *et al's* Link between Project Phase and Project Risk (2001: 3)

Project Phase	Type of Risk
Investment Phase	• *Regulatory Risk* – the risk of not obtaining all approvals required to build and operate the system. • *Completion Risk* – the risk that the satellite system will not be completed within the established performance, schedule and cost objectives.
Operational Phase	*Market Risk* – the risk that the target market will not materialise.

2.6.4 Cost of Response

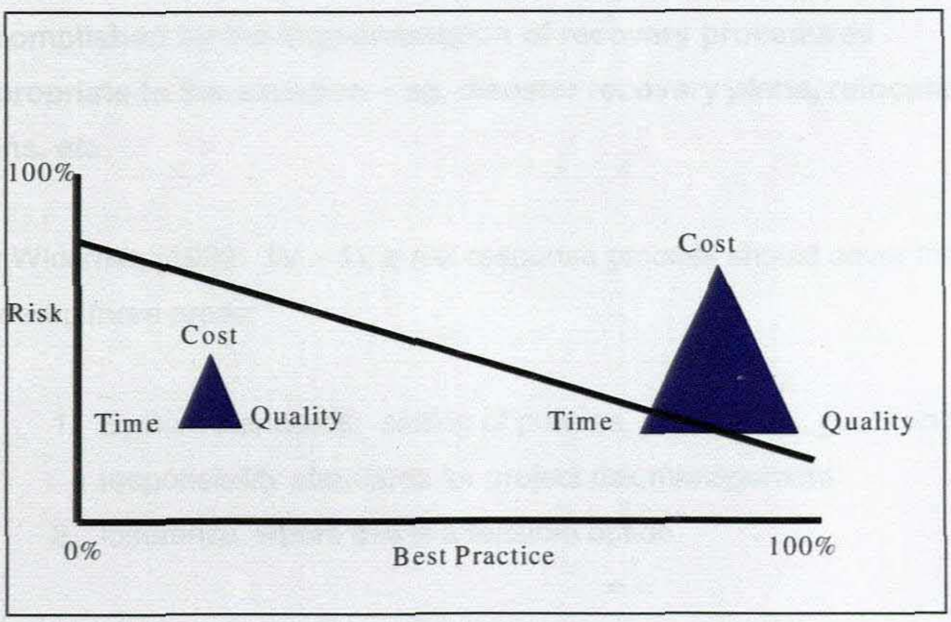
A key consideration in any response to project risk will be the cost. As Remenyi (1999: 125) points out, **The total amount expended on removing or reducing a risk should never be more than the cost of the problem that could occur if the risk materialises.**

However, generally speaking, a greater or lesser range of options is available to the project manager for manipulating project outcomes through the skilful interplay of cost, schedule and outcome choices. As Smith (1999: 21) remarks,

> **For a given level of performance there is likely to be a narrow range of project durations which are commensurate with minimum cost. If the project is required earlier, the cost is likely to be higher because the project is effectively being accelerated. If the period is longer, perhaps because funding limits the resources which can be devoted to the project, then ultimately the cost is likely to be higher because the time-related cost of those resources and management effort increases. In periods of high inflation, either general or industry-specific, the effect of delay is multiplied. It is necessary to study and predict trends in the market and the economy, anticipate technological developments and the actions of competitors, because these are areas of significant uncertainty and hence risk.**

In more general terms, cost can also be seen as **amount of effort invested**. In a presentation to Old Mutual's Strategic Investment Committee (SICOM) in June 2002, the Group Project Support Office manager, Neville Langdon, pointed out that less effort invested in the cost-time-quality triangle would mean having to **live with** a higher risk profile. This is illustrated in figure 2.6 below:

Figure 2.6 Neville Langdon's Risk Reduction Illustration (2002)



2.6.5 Types of Response

Essentially, there are two generic types of response to risk, namely, *prevention*, and *contingency.*

Prevention plans, according to Smith and Merrit (November 2002: 6), are designed to ***deter*** the risk from occurring, while contingency plans are designed to ***minimise*** the effects of a risk if it does occur.

Burke (2001: 239) breaks the list down further, and identifies the following types of response to project risks, once they have been identified, quantified and prioritised:

- Elimination (ie, total avoidance or eradication)
- Mitigation (ie, reducing probability and impact)
- Deflection (ie, transferring the risk, eg, through insurance)
- Acceptance (ie, accepting the consequences of a risk occurring – a form of self-insurance)
- A combination of these.

Wideman (1992: 1V – 1) identifies essentially the same list (as does Kerzner) but adds **sharing**, while Beaumont and Southerland (1992), as quoted in Barnes, Seamour and Xu (2000: 432), add **enable recovery**, which **must be accomplished by the implementation of recovery procedures appropriate to the situation – eg, disaster recovery plans, relocation plans, etc.**

For Wideman (1992: 1V – 1), a risk response process should cover the following three areas:

1. System standards: setting of policies, procedures, goals and responsibility standards for project risk management
2. Insurance, where this is a feasible option

3. Planning alternative courses of action, which could involve "adjustment, deflection or systematic contingency planning."

Knipe *et al* (2002: 353-4) provide a number of insights into effective contingency planning:

- **Contingency planning is "risk management planning for a known event. A contingency plan provides for alternative procedures to address the minimum acceptable level of output for a specific/unique project disruption or risk that is known, and often time bound, for example, work stoppage, labour action and lack of cash flow."**
- **Contingency planning evaluates alternative strategies for possible foreseen events before the risk events occur, and selects the best plan among alternatives.**
- **Early contingency planning facilitates a smooth transition to the remedy or workaround plan. Conditions for the activation of contingency plans should be decided upon early and documented thoroughly.**
- **All stakeholders involved in the project should agree on the contingency plans and commit their authority to the successful implementation of a contingency should circumstances call for such action. [or should the *trigger event/s* occur]**
- **Since implementing contingency plans calls for a disruption in the sequence of work, all contingency plans should be communicated to team members so that surprise and resistance are minimised.**
- **A trigger event is any event that indicates... that a certain threshold... has been transgressed, calling for alternative action.**
- **All trigger events should be carefully documented and distributed to team members.**

Following research on 75 software development projects, Barki, Rivard and Talbot (2001: 37) developed their *Integrative Contingency Model* of software project risk management. The basic hypothesis which their research findings support is that **The better the fit between the level of risk exposure of a software project and its management profile, the higher the project's performance**. (2001: 42). Thus, for example,

- a high risk project would require a high degree of information processing capacity in its management profile;
- a high risk project which was required to operate within tight budgetary constraints would require a high level of internal integration and high levels of formal planning; and
- one where quality was the major performance criterion would require high levels of user participation.

In other words, **one shoe size does *not* fit all feet**. The usefulness of Barki *et al's* findings is that it offers guidelines to the project manager which are *situation*-specific. This contrasts with the **shopping-list** type prescriptions which simply set out lists of **things to do** to avoid project failure. An example of such a list would be the Standish Group's **Chaos Ten** recipe for project success (see table 2.25 below):

Table 2.25. Standish Chaos Ten Recipe for Project Success *Source:* Standish Group International, Inc (1999: 4)

1. User Involvement	20 Points
2. Executive Support	15 Points
3. Clear Business Objectives	15 Points
4. Experienced Project Manager	15 Points
5. Small Milestones	10 Points
6. Firm Basic Requirements	5 Points
7. Competent Staff	5 Points
8. Proper Planning	5 Points
9. Ownership	5 Points
10. Other	5 Points

With reference to the Standish list above, ***how much* proper planning?** one might ask, particularly if project cost is a constraint. As it happens, Barki *et al*

(2001: 40) explain that, **... research in Organization Theory... recommends the use of low levels of formal planning in high-uncertainty environments**. They add,

> **This argument stems from the idea that rigidities inherent to high levels of formal planning decrease an organisation's ability to adapt to external changes associated with uncertain environments. In the context of software development, too much emphasis on the use of formal planning tools is thought to be inappropriate for high risk exposure projects since the information needed for planning is often unavailable, and key elements of the project are not well understood. In contrast, employing formal planning tools is seen as useful in low-risk exposure projects because they can help structure the sequence of tasks in addition to providing realistic cost and time targets.**

Risk-types could, of course, also be industry-specific. For example, Gerosi *et al* (2001: 4) commenting on the commercial space satellite industry have identified the following **barriers** to effective implementation of a Risk and Opportunity Management Strategy:

- Technical arrogance and individualism of the engineering staff (according to Gerosi *et al*, **... engineers are mainly trained toward a strong individual technical excellence, while few of them receive education on team building and communication skill...**)
- Information ownership linked to personal power (which hampers the sharing of information among employees)
- A tendency to deny the existence of project risk, such that **messengers** who bear tidings of project risk tend to suffer persecution.

2.6.6 Risk to Reward Ratio

A well-known response to risk – particularly in investment projects – is that known as the **risk to reward ratio**. (see, for example, Raftery, 1004: 61;). Two practical illustrations are provided:

- Probably the safest investment is government bonds, which also offer the lowest return to investors. By contrast, ordinary shares traded on the stock exchange are more risky, but also offer a significantly higher return.
- Insurance companies charge higher premiums when the following kinds of factors (in essence, higher risk factors) are present: fast car, young driver, previous accident history, etc.

Offering a higher reward for higher risk does not, of course, eliminate or reduce the risk. It merely incentivises those with a stake in the project's outcome.

2.6.7 Integration

Smith and Merritt (2002: 1-9) have developed what they call a **Standard Risk Model** which – along with their **Risk Management Process** - in effect integrates the PMBOK processes of identification, analysis and response. The result is a practical tool for the management of project risk.

Broadly, the model is based on the following sequence of actions for each risk:

1. The starting point is identification of a **risk event**, or trigger which could make a risk a reality.
2. Next, the impact (or undesirable consequence) of the risk event must be described
3. The concept of **risk event drivers** is introduced. Risk event drivers, according to the authors, **are simply the facts in the project environment that lead [one] to believe that the risk event and its impact could occur**. This strengthens the factual basis of the risk.

4. Identifying risk event drivers also provides insight into the probability of particular risks occurring. The fourth step is to determine a probability rating for the risk in question
5. The final step is to determine the magnitude of the **total loss**, that is, the combined effect of probability x impact.

The Standard Risk Model is part of the larger 5-step Risk Management Process, and forms the first three steps of the latter. Steps 4 and 5 are **resolve risks**, and **monitor risks**, respectively.

2.6.8 Conclusion

The literature on project risk management appears to be well-established and voluminous, with PMBOK providing a unifying base. There is consistency in how project risk is defined, as well as in the processes for its management. Perhaps the strongest variation lies in techniques advocated for the identification of project risk, with some authors preferring quantitative approaches, and others, qualitative.

A key finding in this review of the literature is that there exists no **silver bullet** for project risk management. While good tools are indispensable aids in any endeavour, all the theories, tools, techniques and models that have been devised are no more than that - *aids* to the management of project risk. The critical factor remains *skilful* management decision-making. This should not be surprising – the scalpel does not perform the operation, nor does the putter sink the shot; they are aids, the better the scalpel and putter, and the more *skilfully* they are used, the more likelihood there will be of a successful outcome. It is no different in project risk management.

This study proceeded to examine what aids were available to the project managers of the projects in question, and how skilfully these aids were used.

Chapter 3. Design of the Study

3.1 Introduction

According to the PMBOK Guide (2000: 127) project risk management consists of the following processes:

- Risk *identification*
- Risk *analysis*
- *Responding* to project risk

Various authors have expanded upon this basic set of core processes. For example, Schwalbe (2004: 393) has devised the following list:

- Risk management planning
- Risk identification
- Qualitative risk analysis
- Quantitative risk analysis
- Risk response planning
- Risk monitoring and control

For the purposes of this study, an analytical framework has been designed which is consistent with PMBOK and the general literature. It also uses the core processes identified by PMBOK, but emphasises the criticality of management's role in project success. This so-called **analytical framework** has been set up in the form of a questionnaire, shown in Appendix A.

3.2 Analytical Framework

3.2.1 Project Risk Management Policies

Top management expresses its leadership through policy. The various Standish Reports have indicated how important top management support is to project success (see, for example, Schwalbe, 2004: 40). Schwalbe comments:

> **A very important factor in helping project managers successfully lead projects is the level of commitment and support they receive from top management. In fact, without top management commitment, many projects will fail.... [P]rojects are part of the larger organizational environment, and many factors that might affect a project are out of the project manager's control. Several studies cite executive support as one of the key factors associated with the success of virtually all projects.**

For this reason, **project risk management policies** is the first point of enquiry. Questions in the analytical framework designed to elicit the relevant information about policy include the following:

- Does the organisation have a risk management process or strategy in place?
- Does the organisation have a project risk management policy?
- Was the organisation's risk management policy – if any – observed?
- Was the project agreed or launched despite the presence of any of the following circumstances:
    - The organisation cannot afford to lose
    - The exposure to the outcome is too great
    - The situation or project is just not worth it
    - The odds are not in favour of the project
    - The project is no more than a 'fair bet'
    - The benefits are not identified
    - There are a large number of acceptable alternatives
    - The risk does not result in the achievement of a project objective
    - The expected value from the baseline assumptions is negative
    - There is not enough data to compute the results

- The data is unorganised
- A contingency plan is not in place should the results prove less than satisfactory.

3.2.2 Project Success Criteria

What constitutes project success? The simple answer, according to McLeod & Smith (1996: 34) is, **...when it satisfies all three of the following criteria:**

- **It meets requirements (of functionality, reliability, maintainability, portability, efficiency, integration and operability)**
- **It is delivered on time**
- **It is delivered within budget.**

But as Kerzner points out, (1998: 6) there could be other, additional measures of success, too, such as

- With acceptance by the customer/user
- When the customer's name can be used as a reference

Thus, a project could overrun its budget or schedule yet be deemed a success.

For this reason, it is important for the project manager to develop a clear understanding of what, on his particular project, specifically constitutes success (and failure).

The analytical framework developed for this study contains a number of questions to assist in understanding whether indeed the criteria for project success had been determined:

- Have the criteria for project success been established?

- Have the criteria for project failure been established?
- Have tolerance bands for project delivery been identified?
- Have trade-offs been identified, such that the project team is aware of how to decide between conflicting delivery-priorities?
- Were the objectives and key criteria for successful delivery established at the *outset?* Were they reviewed during the project life cycle?
- Has management indicated how important the project is?
- Has management defined and authorised the project objectives?
- What steps has management taken to ensure delivery of the project objectives?
- Has management satisfied itself that the project has been adequately resourced to deliver the project objectives effectively?
- How can management be confident that any risk to project delivery, such as project problems, shortcomings, budget shortfalls, scope limitations, etc, are promptly identified and reported for its attention?
- Are any of the following identified as project success criteria?
    - Completion of the project within the allocated time period
    - ... and budgeted costs
    - .....and at the specified performance level
    - to the customer's satisfaction
    - with minimum disruption
    - with mutually-agreed scope changes
    - other?

3.2.3 Project Risk Identification

Project risk identification is a cornerstone-process within the overall project risk management process. In the analytical framework, various questions were formulated to explore how this process was applied on the projects being studied. These questions include the following:

- Were project risks identified?
- What processes were used to identify project risks?
    - Checklists
    - Focus groups
    - Expert opinion and inputs
    - Brainstorming sessions
    - Other?
- At which points in the project life cycle were risks identified?
- Who participated in the risk identification process?
- Into what categories were the identified risks placed?
- How many risks were identified?
- Were action plans formulated to deal with identified risks?
- Was a report on identified risks prepared for management's attention?

3.2.4 Project Risk Assessment

For the **second cornerstone process**, that of project risk assessment, the following questions were developed:

- Does the organisation have a risk assessment process in place?
- Were identified risks assessed?
- What criteria were used to assess qualitative risks?
    - Probability
    - Impact
    - Severity
    - Data precision
    - Other?
- Were identified risks prioritised?
- What processes were used to assess risks?
    - Focus groups
    - Expert opinion and inputs
    - Brainstorming sessions

- Past experience
- Other?

- At which points in the project life cycle were risks assessed?
- Who participated in the risk assessment exercise/s?
- Into what categories were the assessed risks placed?
- Were quantitative processes of risk assessment used, if applicable?
- Have risk and return been aligned?

3.2.5 Project Risk Response Measures

The final part of the analytical framework covered questions on the response to project risk:

- Have resources been allocated to respond to risks?
- Are risks reviewed on a regular basis?
- Have incentives been identified for the effective management of risks?
- Has a risk management plan been drafted?
    - How?
    - By whom?
    - When?
- Does the risk management plan provide for
    - Policies, standards, procedures?
    - Guidelines to action?
    - Authorisation to act?
    - Reporting, documenting and communication requirements?
    - Funding?
- Have specific response-measures been identified in advance? For example
- Measures to *eliminate* risk, i.e. to avoid the occurrence of the risk
- Measures to *mitigate* the effects of any risk, should it occur
- Measures to *deflect* or transfer the risk, e.g. through insurance

- Decision to *accept* the consequences of a particular risk, should it occur, i.e. to deal reactively with its consequences
- Are there proactive, tested, reliable controls in place?

3.3 Fact-gathering Process

As already mentioned, the questions devised in the analytical framework described above, were structured into an interview questionnaire (see specimen attached as Appendix A) which was used in the following interviews:

- With the SSA Project managers, Warren Francis (business project manager), and Peter Harvey (technical project manger) on 20 August 2004.
- With the CRAFT Project manager, Sharon Watkins on 25 August 2004

In addition to the abovementioned interviews, pertinent information was also obtained from a study of project-specific documentation, as acknowledged in the list of reference sources below. The questions in the analytical framework assisted in providing direction and focus to the study of the project documentation.

Chapter 4. Secure Services Authentication (SSA) Project

4.1 Background

On 11 May 2001, a Strategic Investment Proposal (SIP) was drafted by Old Mutual's e-Commerce unit, motivating a spend of R6.3 m to

> **... provide a means for a single, secure registration, authentication and login process for Old Mutual clients, intermediaries and 3rd parties wishing to access OMSA business services via open channels, for example online and voice/IVR.**

The executive summary elaborated as follows:

> **The demand for e-commerce is on the increase. Old Mutual has instituted measures to cater for this demand. However, the current on-line Old Mutual presence is fragmented, unstable and not entirely secure or user friendly. If measures are not put in place to address and correct these issues, Old Mutual will lose out on potentially large revenue streams. Old Mutual could also suffer significant brand damage and loss in client confidence if its on-line presence does not support the world class image it portrays in media and advertising. GreenKey Phase II[1] is intended to be a significant step in achieving a world class on-line presence. Its implementation will ensure a streamlined on-line offering that is stable, secure and user friendly.**

The project scope objectives were described as follows:

- **Establish a robust, scalable client registration and authentication system for all OMSA business units and all supported channels allowing a client to use a single user identification to interact with every business unit**
- **Develop a single, secure authentication framework, providing for group-wide rather than business unit specific authentication**
- **Automate manual processes**

[1] The SSA Project was initially known by the title, "GreenKey Phase II.

- **Develop and implement processes and organisational capability to deliver ongoing client support for the single on-line registration and authentication solution**

The risks were listed as follows:

Table 4.1 GreenKey Phase II SIP Risk Listing

Risk	Mitigation
Not identifying the relevant business units' requirements	Continual dialogue with the business units to identify the requirements and whether or not the proposed solution will meet them. Also educating business units on issues, solutions and risks of authentication technology
Developing a solution that will soon become outdated	Try to identify what the requirements may be in five years time. Employ additional resources now to develop a solution that is scalable and ready for growth and change
Not all stakeholders are involved in a common group solution	Continual dialogue with stakeholders to emphasise the need for a common group solution
Not implementing the solution in a timely manner so as to stay ahead, or at least abreast, of the competition	Develop and implement a solution by the end of 2001
New statutory requirements relating to data protection, security, secure sites and on-line transacting will not be catered for	Anticipate the possible statutory changes relating to the on-line environment by staying abreast of current issues in both Europe and the USA. Build on existing efforts by IRM programme

A large number of business units were affected by the proposed solution:

- Individual Life
- Investment Frontiers
- Unit Trusts
- FundsNet
- OMBS
- Galaxy
- Employee Benefits
- Group Schemes
- Health Care
- PFA and BD (Gateway)

The users of the SSA solution would be the business units themselves, as well as their clients and intermediaries. Thus, it was going to be important to ensure that the project delivered an outcome which met the requirements of the multiple business units, or at least did not conflict with their requirements. The awareness of this need was reflected in the first risk listed above – ***Not identifying the relevant business units' requirements.***

The project received Strategic Investment Committee (SICOM) approval. Thus, it was required to be managed according to SICOM's requirements for strategically-important projects. These requirements were outlined in the document entitled, *Strategic Investment Authorisation Policy and Procedures,* revised from time to time. A sample of the requirements specified in the version of this document dated 12 November 2001, is as follows:

1. Investment Policy

   1.1 Introduction
   1.2 Scope
   1.3 Authorisation levels
   1.4 Authorisation process
   1.5 Proposal content
   1.6 Cost overruns and changes
   1.7 Post-implementation review
   1.8 Business Benefits
   1.9 Budgeting
   1.10 Ongoing reporting

The project start date was set at 15 January 2001.

4.2 Project Risk Management Policies

As project managers, Warren Francis and Peter Harvey noted in an interview (see interview record, Appendix B) on 20 August 2004:

Because this project was identified as a Group-wide strategic project, it was subject to the Group governance principles. This means that it would have had to follow Sicom's best practice guidelines for all aspects of programme and project management, including project risk management.

For risk management, specifically, the process required us to identify the project risks upfront, and list them in our business case. It also required some form of risk prioritisation, and an indication of how the more serious risks would be addressed.

More generally, the so-called best practice approach to project management required a structured approach to managing all aspects of the project through its life cycle. This in itself – while not overtly *risk management* – would have mitigated certain inherent risks, such as the risk of overrunning time or cost.

The company has a well-formulated and strict governance for all system-related initiatives. For us to have stood any chance of implementing this project, we would have had to satisfy the fairly stringent rules laid down by our Group Technology department. This might be seen as a way of dealing with "technology risk" even though we might not have conceptualised it as such.

So, yes – there was a formalised project management process and policy framework within which we had had to operate.

4.3 Project Success Criteria

As mentioned in the background section above, a number of business units were affected by the project. For this reason, special rigour would have been necessary in specifying project success criteria. As it happened, this is an area where the project fell short.

According to the project managers:

It was made very clear to the project team by the steering committee that the main criterion was to put in place a solution which successfully addressed the audit concerns, but within the cost parameters established.

By implication, (a moderated degree of) schedule-overrun (or, for that matter, any other slippage in delivery) would be tolerated, provided the basic requirements of the project were met.

This conflicted to some extent with the needs of the individual business units, whose specified requirements were consequently subordinated. The situation which subsequently arose was one in which the Group – generally speaking – deemed the project to have delivered successfully, while certain of the business units felt otherwise, mainly because some of their custom requirements were not seen to be granted adequate attention.

In a post-project review analysis dated November 2003, a member of the management board for the SSA Project observed:

The project was well managed in terms of adherence to process and communications. However, agreeing business requirements was a major problem. Because this was a group project each BU had input to the requirements and the project was hard-pressed to keep all parties happy and still come up with a good, cost-effective solution. This aspect was not well managed and as a result the project slipped in time, the scope grew in size and complexity, and the project started to struggle.

In the meeting record of the management board's post-project review session on 25 November 2003, the following point was made:

A key risk facing projects of this nature is the "group vs business unit" focus. It is an oversimplication to say that all business units should simply conform to group norms, while it is equally problematic to try to factor in (all) individual business unit requirements. In similar projects in the future, this area needs to be thoroughly researched, to ensure that all valid issues are properly addressed. Considerations include the following:

- If the overriding need is to address a group-based problem, then *group* needs should predominate; that is, business units should adapt *their* systems and processes to fit the (single) group standard
- On the other hand if customisation is essential to accommodate non-negotiable business needs, then this should be allowed, and the affected business units should bear the cost of the additional work/customisation

- **Communication is vital to ensure that all parties understand (and buy into) the rationale for going any particular route.**

Because the project success criteria were not unambiguously determined, perceptions of the project outcome were contradictory, as the following examples show:

- **This was a group-wide project of significant technical and process complexity. It overran by about 100% in terms of both time and budget. In hindsight, too much freedom was given to Business Units to include their specific requirements. Had Group e-Commerce had a stronger relationship with the BUs (as it does now) this would probably have been different and some of the slippage would have been avoided. In the end it demanded a huge effort from the project team and much financial negotiation from the business owner to keep the project going and ultimately deliver. They should be commended for that. As group IT projects go, this was pretty successful. (Comment by member of the management board)**

- **Even though I think the project was a disaster, I really admire the SSA Project team for their determination to implement the project. (comment by a user from the Fairbairn Capital business unit)**

- **Thus, although we were succeeding in implementing a world-class solution that would result in competitive leadership for our company, few people understood this or appreciated its significance. Instead, there was a lot of griping among business units around their dissatisfactions with their requirements and charges. A more "marketing-oriented" approach to our communications might have made a world of difference.... It is pleasing to be able to say that we succeeded in putting in a truly world class solution, and that we did so largely within the terms of our mandate. (comment by project managers)**

4.4 Project Risk Identification

For the SSA Project, risk management was the subject of ongoing project management attention, at least insofar as it was a reporting category in the monthly SICOM Dashboard report.

The following sample dashboards show movement in the risk listing in each month cited, suggesting that risks were the subject of conscious attention.

Table 4.2 Risks in sample SSA dashboards

Dashboard	(Six) Highest Project Risks Specified
July 2001	• Related project dependencies (GCS, IRP) • Infrastructure • Product selection and cost • Approval of policy and procedures
August 2001	• Related project dependencies (GCS, IRP) • Infrastructure • Product selection and cost • Approval of policy and procedures • Agreement on standardised processes • New take-ons to SSA that will have to be migrated
October 2001	• Related projects (interim stabilisation) • Operational impact • Product selection and cost • Approval of processes, stds, policy and proc • New take-ons to SSA that will have to be migrated • Effort involved to configure product
August 2002	• Performance issue in Netpoint product: 49 • Impact on related projects: 49 • Aggressive timeline with limited resources: 47 • Scope creep: 30 • Complex client migration process: 28 • Operational and client impact: 28
September 2002	• Performance/stability problem in Netpoint product: 64 • Vendor agreement on accountability: 54 • Impact on related projects: 42 • Aggressive timeline with limited resources: 49 • Scope creep: 36 • Ordering of Hardware: 36
November 2002	• EB Compass readiness: 46 • Vendor commitment: 42 • Vendor agreement on accountability: 42 • QA&Prod could introduce new complexities: 36 • High operational costs: 36 • Performance/stability problems in Netpoint: 16

According to the project managers, risks on the project were not managed in terms of a formal **risk identification process**:

> **The approach tended to be reactive, and focused on the big-ticket items, such as the risk that the off-shore provider might fail.**
>
> **... The approach to risk identification was probably driven more by intuitive factors and the experience of the project team rather than a specific risk process. It would probably have helped if, say, a risk checklist were available for scrutiny, as this would have had the benefit of prompting us to think of risks which we might otherwise have overlooked.**

This might be why a member of the core project team, in the post-project review done in November 2003, remarked, **I believe the following were neither established nor achieved: criteria for measuring completion and success, and project risks and actions.**

4.5 Project Risk Assessment

Risks were assessed in terms of the qualitative method prescribed in the company's X-Pert methodology. However, as the project managers observed in their interview on 20 August 2003:

> **It is probably true to say that our commitment to these guidelines was no more than marginal. Perhaps a more scrupulous adherence to them might have mitigated actual risk more effectively, but there is also a possibility that we could have created needless red tape for ourselves. Our approach might best be illustrated with reference to a travel metaphor: when one travels to work by car everyday, one is not likely to do a detailed safety check before each departure. However, if one is going to fly a light aircraft to, say, Johannesburg, then one will regard a full-scale safety check as imperative.**
>
> **As mentioned in several places above, our approach was to manage all aspects of the project as best we could to achieve the specified objectives. In the process, we would have addressed a number of key risks, or be it reactively.**

It is apparent that once risks on the SSA Project were identified **(or be it reactively)** definite attempts were made to do a qualitative assessment of them, and this would have assisted the project managers to determine their priorities. However, by identifying risks **reactively**, assessment – and therefore, preventive action – would of necessity also be reactive.

4.6 Risk Response Measures

There was no specific risk management plan in place for SSA. Thus, key questions relating to the management of project risk did not receive proactive attention. In the absence of a risk management plan, no specific provision existed to address the following key areas:

- Policies, standards, procedures and action-guidelines for the management of project risk
- Obtaining of special funding and resourcing to manage project risk

This might be the reason that a user from the Unit Trust business unit remarked, **[T]he Project was too ambitious. The 'Big Bang' approach should not have been applied to such a high-risk project.**

4.7 Conclusion

SSA's mandate was to ***provide a means for a single, secure registration, authentication and login process for Old Mutual clients, intermediaries and 3rd parties wishing to access OMSA business services via open channels...*** (SIP for GreenKey Phase II, dated 11 May 2001). There is no disputing that it delivered on this mandate. Indeed, the management board post-project review on 25 November 2003 noted:

> **Despite the difficulties in implementing the current solution, there are a number of real, specific benefits, including:**
>
> - **We have a superior product in place**
> - **We are ahead of the pack in terms of implementing a secure solution**

- **Only 10% of what the product can actually do is being utilised at the moment. There is thus considerable potential for business benefits to be harvested in coming months.**
- **A platform has been created which is scaleable.**

Yet, the project managers were forced to concede that,

> **... although we were succeeding in implementing a world-class solution that would result in competitive leadership for our company, *few people* understood this (my emphasis) or appreciated its significance. Instead, there was a lot of griping among business units around their dissatisfactions with their requirements and charges." (interview with project managers on 20 August 2004).**

Thus, although ***[n]ot identifying the relevant business units' requirements*** was the first risk identified in the list of risk described in the SIP, it was also the risk least effectively managed.

In summary, the analysis (based on the analytical framework) of the SSA Project shows the following:

Table 4.3 Summary of SSA findings

Risk Management Process	Findings	Comment
Project Risk Management Policies	The project operated according to SICOM's **best practice** requirements for strategic projects, which included provision for the formal management of project risks.	Although risks were the focus of regular, ongoing attention, the absence of a risk management plan meant that action was always going to be reactive.
Project Success Criteria	The criteria for project success were never clearly spelt out. This resulted in an unstable project scope, which in turn lead to a conflict between corporate and business unit requirements.	The failure to clarify the project success criteria is possibly the single most important shortcoming in the way in which risk was managed on this project.

Table 4.3 Summary of SSA findings - continued

Project Risk Identification	Project risks were identified upfront, and revised with each monthly project dashboard.	By maintaining the focus on risks, the project management team were ultimately able to deliver on their mandate, even though both cost and schedule were significantly overrun.
Project Risk Assessment	Various dashboards reveal that an attempt was made each month to prioritise the list of project risks. The company's qualitative risk assessment process was used for this purpose.	By applying a risk assessment process, the project team were able to focus on the priority issues facing them during the implementation of the project.
Project Risk Response Measures	There was no proactive risk management plan in place, which resulted in much of the corrective action taken being reactive.	Proactive planning would have highlighted potential risks *ahead* of their occurring. This in turn would have enabled the project team to devise a response strategy – also in advance.

Chapter 5. CRAFT Project

5.1 Background

Within Old Mutual's Group Schemes business unit, CRAFT was a project launched to **radically expand** the capability of the Group Schemes *Vantage* system.

Group Schemes was looking to strengthen the 'clientcentricity' of their service to their policyholders, but in a cost effective way. Thus, targeted project outcomes included lower administration costs, reduced levels of exception processing, and reduced duplication of resources.

Moreover, in building the new CRAFT technology platform, it was necessary to ensure that *Vantage* would be able to interact with other technologies within the larger Old Mutual corporation.

As the project manager, Sharon Watkins pointed out in an interview on 25 August 2003 (see interview record, Appendix C):

> ***Craft* was actually the second part of a bigger initiative to *acquire* and *install* what was the latest upgrade of the Vantage system.**
>
> **The real risk probably lay in the acquisition phase, which was the responsibility of I S management. They had to establish the business case for spending R10 million on a relatively untested system, but one with huge potential for our business.**
>
> **The second phase – the implementation or customisation phase – was what *Craft* ... was all about.**

5.2 Project Risk Management Policies

Although CRAFT was a largely business unit-specific project, it was nevertheless considered to be of sufficient strategic importance for Old Mutual's Strategic Investment Committee (SICOM) to require it to be logged on the company's portfolio of key projects. This meant that CRAFT would be subject to close central monitoring, and that it would have to conform to the company's project management 'best practice' requirements.

SICOM registration required, among other things, that CRAFT complete a *monthly dashboard report, in which project risk issues were highlighted.*

5.3 Project Success Criteria

According to the project manager, the project success criteria were established at the project scope determination phase. A document called the **macro scope of work** dated 20 December 2001, details the critical project success factors as follows:

1. **The appropriateness of the business requirements**
2. **The stability of the infrastructure**
3. **The effectiveness and efficiency of the Change Management process, i.e. skills and emotions**
4. **To have implemented a new security model.**

In addition, the macro scope of work document provided a detailed work breakdown structure (WBS). As an illustration of the detailed nature of the WBS, the portion for sub-project 1 is shown in table 5.1 below.

Table 5.1 WBS for CRAFT Sub-project 1

SUB-PROJECT 1 -	BUSINESS REQUIREMENTS IS:	(RO/SO)
1. The identification of the current process flows. 2. The benchmarking of all current transactions. 3. The identification of all service events – future. 4. The prioritisation of service events. 5. The determination of business rules in terms of: • Product rules • Manual checks • Validations 6. The determination of which product / rules impact on the process in terms of negotiation with stakeholders to changing the rules. 7. The mapping of new service events in terms of: • Process flow • Security requirements • Systems detail • Testing conditions 8. The field / admin testing to make sure that all parties are happy / agreed on – Branch testing. 9. The sign-off of specified events.		
SUB-PROJECT 1 -	**BUSINESS REQUIREMENTS IS NOT:**	
1. The RB / GP transactions. 2. The Peoples Bank Credit Insurance products. 3. The BWE. 4. The Pensions List 5. The compulsory F/B – JMEA		
SUB-PROJECT 1 -	**SPECIFICATION OF DELIVERABLES:**	
1. To have enquiring events specified delivered – screen design by 1st week by February 2002. 2. To have policy maintenance events specified. 3. To have cash withdrawal events specified. 4. To have cancellation events specified. 5. To have session events specified. 6. To have refund events specified. 7. To have premium events specified. 8. To have claims events specified.		

As a further indication that the CRAFT project's success criteria were spelt out in detailed, concrete terms, the following slide, which was drawn from a final report back presentation to the stakeholder board on 17 November 2003, is apposite:

Table 5.2 CRAFT Milestones Report

Milestones	Target Date	Actual Date
Phase 1: DB2 Conversion	15/02/02	15/02/02
Phase 2: Enquiries Event Installed	29/07/02	29/07/02
Phase 3A: Non-Financial Trx's	29/03/03	29/03/03
Phase 3B: Financial Transactions	30/06/03	04/07/03
FMS Version installed (Scope Change)		
Cancellations and Cash Withdrawals	30/06/03	30/06/03
Surrenders and Death/ Disability Trx	01/09/03	01/09/03
Funeral Transaction	02/10/03	02/10/03

As a result of the attention to detail in specifying project success criteria, Group Schemes management provided clear targets for project delivery. Thus, although there is reference to **scope creep** and a **lack of clarity** about deliverables (by one person) in the post project review done in November 2003, the project was regarded as a huge success (a comment in the post project review about how the project was run stated, **On the whole, [CRAFT was] a very well run project. There were many sub-projects and it was quite an achievement to get all these sub-projects aligned to a common goal.**)

5.4 Project Risk Identification

The macro scope of work dated 20 December 2001 shows the following detailed listing of project risks.

Table 5.3 CRAFT Risk Listing, 20/12/2001

High Risks	Rating	Actions to Reduce Risk
1. Lack of dedicated and experienced resources and insufficient backup	P10 X I10 = F100	1.1 Contract in the resources 1.2 Delay the deadline 1.3 Identify the backups
2. The impact of other initiatives on the bandwidth	P07 X I10 = F70	2.1 Monitor what's happening in the rest of the organisation

Table 5.3 CRAFT Risk Listing, 20/12/2001 - continued

3. The impact of Strategic Initiatives	P08 X I07 = F56	3.1 Renegotiate the time line and the priorities
4. The response time is too slow within Old Mutual and people may end up not using CRAFT	P05 X I10 = F50	4.1 The benchmark through put data
Medium Risks		
1. Inability to up skill in new technology	P04 X I08 = F32	
2. The slippage of CSC (USA) deliverables	P04 x I08 = F32	
Low Risks		
1. That leading edge technology is not as stable as the old technology	P07 X I03 = F21	
2. Legislative changes	P02 X I08 = F16	

Evidence is available over a period of 28 months from June 2001 to September 2003, that risks were actively monitored from month to month. An examination of the dashboard reports in this period show that every two or three (and in some cases, four) months either the list of risks or their factor ratings changed. This is shown in the table below[2]:

[2] Dashboards for the following months were not available: September and December 2001, and October and December 2002.

Table 5.4 CRAFT Monthly Risk Pattern

Months	6 Highest Project Risk & their Risk Factor Ratings Listed in the Sicom Dashboard Reports
June, July and August, 2001	• CSC slipping on delivery of STP program: 50 • Losing staff due to new technology skills: 40 • Quality of delivered product not up to scratch: 30 • *Appropriateness of Web software: 30* • Resistance of service staff to new procedure: 28 • Unskilling of technical staff: 24
October and November 2001, and January 2002	• Other business priorities: 54 • CSC slipping on delivery of STP program: 50 • Losing staff due to new technology skills: 40 • *Quality of delivered product not up to scratch:* 30 • Appropriateness of Web software: 30 • Resistance of service staff to new procedure: 28
February 2002	• The slippage of CSC (USA) deliverables: 80 • Lack of dedicated/experienced resources: 70 • The impact of other initiatives on the bandwidth: 70 • *The impact of strategic initiatives: 56* • Possibility of slow response times: 50 • Inability to upskill in new technology: 32
March, April, May, June, July, August, September, and November 2002	• Lack of dedicated/experienced resources: 70 • The impact of other initiatives on the bandwidth: 70 • The slippage of CSC (USA) deliverables: 60 • *The impact of strategic initiatives: 56* • Possibility of slow response times: 50 • Inability to up skill in new technology: 32
January and February 2003	• SSA security issues: 90 • Acquisition of Servers: 70 • Lack of dedicated/experienced resources: 70 • *The impact of other initiatives on the bandwidth:* 70 • The impact of strategic initiatives: 56 • Possibility of slow response times: 50
March and April 2003	• SSA security issues: 90 • Lack of dedicated/experienced resources: 70 • The impact of other initiatives on the bandwidth: 70 • *The impact of strategic initiatives: 56* • Possibility of slow response times: 50 • Users don't use the system: 50
May and June 2003	• Time constraints: 90 • Lack of dedicated resources: 80 • Quality of functionality due to time constraints: 72 • The impact of other initiatives on the bandwidth: 70 • *Impact of Unearned project on deadlines: 64* • The impact of strategic initiatives: 42

Table 5.4 *CRAFT Monthly Risk Pattern – continued*

Months	6 Highest Project Risk & their Risk Factor Ratings Listed in the Sicom Dashboard Reports
July, August and September 2003	• Time constraints: 90 • Lack of dedicated resources: 80 • Quality of functionality due to time constraints: 72 • The impact of other initiatives on the bandwidth: 70 • The impact of strategic initiatives (My Series): 64 • Response time of Craft: 35

As can be seen, the risks identified over the months of the project were mainly related to project delivery issues. Sharon Watkins explains:

> **As mentioned, the key risks were probably those related to acquiring the system, and as we have seen, these were effectively dealt with. Associated risks would have included such things as unfavourable forex movements and *failure on the part of the offshore-based provider. These never materialised.***

5.5 Project Risk Assessment

As can be inferred from the analysis in section 5.4 above, identification and assessment were managed as a single process.

For risks assessed as **high**, the process required that 1 or more actions by stipulated for addressing the risk.

CRAFT did not use quantitative risk assessment techniques, as the focus was on implementing a system for users, rather than financial justification of an investment.

5.6 Project Risk Response Measures

Sharon Watkins points out that there was no risk plan, but that risks were nevertheless proactively managed. **Certain risks were eliminated in the way that the project was structured,** she observes. **Others were monitored and dealt with as and when the need arose.**

A reason for not setting up a special risk plan was because, as the Ms Watkins explained:

> **We were not expecting major problems. This was a project for only *our* business unit (that is, it was not a cross-company implementation) so a major source of complexity was absent. Secondly, although the technology was new, Vantage had been our partner for more than a decade, and we knew them well. Thirdly, sound steps were being taken with regard to implementation – the project was well-resourced and had a high profile in the organisation. All these factors meant that most sources of potential project risk were effectively excluded from contention.**

Also,

> **[W]e did not see the need for *special* action to deal with risks over-and-above managing the project well. In the event, this proved to be correct.**

A positive consequence of this approach was that the project **did not see risks where there were none, so we did not waste resources on preparing for non-existent contingencies.**

5.7 Conclusion

Even though CRAFT marginally overran its scheduled delivery date, the project was still considered a huge success. In the post project review conducted in November 2001, most of the areas surveyed scored in excess of 80 percent. The following table shows a section of the survey results:

Table 5.5 CRAFT Post project review survey results for Project Concept (November 2001: 1)

QUESTION	AVERAGE
1. Was the need for the Project established?	8.38
2. Was sufficient business data gathered for the Project?	8.25
3. Was *sufficient technical data gathered for the Project?*	7.71
4. Was the feasibility of the Project confirmed?	8.00
5. Did you identify alternatives to the Project?	5.33
6. Were the high level Risks identified and classified?	8.38
7. Were the following established for the Project: 7.1 Goals and Objectives 7.2 Strategy 7.3 Potential Project resources 7.4 Guesstimates 7.5 Stakeholders. 7.6 Business Benefits	8.13
8. Was the Project concept presented to Senior Management? Please rate effectiveness	8.00
9. Was approval for the Project received? Please rate effectiveness	8.25

The project's success was attributed by the project manager to **a well-motivated and competent team**, and **by following a proven methodology**.

As she put it:

> **Risk management ended up being a secondary issue which was never going to have a major impact on our performance, unless something really untoward – and therefore improbable – was going to arise. In effect, this implies that by following a proven methodology in a reasonably consistent way, we actually were *eliminating the risk of poor delivery.* (my emphasis).**

Is it correct to conclude that, for CRAFT, risk management was indeed secondary to project success? This notion bears closer scrutiny.

- The project did not have to deal with any **untoward** event (to use the project manager's term) – something that Dey (2001: 634-639) would have referred to as an **act of God**. For example, the sudden resignation of the project manager would most likely have had serious repercussions on project delivery. The project would then have been obliged to launch a major risk mitigation effort (that is, respond reactively to the crisis). In this case, the post project review might well have reasoned that more secure measures for skills retention *should have* been in place upfront. This would have reflected poor risk management. However, in the event, no such contingency arose. Thus, with hindsight, it could be concluded that the fact that an improbable event that was not anticipated did not occur actually shows *good* risk management competency.
- The project manager indicated that the project was adequately resourced, and that, moreover, a moderate degree of schedule overrun would be tolerated. This immediately eliminated **schedule overrun** as a risk. In another context, schedule overrun might *not* have been tolerated. This emphasises the importance of establishing clear success criteria.
- Schmidt *et al* (2001: 16) list, among others, the following project management shortcomings as risks:

    - Not managing change effectively
    - Lack of effective project management skills
    - Lack of effective project management methodology
    - Poor or nonexistent control

It is clear that CRAFT suffered none of these. Thus it could be inferred that, because of the presence of good change management practice, good project management skills, an effective project management methodology, etc, the *project management risk* was effectively eliminated. This introduces the analytical dilemma posed by McGrew & Bilotta (2000: 293) – **If a team**

assesses the risks associated with a project and intervenes to minimize them and the project succeeds, was the intervention program successful, or would the project have succeeded anyway? It could be argued that any action which eliminates the possibility of a particular risk emerging, indirectly amounts to good risk management (prevention being 'better than' cure). If, in addition, one's project *does have* an active risk management process at work, then one can safely conclude that risk management *has* contributed to project success. This means that risk management is more than simply having a visible process in place, which identifies, assesses and responds to risk; it is also about preventive action. In the case of CRAFT, the project success criteria were well-specified; the project team was adequately resourced; accepted project management practices were being followed, and (as part of these project management practices) risks were being actively managed. Since CRAFT was an acknowledged success, it has to be concluded that good risk management practice was instrumental in this success.

Chapter 6. Conclusion and Recommendations

6.1 Conclusions

6.1.1 Establishment of Project Success Criteria

The difference between project success and failure could easily be a matter of how clearly success is defined. In the case of SSA, the project team believed it had achieved success because it had delivered on its basic mandate, while a number of its clients or stakeholders believed that it had failed, because it had not delivered on *their* expectations.

In the case of CRAFT, success was defined to include an allowance for some schedule overrun. Thus, when the project did indeed overrun its schedule, this was not regarded as sign of project failure or impairment.

It could therefore be concluded that **poor definition of project success criteria** is a key project risk. Alternatively, **good establishment of project success criteria** is an important risk-elimination or –reduction measure.

6.1.2 Value of a Good Risk Management Process

Probably the major risk experienced by the SSA project was **failure to manage end-user expectations** (to use Schmidt *et al's* term – 2000: 15), yet the closest the project team seemed to come to a realisation that this was a critical risk on their project was to list **scope creep** as a risk. It is tempting to conclude that had the project management team had access to a list such as Schmidt *et al's*, they would thereby have been prompted to see this risk more clearly, and would therefore have been in a better position to deal with it.

In addition, a carefully formulated risk action plan might have enabled the project team to establish risk elimination and mitigation strategies *in advance.* This would then have reduced the need for reactive response measures.

In the case of CRAFT, a good risk management process included the *elimination* of risk through good project management processes. One could therefore infer from this that any action which prevents a risk occurring (and therefore causing harm) is 'good' action.

The point about a good risk management process is not that it will work, invariably, but that it *could* have the desired effect. This recalls the analogy with the scalpel and the putter referred to in section 2.6.8 above – good tools and techniques – in skilful hands – *enhance* the chances of success.

In the case of both SSA and CRAFT, adherence to SICOM requirements was mandatory. This had the effect of ensuring that dashboard reports were produced on a monthly basis, and hence, that risks were reviewed on a monthly basis.

Based on these facts, there can be little question of the value of implementing a good project risk management process.

6.1.3 The Role of Risk Management in Project Success

In the case of SSA, it has been seen that the project was successful in delivering on its basic mandate, while having slipped on customer expectations. The role of project risk management practice in what success *was* achieved can be demonstrated by the fact that the major risk focus throughout the project was on risks which threatened the basic deliverable. It is therefore fair to say that addressing these risks through the risk management practices applied on the project *supported* successful delivery.

In the case of the risk which was 'missed' – that of customer expectations – the following is true: while it could be reasonably inferred that the deficient application of risk management practice might have contributed to the lack of establishing customer expectations, the reverse is *not* automatically true. That is, one cannot infer that *had* the project succeeded in identifying and managing this risk that this risk would then have been mitigated. Thus, it has not been shown that poor or deficient risk management practice has a role in project failure or impairment.

It has also been shown that a factor in the success of CRAFT was good risk management practice through the proactive, upfront elimination of project risk. This speaks powerfully in favour of preventive techniques.

It has been shown that, for both projects, the SICOM provisions – by requiring regular, ongoing review of project performance, and focusing on project risk as a specific area to be reported on – encouraged a 'culture' of risk management alertness. Thus, risk management practice would have been intertwined with or inseparable from, the successes achieved by each project.

In conclusion, it is posited that the evidence examined supports the contention that, on the projects studied, project risk management practice played a positive role in supporting project success.

6.2 Recommendations

6.2.1 Risk Checklists

The general literature on project management is rich in risk checklists, particularly for the *identification* of project risks. The value of such checklists is that they could prompt project teams to identify risks which might otherwise have been overlooked. In addition, new checklists add to the body of knowledge, and in this way provide new insights.

If organisations started off using a generic list, they could gradually move towards greater customising of the list, by increasingly identifying risks unique to themselves, and writing these risks into the checklist being used.

For this reason, it is recommended that organisations acquire or adopt a well-chosen generic project risk checklist, and make it mandatory for all project teams to use them.

6.2.2 The Discipline of Regular Reporting on Project Risks

In the case of both projects studied, the discipline of regular reporting which the SICOM governances required ensured that risk management remained the focus of regular, ongoing attention not only by the project manager, but by all affected parties or stakeholders, including the steering committee and the executive.

A recommendation would therefore be for all organisations to establish similar disciplines.

6.2.3 Areas for Further Research

6.2.3.1 Distinguishing Real from Imaginary Risks

McGrew & Bilotta (2000: 295) have devised a practical tool for gathering information about how accurately organisations are able to identify risks. Their **SDT Analysis Framework** shows how effectively organisations are able to distinguish real from imagined risks – that is, whether the dominant tendencies within the organisation are skewed towards **yea-saying** or **nay-saying**.

Empirical research within and across organisations would yield insight-building information in this regard. It would show how well organisations are able to identify areas of risk, whether they tend at over-cautiousness by targeting 'unnecessary' risks, or whether they tend to be too dismissive of risks which could materially impact their projects.

6.2.3.2 Risk Management Plans

A further area which could provide meaningful research findings is whether or not – and to what extent – risk management *plans* assist in the management of project risks. Do they justify the cost and effort? Are they effective in *all* projects? Which organisations are using them effectively?

As part of this exercise, or as a research project in its own right, the subject of *risk response management techniques* could provide organisations with useful insights. Such research could focus on which responses (avoidance, *mitigation, sharing, etc) are being used, and which more effectively.*

6.2.3.3 Upside Risks

The overwhelming focus in the literature is on downside risks. Almost invariably, risks are assumed to be the negative possibilities which could harm projects. The field is wide open for research into what constitutes positive or 'upside' risks. If organisations can improve their capacity for managing the kind of risks which result in opportunities, then they might well have found a *means of strengthening their competitive* edge.

The hesitance to focus on opportunities which arise in the course of project implementation is understandable, since opportunities need effort if they are to result in material gain. Effort, however, implies adding to scope, and this requires changes to scope as well as additional investments in resources. Opportunity-harvesting is, in effect, another form of the dreaded 'scope creep' – of which Schwalbe (2004: 167) comments, **There are many horror stories about... projects failing due to... scope creep.**

6.2.3.4 Further Case Studies into the Role of Risk Management Practice

Finally, case studies of the kind undertaken in this research project are to be encouraged in other organisations and industries as well, as they will help to build a knowledge base accessible to stakeholders in business. If a growing body of evidence supports a link between risk management practice and project success, then the wisdom in adopting sound risk management practices becomes irresistible. If, however, such a link cannot be incontrovertibly established, then this, too, will provide meaningful direction to business about the necessity (or otherwise) of employing such practice.

References Cited

Alexander, E., Oldert, N. 2002. *Profile's JSE Handbook: Jan 2002 – Jun 2002*. Johannesburg: Profile Media.

Atkinson, R.L., Atkinson, R.C., Smith, E.E., Bem, D.J. & Nolen-Hoeksema, S. 1996. *Hilgard's Introduction to Psychology*. 12th ed. International edition. Fort Worth: Harcourt Brace College Publishers.

Barki, H., Rivard, S. & Talbot, J. 2001. An Integrative Contingency Model of Software Project Risk Management. *Journal of Management Information Systems*, 17 (4): 37-69. Spring.

Barnes, J., Seamour, S., & Xu, M. 2002. *Systems and Project Management: CIMA's Official Study System, Intermediate Level*. The Chartered Institute of Management Accountants. Accra, Ghana: EPP Books Services.

Bernstein, P.L. 2001. *The Enlightening Struggle Against Uncertainty*. Financial Times: Mastering Risk, Volume 1: Concepts. Executive Editor James Pickford. Harlow: Pearson Education.

Billows, R. 2003. Qualitative Risk Analysis: An Ounce of Prevention, not Pounds of Paperwork. *The Hampton Group*. PMTalk Newsletter, The Project Management Control Tower, http://www.4pm.com.

Brealey, R.A. & Myers, S. 1991. *Principles of Corporate Finance*, 4th ed, International Ed, New York: McGraw-Hill, Inc.

Burke, R. 2001. *Project Management: Planning & Control Techniques*. 3rd ed. Cape Town: Promatec International.

Carey, A. 2001. Effective Risk Management in Financial Institutions: the Turnbull Approach. *The Balance Sheet*, 9 (3): 24-27.

Carey, A. & Turnbull, N. 2001. The Boardroom Imperative on Internal Control (10-14) in *Mastering Risk, Volume 1: Concepts,* Harlow: Pearson Education.

Chadbourne, B. 2001. Put Risk Management Training Wheels on Your Project Office: Enhance Risk Management with a Risk Database. *PM Network,* 15 (2): 34-38.

Chapman, C. & Ward, S. 1997. *Project Risk Management: Processes, Techniques and Insights.* Chichester: John Wiley & Sons.

Correia, C., Flynn, D., Uliana, E., & Wormald, M. 2003. *Financial Management.* 5th ed. Lansdowne, Cape Town: Juta & Co, Ltd.

Datta, S. & Mukherjee, S.K. 2001. Developing a Risk Management Matrix for Effective Project Planning – An Empirical Study. *Project Management Journal,* 32 (2): 45-57.

Dey, P.K. 2001. Decision Support System for Risk Management: a Case Study. *Management Decision*, 39 (8): 634-639.

DIR: Department of Information Resources, State of Texas. 2003. Process for Analyzing and Managing Project Risk. v.1.0 Initial Release March, 2000. Available at http://www.dir.state.tx.us/eod/qa/risk/.

Drury, C. 1992. *Management and Cost Accounting.* 3rd ed. Boundary Row, London: Chapman & Hall.

Field, M., & Keller, L. 1998. *Project Management.* London, Thomson Business Press.

Forsberg, K., Ph.D, Mooz, H., & Cotterman, H. 1996. *Visualizing Project Management.* New York: John Wiley & Sons, Inc.

Frosdick, S. 1996. Practical Management of Programme Risk: the Case of the National Strategy for Police Information Systems for England and Wales. *Information Management & Computer Security*, 4 (5): 24-33.

Gerosi, S., Nasini, F., Spazio S. p. A. – Italy. 2001. Project Financing and Risk Management: A new Challenge for Program Management in the Space Industry of the Third Millennium. (A Paper presented at the Fourth European Project Management Conference). *PMI Europe*. London, U K, 6-7 June.

Groebner, D. F. & Shannon, P. W. 1989. *Business Statistics: A Decision-Making Approach.* 3rd ed. Columbus: Merrill Publishing Company.

Heizer, J. & Render, B. 2001. *Operations Management.* 6th ed. Upper Saddle River, New Jersey: Prentice-Hall, Inc.

Ingebretson, M. 2002. In No Uncertain Terms. *PM Network,* 16 (12): 28-32.

Jiang, B. 2002. Risk Management and the Office of Homeland Security's Antiterrorism Tasks. *OJPCR: The Online Journal of Peace and Conflict Resolution.* 4.2: 30-36. Available at www.trinstitute.org/ojpcr/4.2jiang.pdf.

Kent Crawford, J. 2002. *The Strategic Project Office: a Guide to Improving Organisational Performance.* New York: Marcel Dekker, Inc.

Keown, A. J., Scott, Jr., D. F., Martin, J. D. & Petty, J. W. *Basic Financial Management.* 3rd ed. New Jersey: Prentice-Hall, Inc.

Kerzner, H., Ph.D. 1998. *Project Management: A Systems Approach to Planning, Scheduling, and Controlling.* 6th ed. New York: John Wiley & Sons.

Kindler, H. S. Ph.D. 1990. *Risk Taking: A Guide for Decision Makers.* Los Altos, Calif.: Crisp Publications Inc.

Kindlinger, J. P. & Darby, J.L. 2000. Risk Factor Analysis – A New Qualitative Risk Management Tool. *Proceedings of the Project Management Institute Annual Seminars & Symposium.* Houston, Texas. September 7-16.

Kirkwood, A. S. 1994. Why do we worry when Scientists say there is no Risk? *Disaster Prevention and Management.* 3 (2):15 – 22. MCB University Press [ISSN 0965-3562].

Knipe, A., van der Waldt, G., van Niekerk, D., Burger, D. & Nell, K. 2002. *Project Management for Success.* Sandown: Heinemann.

KPMG LLP. 2002. *Programme Management Survey 2002.* Available from the KPMG Risk Management Team at irm@kpmg.co.uk.

Matta, N.F. & Ashkenas, R.N. Why Good Projects Fail, Anyway. *Best Practice: Harvard Business Review.* September 2003, 109 –114.

McConnel, C.R., Brue, S.L. 1999. *Economics: Principles, Problems, and Policies.* 14th ed. International Ed. Boston: Irwin/McGraw-Hill.

McGrew, J.F. & Bilotta, J.G. 2000. The effectiveness of Risk Management: Measuring what didn't Happen. *Management Decision.* 38(4): 293-300. MCB University Press [ISSN 0025-1747] http//:www.emerald-library.com.

McLeod, G. & Smith, D. 1996. *Managing Information Technology Projects.* Cambridge: Course Technology.

Mobey, A. & Parker, D. 2002. Risk Evaluation and its Importance to Project Implementation. *Work Study.* 51 (4): 202-208.

Nicholson, N. 2000. *Managing the Human Animal.* London: Texere.

Old Mutual References (Internal)

CRAFT Project. *Project Dashboards.* 2001: June, July, August, October and November. 2002: January, February, March, April, May, June, July, August, September and November. 2003: January, February, March, April, May, June, July, August and September.

CRAFT Project. 2003. *Final CRAFT Stakeholder Board Presentation.* 17 November 2003.

CRAFT Project. 2001. *Macro Scope of Work (First Pass).* 20 December 2001.

CRAFT Project. 2003. *Post Project review Survey Feedback.* November 2003.

Group Internal Audit. 2003. *Audit Report: Strategic Projects Portfolio Management.*

Neville Langdon. 2002. Presentation*: SICOM Project Update June 2002*

Old Mutual Life Assurance Company (South Africa) Limited. 2002. *Detailed Business Case Proposal.* Document Version 1.1

Old Mutual South Africa. 1995. X-Pert™ Project Management Methodology: *Concept Scope of Work template.*

Old Mutual South Africa, Group E-commerce. 2001. *Strategic Investment Proposal: GreenKey Phase II.* May 2001.

Secure Services Authentication Project. 2003. *Post Project Review Survey Feedback.* November 2003.

Secure Services Authentication Project. 2003. *Post Project Review Session: Management Board.* 25 November 2003.

Secure Services Authentication. *Project Dashboard Reports.* July, August, and October 2001. August, September and November 2002.

Strategic Investment Committee. 2001. *Strategic Investment Authorisation Policy and Procedures.* 12 November 2001.

Pickford, J. (executive editor). 2001. *Mastering Risk: Volume 1: Concepts.* Harlow: Pearson Education.

Piney, C. 2003. Applying Utility Theory to Risk Management. *Project Management Journal.* September.

Project Management Institute. 2000. *A Guide to the Project Management Body of Knowledge (PMBOK Guide).* Newtown Square, Pa: Project Management Institute.

Preyssl, C., Atkins, R. & Deak, T. 1999. Risk Management at ESA. *ESA Bulletin,* March.

Raftery, J. 1994. *Risk Analysis in Project Management.* Boundary Row, London: E & F N Spon (an imprint of Chapman & Hall).

Redelinghuis, A., Julyan, F.W., Steyn, B.L. & Benade, F.J.C. 1994. *Quantitative Methods for Managerial Decision Making.* 2nd ed. Durban: Butterworths.

Remenyi, D. 1999. *Stop IT Project Failures Through Risk Management.* Oxford: Butterworth-Heinemann.

Rodney Turner, J. 1993. *The Handbook of Project-based Management.* London: McGraw-Hill Book Company.

Ross, S., Westerfield, R.W., Jordan, B.D. & Firer, C. 2001. *Fundamentals of Corporate Finance.* 2nd South African Ed. Roseville, NSW 2069, Australia.

Schmidt, R., Lyytinen, K., Keil, M. & Cule, P. 2001. Identifying Software Project Risks: An International Delphi Study. *Journal of Management Information Systems.* Spring. 17 (4): 5-36.

Schwalbe, K. 2004. *Information Technology Project Management.* 3rd ed. Boston: Thomson Course Technology.

Shevel, A. 2003. Managers Find Risk Strategy a Yawn. *Sunday Times Business Times.* October 19.

Smith, N.J. (ed). 1999. *Managing Risk in Construction Projects.* Oxford: Blackwell Science Ltd.

Smith, P. & Merritt, G. 2002. Dealing with Project Risk Successfully. *Product Development: Best Practices Report.* 9 (10): October 2002.

Smith, P. & Merritt, G. 2002. Dealing with Project Risk Successfully. *Product Development: Best Practices Report.* 9 (11): November 2002.

The Standish Group International, Inc. 1999. *Chaos: A Recipe for Success.* www.standishgroup.com.

Webster, G. 1999. *Managing Projects at Work.* Gower, cited in *The Antidote* 2000 issue (available: www.theantidote.co.uk).

Welman, J.C. & Kruger, S.J. 2001. *Research Methodology for the Business and Administrative Sciences.* 2nd ed. Cape Town: Oxford University Press.

Wideman, R. Max (ed). 1992. *Project & Program Risk Management: A Guide to Managing Project Risks & Opportunities.* Sylva, NC: Project Management Institute.

APPENDIX A

PROJECT RISK MANAGEMENT QUESTIONNAIRE

Project Name:	
Project Manager:	
Questionnaire completed By:	
Date:	

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1. Project Risk Management Policies

Question	Comment
1.1 Does the organisation have a risk management process or strategy in place?	
1.2 Does the organisation have a project risk management policy?	
1.3 Was the organisation's risk management policy – if any – observed?	
1.4 Was the project agreed or launched despite the presence of any of the following circumstances: • The organisation cannot afford to lose • The exposure to the outcome is too great • The situation or project is just not worth it • The odds are not in favour of the project • The project is no more than a 'fair bet' • *The benefits are not identified* • There are a large number of acceptable alternatives • The risk does not result in the achievement of a project objective • The expected value from the baseline assumptions is negative • There is not enough data to compute the results • The data is unorganised • A contingency plan is not in place should the results prove less than satisfactory.	

Continued on the next page

2. *Project Success Criteria*

Question	Comment
2.1 Have the criteria for project success been established?	
2.2 Have the criteria for project failure been established?	
2.3 Have tolerance bands for project delivery been identified?	
2.4 Have trade-offs been identified, such that the project team is aware of how to decide between conflicting delivery-priorities?	
2.5 Were the objectives and key criteria for successful delivery established at the *outset?*	
2.6 Were they reviewed during the project life cycle?	
2.7 Has management indicated how important the project is?	
2.8 Has management defined and authorised the project objectives?	
2.9 What steps has management taken to ensure delivery of the project objectives?	

Continued on the next page

2. Project Success Criteria – *continued*

Question	Comment
2.10 Has management satisfied itself that the project has been adequately resourced to deliver the project objectives effectively?	
2.11 How can management be confident that any risk to project delivery, such as *project problems, shortcomings, budget* shortfalls, scope limitations, etc, are promptly identified and reported for its attention?	
2.12 Are any of the following identified as project success criteria? • Completion of the project within the allocated time period • *... and budgeted costs* • .....and at the specified performance level • to the customer's satisfaction • with minimum disruption • with mutually-agreed scope changes • other?	

3. Project Risk Identification

Question	Comment
3.1 Were project risks identified?	
3.2 What processes were used to identify project risks? • Checklists • Focus groups • Expert opinion and inputs • Brainstorming sessions • Other?	

Continued on the next page

3 Project Risk Identification - continued

Question	Comment
3.3 At which points in the project life cycle were risks identified?	
3.4 Who participated in the risk identification process?	
3.5 Into what categories were the identified risks placed?	
3.6 How many risks were identified?	
3.7 Were action plans formulated to deal with identified risks?	
3.8 Was a report on identified risks prepared for management's attention?	

4. Project Risk Assessment

Question	Comment
4.1 Does the organisation have a risk assessment process in place?	
4.2 Were identified risks assessed?	

Continued on the next page

PROJECT RISK MANAGEMENT QUESTIONNAIRE – continued

4. Project Risk Assessment - continued

Question	Comment
4.3 What criteria were used to assess qualitative risks? • Probability • Impact • Severity • Data precision • Other?	
4.4 Were identified risks prioritised?	
4.5 What processes were used to assess risks? • Focus groups • Expert opinion and inputs • Brainstorming sessions • Past experience • Other?	
4.6 At which points in the project life cycle were risks assessed?	
4.7 Who participated in the risk assessment exercise/s?	
4.8 Into what categories were the assessed risks placed?	
4.9 Were quantitative processes of risk assessment used, if applicable?	
4.10 Have risk and return been aligned?	

Continued on the next page

5. Project Risk Response Measures

Question	Comment
5.1 Have resources been allocated to respond to risks?	
5.2 Are risks reviewed on a regular basis?	
5.3 Have incentives been identified for the *effective management of risks?*	
5.4 Has a risk management plan been drafted? • How • By whom • When?	
5.5 Does the risk management plan provide for • Policies, standards, procedures • Guidelines to action • Authorisation to act • Reporting, documenting and communication requirements • Funding	
5.6 Have *specific response-measures* been identified in advance? For example • Measures to *eliminate* risk, i.e. to avoid the occurrence of the risk • Measures to *mitigate* the effects of any risk, should it occur • Measures to *deflect* or transfer the risk, e.g. through insurance • Decision to *accept* the consequences of a particular risk, should it occur, i.e. to deal reactively with its consequences	
5.7 Are there proactive, tested, reliable controls in place?	

End

Appendix B

PROJECT RISK MANAGEMENT QUESTIONNAIRE

Project Name:	Secure Services Authentication (SSA)
Project Manager:	Warren Francis
Persons Interviewed:	Warren Francis and Peter Harvey
Date:	20 August 2004

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1. Project Risk Management Policies

Question	Comment
1.1 Describe the risk management policy framework within which the project was executed.	Because this project was identified as a Group-wide strategic project, it was subject to the Group governance principles. This means that it would have had to follow Sicom's best practice guidelines for all aspects of programme and project management, including project risk management. For risk management, specifically, the process required us to identify the project risks upfront, and list them in our business case. It also required some form of risk prioritisation, and an indication of how the more serious risks would be addressed. More generally, the so-called best practice approach to project management required a structured approach to managing all aspects of the project through its life cycle. This in itself – while not overtly *risk management* – would have mitigated certain inherent risks, such as the risk of overrunning time or cost. The company has a well-formulated and strict governance for all system-related initiatives. For us to have stood any chance of implementing this project, we would have had to satisfy the fairly stringent rules laid down by our Group Technology department. This might be seen as a way of dealing with "technology risk" even though we might not have conceptualised it as such. So, yes – there was a formalised project management process and policy framework within which we had had to operate.

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PROJECT RISK MANAGEMENT QUESTIONNAIRE – continued

Question	Comment
1.2 To what extent was the organisation's risk management policy observed?	A set of high-level risks were identified for the project and described in our business case, upfront. In addition, once the project was up-and-running, we reported on risks (among other aspects) on a monthly basis, as required by the Sicom reporting process. This required us to monitor probability and impact factors on an ongoing basis. The status indicator for a (currently) high risk was red on the Sicom dashboard report, for a moderate risk, amber, and a low risk, green. It was a requirement that we report satisfactorily on how we were managing especially the red indictors, since the reds were obviously the main concerns of Sicom. It should be mentioned that all risks were not necessarily managed as risks, *per se*. For example, any project runs the risk of exceeding budget, but budget is normally managed as a cost constraint, rather than as a risk item. What this means is that the real risk of overrunning budget might not be listed in the risk category, but would still nevertheless be closely managed – that is, like any other risk. Thus, the fact that we did not list, say, 'budget overrun,' as a risk does not mean that we did not see it or manage it, as a risk. A glance at the Sicom reporting categories will show such items as cost, schedule, scope, team morale, communication, impacts, benefits realised – plus project risks. If any of these areas went into the red, it would be managed back into the green, so to speak. Thus, indirectly, a project risk mitigation strategy was at work for all the major project process categories, even though they were not specifically denoted as project risks.

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Question	Comment
1.3 Was the project agreed or launched despite the presence of any of the following circumstances: • The organisation cannot afford to lose • The exposure to the outcome is too great • The situation or project is just not worth it • The odds are not in favour of the project • The project is no more than a 'fair bet' • The benefits are not identified • There are a large number of acceptable alternatives • The risk does not result in the achievement of a project objective • The expected value from the baseline assumptions is negative • There is not enough data to compute the results • The data is unorganised • A contingency plan is not in place should the results prove less than satisfactory.	From the outset, the business had identified this project as a strategic necessity. The main requirement was that we "turn a red audit report into a green one." This is because the company's open channels were seen by an audit review to be potentially compromised – a business problem requiring urgent attention. Our business case got through with little difficulty for the following reasons: • As mentioned, this project was to address a key existing business deficiency • The project enjoyed top-level management support, including that of the CEO, personally • The best resources were allocated to it. Both the project team as well as the steering committee were staffed up by well-selected persons who brought a range of business and technical skills to bear. In addition, we engaged "the best" external provider available. • The scope of the project was Group-wide. It had to provide a Group solution, but customised to the needs of the individual business units. Thus, it had the highest possible profile (and complexity!) in the context of our business • We were required to put in place a "world class" solution, which implied aiming for the best – this in itself would have reduced the odds of failure.

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2. Project Success Criteria

Question	Comment
2.1 Were the criteria for project success clearly established? 2.2 Were trade-offs identified, such that the project team was aware of how to decide between conflicting delivery-priorities?	It was made very clear to the project team by the steering committee that the main criterion was to put in place a solution which successfully addressed the audit concerns, but within the cost parameters established. By implication, (a moderated degree of) schedule-overrun (or, for that matter, any other slippage in delivery) would be tolerated, provided the basic requirements of the project were met. This conflicted to some extent with the needs of the individual business units, whose specified requirements were consequently subordinated. The situation which subsequently arose was one in which the Group – generally speaking – deemed the project to have delivered successfully, while certain of the business units felt otherwise, mainly because some of their custom requirements were not seen to be granted adequate attention.
2.3 Were the criteria for project failure established?	At a Group level, project failure was simply seen as not achieving the basic requirement set for project success. No attempt was made to spell out "criteria for project failure," as such, since these were taken simply to mean "not achieving project goals." As can be inferred from our comments earlier in this interview, this is a project which the organisation would not have allowed to fail. That is, everything would have been done to "turn the red audit green." In a worst-case scenario, we would have overrun time and budget – and in all likelihood, heads might consequently have rolled – but we *would have* put in place an effective solution. Thus, project failure, as in "not delivering the solution," was never going to be an issue.

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PROJECT RISK MANAGEMENT QUESTIONNAIRE – continued

Question	Comment
2.4 Were tolerance bands for project delivery identified?	No *formal* attempt was made to establish tolerance limits. The general approach was to "do our best" to deliver the project as successfully as possible. Thus, the ultimate solution implemented had to "turn a red audit green" – there was no compromising this – at a specified cost limit not to be exceeded. The various measures taken – for example, prioritising the project as a Sicom project, providing top-quality resourcing, etc – were all aimed at ensuring a smooth, effective delivery of the final results. The notion of "tolerance limits" did not enter our thinking as such, but we had a "common sense attitude" in our approach, in that we were willing to be flexible where possible (e.g., in overrunning on schedule in order to meet our goals)
2.5 Were the objectives and key criteria for successful delivery established at the *outset?*	Yes, and reviewed throughout the project life cycle, mainly through ongoing monitoring and reporting.
2.6 Were they reviewed during the project life cycle?	Yes. See point 2.5 above.
2.7 Had management indicated how important the project was?	Definitely – this was a Sicom project, which means it enjoyed the highest profile and priority in the Organisation.
2.8 Had management defined and authorised the project objectives?	Yes, mainly through Sicom's formal acceptance of our business case, and through the broad directives of the steering committee.
2.9 What steps had management taken to ensure delivery of the project objectives?	See point 1.3 above. Also, we can think of specific instances where members of senior management got personally involved – particularly when it came to engaging our providers in some hard negotiating.

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2. Project Success Criteria – continued

Question	Comment
2.10 Had management satisfied itself that the project was adequately resourced to deliver the project objectives effectively?	Yes, see point 1.3 above. In addition, the project team was able independently to establish its requirements (including for cost and schedule) and to motivate these in the business case.

3. Project Risk Identification and assessment

Question	Comment
3.1 What processes were used to identify project risks? • Checklists • Focus groups • Expert opinion and inputs • Brainstorming sessions • Other?	The specialised team which put together the business case developed the list of project risks, based largely on their professional judgement and experience. It should be noted that this project was something of a first for us, combining so many elements which would be new to our experience.
3.2 At which points in the project life cycle were risks identified?	Project risks were identified at the business case stage, and managed on an ongoing basis through the implementation phase of the project. At monthly intervals, we were required to report on risks to Sicom, so risks as such remained a project team focus. Moreover, it should be mentioned that the initial list did not remain static, since new risks emerged as the project progressed. However, there was no formal "risk identification process" at work, in terms of which the project team continuously updated a risk management strategy or plan for the project. The approach tended to be reactive, and focused on the big-ticket items, such as the risk that the off-shore provider might fail.

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Question	Comment
3.3 Into what categories were the identified risks placed?	The approach to risk identification was probably driven more by intuitive factors and the experience of the project team rather than a specific risk process. It would probably have helped if, say, a risk checklist were available for scrutiny, as this would have had the benefit of prompting us to think of risks which we might otherwise have overlooked. *For us the major categories of risk facing this* particular project were the technical and the financial risks, but we tended not to overtly place them into these category-boxes.

4. Project Risk Assessment

Question	Comment
4.1 Does the organisation have a risk assessment process in place?	The corporate project management process is based on the X-Pert methodology, which in turn is based on PMBOK's guidelines for project management best practice. This treats project risk identification and assessment as one related process. In our business case, we simply listed the key risks, but for reporting purposes, we did indicate how each risk was assessed in terms of probability x impact. This enabled us to distinguish between high, medium and low risks.
4.2 Were identified risks assessed?	Yes, see point 4.1 above

Continued on the next page

4. Project Risk Assessment - continued

Question	Comment
4.3 What criteria were used to assess qualitative risks? • Probability • Impact • Severity • Data precision • Other? 4.4 Were identified risks prioritised? 4.5 What processes were used to assess risks? • Focus groups • Expert opinion and inputs • Brainstorming sessions • Past experience • Other?	Probability and impact were each rated out of 10, and the scores multiplied. Thus, a risk with a probability of 6 multiplied by an impact of, say, 7, would have scored 42. High risks achieved a factor score of 40 – 100; medium risks, 30 – 39, and low risks, less than 30. The process further required that special action plans be formulated at least for the high risks. It is probably true to say that our commitment to these guidelines was no more than marginal. Perhaps a more scrupulous adherence to them might have mitigated actual risk more effectively, but there is also a possibility that we could have created needless red tape for ourselves. Our approach might best be illustrated with reference to a travel metaphor: when one travels to work by car everyday, one is not likely to do a detailed safety check before each departure. However, if one is going to fly a light aircraft to, say, Johannesburg, then one will regard a full-scale safety check as imperative. As mentioned in several places above, our approach was to manage all aspects of the project as best we could to achieve the specified objectives. In the process, we would have addressed a number of key risks, or be it reactively.

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5. Project Risk Response Measures

Question	Comment
5.1 Were resources allocated to respond to risks?	Not specifically. However, the project team was adequately resourced overall, in terms of its identified needs

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Question	Comment
5.2 Were risks reviewed on a regular basis?	Yes, as mentioned above.
5.3 Were incentives identified for the effective management of risks?	There was no need to incentivise the project, since the scope and requirements were clearly specified. Even when it was clear that we would overrun time, there was no need for special incentives, as we were still able to operate within the cost parameters, and we were still on track for delivering the functionality. Generally-speaking, the organisation could be more innovative in the sphere of incentives. We tend to be fairly traditional. This is certainly an area that could benefit from more focus. Well-conceived incentives could certainly act as a spur to improved performance.
5.4 Has a risk management plan been drafted? • How • By whom • When?	There was a project plan, and the project processes were managed by competent people according to sound project management principles. However, no risk management plan, as such, was regarded as necessary.
5.5 Does the risk management plan provide for • Policies, standards, procedures • Guidelines to action • Authorisation to act • Reporting, documenting and communication requirements • Funding	See point 5.4 above

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<table>
<tr><th>Question</th><th>Comment</th></tr>
<tr><td>5.6 Have specific response- measures been identified in advance? For example

• Measures to eliminate risk, i.e. to avoid the occurrence of the risk
• Measures to mitigate the effects of any risk, should it occur
• Measures to deflect or transfer the risk, e.g. through insurance
• Decision to accept the consequences of a particular risk, should it occur, i.e. to deal reactively with its consequences</td><td>The main risk or concern was that we were putting in an expensive new/untested solution, with the aid of offshore-based providers, and that this was addressing a highly important problem for the entire organisation. This, as it happened, was for us the key risk that had had to be managed. Had we succeeded well with this, we would – in our judgement – have delivered handsomely.

In the event, we did deliver, but there were other risks which tripped us up, and which blurred perceptions of our success on the critical delivery.

With the benefit of hindsight, the actual risks which we ended up having to deal with were mainly the following:

• Offshore provider not performing optimally, and thus complicating and delaying delivery
• Stakeholder needs conflicting with the Group solution. (Again with hindsight) we should – upfront – have taken a decision on the extent to which we would be accommodating customisation, and applied it consistently.
• A poor financial model for funding the exercise, which resulted in dissatisfaction among the users, especially those who had to bear a disproportionate share of the cost.
• Inconsistent commitment by individual members of the steering committee. Some of them tended to skip too many meetings, and did not focus sufficiently on their responsibilities.</td></tr>
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PROJECT RISK MANAGEMENT QUESTIONNAIRE – continued

Question	Comment
Point 5.6 continued	• Poor communication. There was actually a lot of communication. The project team went out of its way to liase with the business units on their needs. Also, we constantly provided progress updates to all our stakeholders, but, importantly, our communication approach did not do sufficient to *market* our achievements. Thus, although we were succeeding in implementing a world-class solution that *would result in competitive leadership for* our company, few people understood this or appreciated its significance. Instead, there was a lot of griping among business units around their dissatisfactions with their requirements and charges. A more "marketing-oriented" approach to our communications might have made a world of difference. It is pleasing to be able to say that we succeeded in putting in a truly world class solution, and that we did so largely within the terms of our mandate. It was a bumpy ride, and a better handle on project risk management would certainly have made it smoother. We have learned important lessons from the experience, which will stand us in good stead for future projects.

End

Warren Francis

Date

Peter Harvey

Date

Appendix C

PROJECT RISK MANAGEMENT QUESTIONNAIRE

Project Name:	*Craft*
Project Manager:	Sharon Watkins
Interviewee:	Sharon Watkins
Date:	25 August 2004

1. Project Risk Management Policies

Question	Comment
1.1 Does the organisation have a risk management process or strategy in place?	*Craft* was launched as a Sicom project, which means it was subject to the process-directives applicable to all high-profile projects in the organisation. Sicom required that *Craft* be managed within the 'best practice' guidelines established by PMBOK, and embodied in the company's preferred methodology, the X-Pert methodology. This provided for a definite project risk management process to be followed.
1.2 Does the organisation have a project risk management policy?	Broadly speaking, the policy is embodied in the process. Thus, at the business case stage and again at the project-planning stage, the process requires one to identify, assess and manage at least the key risks affecting the project.
1.3 Was the organisation's risk management policy – if any – observed?	Yes. We identified and assessed the risks as "high," "medium," and "low." We also reported on them on a monthly basis.
1.4 Was the project agreed or launched despite the presence of any of the following circumstances: • The organisation cannot afford to lose • The exposure to the outcome is too great • The situation or project is just not worth it • The odds are not in favour of the project • The project is no more than a 'fair bet' • The benefits are not identified	*Craft* was actually the second part of a bigger initiative to *acquire* and *install* what was the latest upgrade of the Vantage system. The real risk probably lay in the acquisition phase, which was the responsibility of I S management. They had to establish the business case for spending R10 million on a relatively untested system, but one with huge potential for our business. The second phase – the implementation or customisation phase – was what *Craft* (that is, my project) was all about.

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Project Risk Management Policies - *continued*

Question	Comment
• There are a large number of acceptable alternatives • The risk does not result in the achievement of a *project objective* • The expected value from the baseline assumptions is negative • There is not enough data to compute the results • The data is unorganised • A contingency plan is not in place should the results prove less than satisfactory.	The main risk in this phase was not implementing the system skilfully, and therefore, not enabling the organisation to realise the business benefits.

2. Project Success Criteria

Question	Comment
2.1 Were the criteria for project success established?	The criteria were established in the project scope-determination phase. We set ourselves efficient time and cost parameters, but adopted *a flexible, "common sense" approach. In other* words, if circumstances required a "reasonable amount" of extra time and/or cost, we would not quibble about it. The main thing was to get the system in and working well.
2.2 Were the criteria for project *failure* established?	Not really. Project failure was taken to mean the opposite of project success. We had every expectation of delivering the project successfully, so this was our focus.
2.3 *Were tolerance bands for* project delivery identified?	*Our limits were set in terms of the usual project* criteria – quality, cost and time. As I mentioned earlier, if there was a need for additional resources of any kind, we would have been able to motivate for them, since the main concern was to implement the system effectively, and get it to a point where it was up-and-running, and we were enjoying the benefits.

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2. Project Success Criteria – *continued*

Question	Comment
2.4 Were trade-offs identified, such that the project team would be aware of how to decide between conflicting delivery-priorities?	There was no need for this upfront, but because we managed the project closely, we would have been immediately alerted to any need if it arose during the unfolding of the project. We would then have communicated with our steering committee and with Sicom, and negotiated a solution.
2.5 Were the *objectives* and key criteria for successful delivery established at the *outset?*	Yes
2.6 Were they reviewed during the project life cycle?	Yes, continuously, since we managed the project in accordance with best practice principles. This means that we constantly reviewed and evaluated progress.
2.7 Had management indicated how important the project was?	Yes, there was never any doubt or uncertainty or vagueness.
2.8 Had management defined and authorised the project objectives?	This was determined at the earliest stage, when the business made the strategic decision to purchase the system. *Craft* was then merely the logical outflow of this decision, and was all about how best to implement the system.
2.9 What steps had management taken to ensure delivery of the project objectives?	We staffed up the project with an able team of seasoned people, who, at the end of the day, were the real reason that the project was delivered so successfully. Also, management did not skimp on any other resources reasonably required for successful implementation. This in itself would have cancelled out a major source of project risk. In addition, we had both a steercom and Sicom looking over our shoulders! If that was not enough, we also liased quite closely with the GPSO for guidance, and implemented their benefits tracking process, so that we would not lose sight of the real implementation objectives.

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2. Project Success Criteria – *continued*

Question	Comment
2.10 Had management satisfied itself that the project was adequately resourced to deliver the project objectives effectively?	Definitely, as all the above comments indicate
2.11 How could management be confident that any risk to project delivery, such as project problems, shortcomings, budget shortfalls, scope limitations, etc, would be promptly identified and reported for its attention?	Our project governance provided for regular meetings of the project team, to review the project's progress in terms of a specific agenda. In addition, we were required to produce reports to steercom as well as Sicom, to enable them to monitor progress. We also tracked business benefits, and, most importantly, we lived close to the business, on whose behalf we were installing the functionality.
2.12 Are any of the following identified as project success criteria? • Completion of the project within the allocated time period • ... and budgeted costs • .....and at the specified performance level • to the customer's satisfaction • with minimum disruption • with mutually-agreed scope changes	All of these criteria were part of our focus, with the overriding requirement being to install the functionality successfully, such that the business could start 'harvesting' its potential.

3. Project Risk Identification

Question	Comment
3.1 Were project risks identified?	Yes, we identified high, medium and low risks, and listed these in our project scope of work document.
3.2 What processes were used to identify project risks? • Checklists • Focus groups • Expert opinion and inputs • Brainstorming sessions • Other?	We used a focus group to scope the project. Part of the scope-process was to identify and assess the risks. This was done in our so-called "project concept workshop." We did not use a list. We brainstormed.

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3 Project Risk Identification - *continued*

Question	Comment
3.3 At which points in the project life cycle were risks identified?	Upfront, at the scope-determination phase. However, risks were an ongoing focus of attention throughout the project life cycle.
3.4 Who participated in the risk identification process?	A focus group consisting of the project team, members of the steercom, and persons from the user community.
3.5 Into what categories were the identified risks placed?	High, medium and low. We came up with a total of 6 risks – two in each category – most of them related to the new technology which we were introducing. As can be inferred from this, we were not expecting major problems. This was a project for only *our* business unit (that is, it was not a cross-company implementation) so a major source of complexity was absent. Secondly, although the technology was new, Vantage had been our partner for more than a decade, and we knew them well. Thirdly, sound steps were being taken with regard to implementation – the project was well-resourced and had a high profile in the organisation. All these factors meant that most sources of potential project risk were effectively excluded from contention.
3.6 Were action plans formulated to deal with identified risks?	As mentioned, the key risks were probably those related to acquiring the system, and as we have seen, these were effectively dealt with. Associated risks would have included such things as unfavourable forex movements and failure on the part of the offshore-based provider. These never materialised. With regard to *Craft* specifically, we did not see the need for *special* action to deal with risks over-and-above managing the project well. In the event, this proved to be correct.
3.7 Was a report on identified risks prepared for management's attention?	As already mentioned, Old Mutual and Group Schemes both had very specific processes in place for reporting project progress, and these processes included provision for reporting on project risks.

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4. Project Risk Assessment

Question	Comment
4.1 Does the organisation have a risk *assessment* process in place?	Risk identification and risk assessment are seen as parts of one process. Thus, all the comments made in respect of "risk identification" also apply in respect of "assessment."
4.2 Were identified risks assessed?	Yes, and organised into high, medium and low categories.
4.3 What criteria were used to assess qualitative risks? • Probability • Impact • Severity • Data precision • Other?	*Probability* times *impact* = risk *factor.* Both probability and impact were rated out of 10, to give a factor-maximum of 100. A high risk was one with a factor score of 40 upwards. Medium: 30 to 39, and low, less than 30. For all high risks, the process suggested that 4 specific mitigation-actions be formulated, and that an owner be assigned, but we didn't see the necessity for this degree of detail.
4.5 Were quantitative processes of risk assessment used, if applicable?	This was not required by *Craft* as we were mainly concerned with implementing the system for the users.
4.6 Were risk and return aligned?	Not applicable, as *Craft* was not a project about generating revenue.

5. Project Risk Response Measures

Question	Comment
5.1 Had resources been allocated to respond to risks?	No, not specifically. This would have been over-kill, in terms of how we assessed the project's requirements. However, as mentioned several times earlier, the project was adequately resourced to deliver.
5.2 Were risks reviewed on a regular basis?	Certainly. Sicom required us to report on risks, among other factors, on a monthly basis.

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Question	Comment
5.3 Were incentives identified for the effective management of risks?	Incentives were not identified for *Craft*, specifically. Group Schemes does have an incentive scheme, including opportunities for staff to go on annual Convention, and members of the project team would have come into contention for such opportunities.
5.4 Was a risk management plan drafted? • How • By whom • When?	There was no risk management plan as such. The main way in which the project was managed was to implement the major tasks required for successful delivery, and to do so in terms of a project schedule.
5.5 Did the risk management plan provide for • Policies, standards, procedures • Guidelines to action • Authorisation to act • Reporting, documenting and communication requirements • Funding	There was no risk management plan, but risks were proactively managed. As mentioned, certain risks were eliminated in the way that the project was structured. Others were monitored and dealt with as and when the need arose.
5.6 Were specific response-measures identified in advance? For example • Measures to *eliminate* risk, i.e. to avoid the occurrence of the risk • Measures to *mitigate* the effects of any risk, should it occur • Measures to *deflect* or transfer the risk, e.g. through insurance • Decision to *accept* the consequences of a particular risk, should it occur, i.e. to deal reactively with its consequences	This project was regarded as a success mainly because it delivered on its performance requirements, in a way acceptable to our stakeholders. We overran schedule, but marginally. Moreover, the time-period identified upfront was not scientifically established; it was merely our best guess. As the project progressed, we made adjustments as was necessary, and remained close to our stakeholders, so that they always understood and approved our decisions. As mentioned earlier in this interview, the key to success was a well-motivated competent project team, which dealt effectively with any contingency encountered, and which set about their work in a disciplined way.

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Question	Comment
5.7 Concluding comment	Risk management ended up being a secondary issue which was never going to have a major impact on our performance, unless something really untoward – and therefore improbable – was going to arise. In effect, this implies that by following a proven methodology in a reasonably consistent way, we actually were eliminating the risk of poor delivery. Also, by not adopting an over-cautious approach, we did not see risks where there were none, so we did not waste resources on preparing for non-existent contingencies. We would probably not do things much differently in future. Certainly, if there were a good list of generic risks to prompt our thinking, we would use it in the project concept formulation stage to help us think of possibilities we might otherwise overlook.

End

Sharon Watkins

Date