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Financial Crisis Management: Application to SMEs in Australia

by

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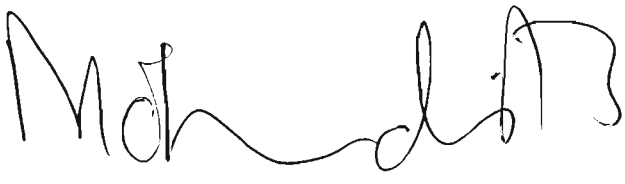
Declaration

I, Mohammed Aba-Bulgu, declare that the DBA thesis entitled "Financial Crisis Management: Application to SMEs in Australia" is no more than 65,000 words in length, exclusive of tables, figures, appendices, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.



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Abstract

The small and medium sized business sector plays a significant economic and social role in Australia. A large number of these businesses suffer from abrupt financial crises resulting from manmade or natural disasters such as fire, flood, storm, etc, which affect all business sectors in the Australian economy. Abrupt financial crises involve a partial or full destruction of productive assets, and manifest themselves in the form of deterioration in cash flows, loss of market share, loss of key personnel and, in extreme cases, a collapse of business organisation built over several years on the back of hard work and lifetime savings.

There are numerous theoretical and empirical models that have been applied in relation to corporate crisis management with great emphasis on smouldering crises, large companies and strategic crisis management principles and practices. Application of these models and techniques to small and medium sized enterprises ("SMEs") in Australia in the event of abrupt financial crises is problematic and less effective due to the elements, design and approach of these models.

The approach employed in this thesis is developed using a new theoretical framework based on the elements of (i) financial management theories and policies such as risk management, financial engineering, portfolio theory, CAPM, capital budgeting and optimal capital structure; (ii) accounting theories and practices including corporate financial distress and financial ratio analyses; and (iii) corporate management theories and principles with major emphasis on corporate governance, marketing management, business ethics and stakeholders analysis. The thesis also applies systems approach to crisis management at two levels, ie. organisational level and financial crisis management level. A corporate planning format involving targets, instruments and policies is adopted.

Qualitative and quantitative data was collected from 12 SMEs in Australia that experienced business interruptions as a direct result of damage to their physical assets, in order to identify the key activities performed during this period and to establish the best financial crisis management processes to be followed. The case studies and analyses of the data based on the new approach developed in this research show that

these businesses passed through different crisis phases and required the application of different financial and managerial instruments including cash flows optimisation model, optimal post-loss investment model, EOQ, optimal capital structure, project management techniques, business impact analysis ("BIA"), target-orientated advertising and promotion, and appropriate communication policies with internal and external stakeholders. The findings indicate that an integrated approach is required to effectively manage crisis and return SMEs to their normal trading position at a minimum cost and within the shortest possible time.

The various financial and other models applied in this thesis are found to be valid and plausible in that they adopt an integrated and comprehensive approach to financial activities of SMEs in crisis mode, can be applied consistently under different scenarios and to data extracted from different entities, and produce results that are consistent with the findings of other studies, the underlying theories and principles. In general, the models are appropriate for application by SMEs in the event of a financial crisis resulting from a disastrous situation. The designs used to formulate the optimisation problems in Microsoft Excel appeal to small businesses, as they do not appear to be overly complicated nor too difficult to understand. As a result, the approach developed in this thesis is robust and superior in its design, application and outcome.

This study therefore offers some significant contributions in making a systematic study of financial activities of small and medium sized business organisations in financial crises mode by developing and adopting a new framework, by identifying, modifying and applying various financial management tools and techniques suitable to SMEs, and by adopting systems approach both at organisational and crisis management levels. The development and application of this new approach to an abrupt financial crisis management is particularly important due to the frequency and severity of manmade or natural disasters in Australia and its potential application to SMEs in other economies beyond our border.

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Aba-Bulgu, M. and Islam, S.M. 2004, 'Corporate Crisis Management: Cash Flow Optimisation Model & Application to SMEs', paper presented on 3rd November 2004, Financial Modelling Programme Seminar Series, Victoria Graduate School of Business, Victoria University, Melbourne.

Refereed International Conferences

Aba-Bulgu, M. and Islam, S.M. 2004, 'A Corporate Crisis Management Model: Application to Small & Medium Sized Businesses in Australia', paper presented at the 3rd International Conference on SMEs in a Global Economy, from 6 July 2004 to 7 July 2004, Kuala Lumpur, Malaysia.

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Aba-Bulgu, M. and Islam, S.M. (forthcoming), 'Corporate Crisis Management: Issues, Mathematical Modelling, Strategies and Small and Medium Size Enterprise Applications', accepted for publication by International Business and Management Series, North Holland Publishing, Amsterdam.

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Chapter 1
INTRODUCTION

1.1 Background

This research began when the author joined a small but dynamic professional consultancy firm involved in providing risk management and insurance claims preparation services, mainly to small and medium-sized enterprises, commonly known as SMEs in Melbourne, Victoria in the late 1990s. In the course of his duty, the author has witnessed various crises that the owners of SMEs and other stakeholders encountered both at human and financial levels following some disastrous incidents such as fire, flood, storm, machine breakdowns, and contamination. In short, this thesis is intended to study and develop crisis management planning models based on a new approach, more specifically financial crisis management tools and techniques that can effectively serve SMEs in Australia in the event of an abrupt financial crisis.

1.1.1 SMEs in Australia

The small business sector plays a significant social and economic role in the Australian economy. The latest survey published by the Australian Bureau of Statistics (ABS) in 2002 shows that 1,122,000 or 96% of total non-agricultural private sector businesses were classified as small businesses in 2000/01. These small businesses employed 3.3 million people or 47% of the total non-agricultural private sector workforce. The share of total employment for SMEs in Australia for the same year was much higher than the above figure, being 5.1 million people or 74% of the total non-agricultural private sector workforce, which was estimated at 6.9 million employees.

Table 1.1 and Table 1.2 on the following page provide the major statistical information regarding the number of businesses and workforce employed in the Australian economy in 2000/01. This information is extracted from the same publication by the ABS (2002). Further surveys were conducted by the ABS in June 2004 but the results are not yet published for public information. Hence the following data represents the latest information available regarding the structure of employment in Australia.

Table 1.1 Businesses by Employment Category (2000/01)

Employment Category	*Businesses ('000)*	*Percentage (%)*	*Rate of Growth (%) 1990-91 to 2000-01*
Non-employing Business	582.1	50.0	2.7
1-4 Employees	370.1	31.8	4.3
5-19 Employees	169.8	14.6	3.3
20-99 Employees	35.9	3.1	3.0
100-199 Employees	3.4	0.3	1.4
200 or more Employees	2.8	0.2	1.0
Total	1,164.4	100	3.3

Source: ABS 2002, Cat. No. 1321.0

Table 1.2 Persons Employed by Employment Category (2000/01)

Employment Category	*Workforce ('000)*	*Percentage (%)*	*Rate of Growth (%) 1990-91 to 2000-01*
Non-employing Business	989.7	14.3	1.1
1-4 Employees	775.1	11.2	3.5
5-19 Employees	1,494.3	21.7	3.1
20-99 Employees	1,376.5	19.9	2.6
100-199 Employees	465.2	6.7	1.4
200 or more Employees	1,801.1	26.1	1.5
Other	989.7	14.3	
Total	6,901.9	100	2.2

Source: ABS 2002, Cat. No. 1321.0

From the above tables, it is evident that the SMEs sector is the largest employer as well as the fastest growing sector in the economy given the overall employment growth rate of 2.2% per annum over the 10-year period from 1990/91 to 2000/01 and the growth rate of 1.5% per annum achieved by large business organisations. SMEs spread across all industries and states within Australia but dominate the service producing industries in the national economy.

In terms of GDP, the total contribution of SMEs is quite significant in that this sector of the economy represents approximately 50% of the total GDP (Hall 2004) and contributed more than $307 billion and $328 billion during the financial years ended June 2001 and 2002, respectively (ABS 2004). As a result, this important part of the Australian economy must not only be protected against natural or man-made disasters

but also be nurtured for the benefit of the whole society in general, and the majority of the Australians employed by this sector, in particular.

1.1.2 Disasters and Business Disruptions in Australia

The survey conducted by CPA Australia in August 2002 shows that more than 40% of small businesses were adversely affected by some type of crisis event, such as fire, flood, etc, over the previous 12 months. A large-scale disaster is less frequent in Australia, as per the major disasters list maintained by the Insurance Disaster Response Organisation on their website at www.idro.com.au. The annual cost of disasters extracted from this list is provided in Appendix 1.1 for ease of reference. This list contains events likely to cost $10 million or more and events declared a disaster by an appropriate Government Authority irrespective of extent of loss sustained. The list shows that since January 1967 to the present time (2004), there have been 151 disasters that cost the Australian economy $6.8 billion. Figure 1.1 is based on Appendix 1.1 and provides a summary of information that highlights some important characteristics of the disasters recorded.

A close look at Appendix 1.1 reveals that the Australian economy has experienced more and more disasters from year to year over the last 3 to 4 decades. For example, from 1967 to 1969, the average number of disasters was only one per annum. In the 1970s, the average increased to 2.9 and to 3.1, 6.1 and 5.4 during the following three decades (1980s, 1990s and the first 5 years of the new millennium). The cost of major disasters also increased over time from $622.2 million in the 1970s to $2.2 billion in the 1980s, and to $3.1 billion in the 1990s. From Appendix 1.1, it is also possible to analyse the disasters by types and locations but this has not been pursued here due to its little significance towards this research.

It should be noted that these incidents cover major disasters for member organisations only, as the true cost of all incidents to all types of business organisations in Australia is much higher given the impact of crises such as the 1998 gas crisis in Victoria, the Sydney water crisis, the 2004 gas crisis in South Australia and numerous other isolated incidents (the main focus of this research) that occur on a daily basis in various parts of the country but do not get on to the Major Disaster List. This shows how the whole economy is vulnerable to natural or manmade disasters at an ever-increasing rate and

why it is essential to have proper managerial, operational and financial tools to deal with them. SMEs are particularly more susceptible to disastrous situations (large scale or not) due to their limited financial and other capacities to deal with such incidents and need to be extra vigilant.

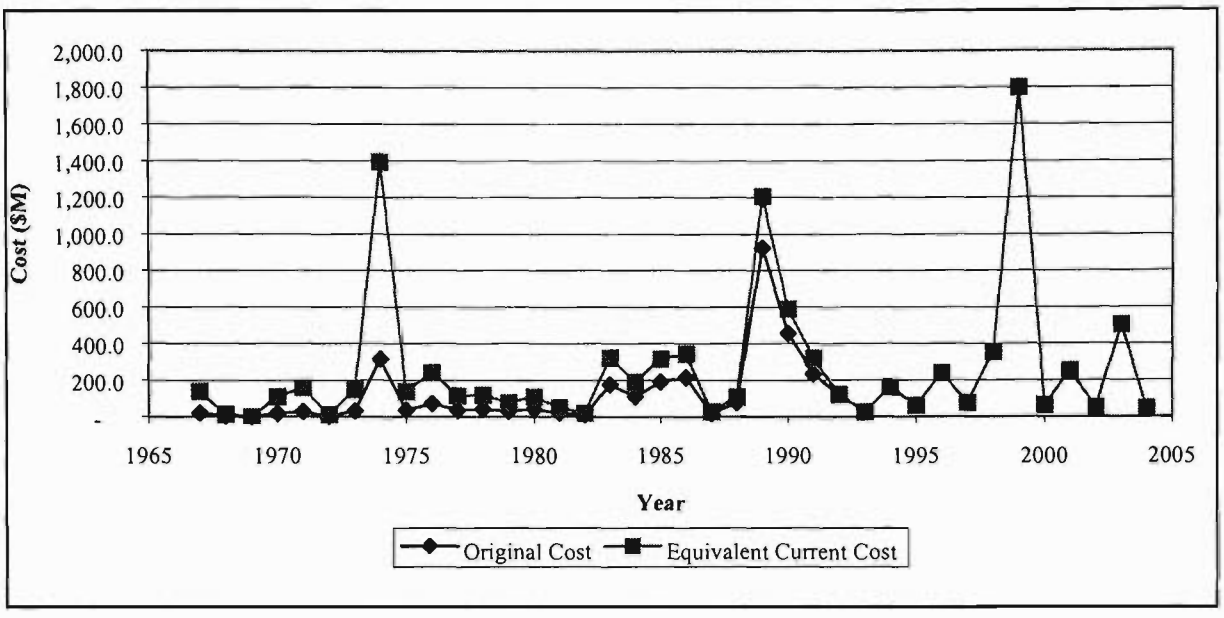


Figure 1.1
Annual Cost of Major Disasters (1967 to 2004)

Coleman (2004) reported the direct cost of corporate crisis in Australia in 2001 at $80 million per incident on average based on of the definition of crises provided by Swiss Re (as damage in excess of $US20 million or more than 20 fatalities, 50 injuries or 2,000 made homeless) and concluded that corporate crises are infrequent and complex, and probably represent only the most serious of multiple lesser incidents. In contrast, the list compiled by the Insurance Disaster Response Organisation shows the cost of crises at $32 million per incident in 2001 and indicates the existence of inconsistencies in the definition of crises and lack of comprehensive compilation of such data for academic and other purposes.

Whether it is caused by a major disaster, small fire from a cigarette butt or accidental damage, a loss of productive assets or any other important business assets leads to a disruption of business operations. In other words, the direct impact of a loss of a productive asset results in a temporary or long term business closure or limited operations for a certain period of time. In financial terms, the impact of business disruption includes

the cost of replacing or repairing the assets, the loss of revenue during the disruption period as a result of inability to produce and sell a particular line of product(s), inability to sell other products because of loss of complementary products, and loss of revenue from all products due to perceived loss of quality (Doherty 2000).

On top of direct loss of cash flows as a result of loss of sales, SMEs may also experience other forms of crises such as loss of market share, loss of key personnel, loss of production efficiency, withdrawal of suppliers, withdrawal of licenses, loss of quality/standard accreditation (eg. ISO 9000), and so on. In general, the consequences of a disaster can be a big burden to the entity experiencing the crisis as well as its internal and external stakeholders and necessitate the restoration of tangible and intangible assets so that the business organisation is able to restore its value within a reasonable period of time and at a minimum cost. This process of restoration requires the application of appropriate managerial, operational and financial instruments suitable to SMEs, ie. effective crisis management models. This thesis is designed to develop such models so that the impact of any abrupt crisis can be overcome or minimised to the benefit of the entity involved in the crisis directly and the whole national economy, indirectly.

1.2 Modelling Crisis Management

Over the last 30 years, crisis management has focused on defining and classifying crisis (Hermann 1969; Billings, Milburn and Schaalman 1980; Fink 1986; Clark 1988; Shrivastava and Mitroff 1987; Mitroff 1988) so that management will be able to understand the nature of the crises, be prepared in advance if possible or contain the crisis if and when it happens, treat it, communicate to the authorities and other important stakeholders, and learn from it (Mitroff, Pearson and Harrington 1996). The general approach adopted by this body of literature was to equip the management of large organisations with strategic principles and communication skills in dealing with smouldering crises and large-scale disasters. Little or no attention was given to the severe and regular crises that face SMEs in Australia.

In others area of business studies such as accounting, Beaver (1966) was a pioneer in analysing the financial ratios of public companies in order to be able to statistically discriminate between failing and non-failing businesses far in advance before the occurrence of a company collapse. Using multivariate ratio analysis, Altman (1968)

advanced statistical fortune telling by developing what is now known as the Z-score as a model for predicting corporate failures up to 5 years in advance. In relation to Australian public companies, Castagna and Matolcsy (1981), Altman and Izan (1981), Izan (1984) and Lincoln (1984), tested various models and arrived at different results. Once again, these models aim at large companies and predicting failures rather than assisting directly with the management of financial crises.

The other related area of business studies, corporate finance has also evolved primarily as financial management tools for large companies. The various theories of corporate finance including efficient markets theory (Samuelson 1965; Mandelbrot 1966), portfolio theory (Markowitz 1952), CAPM (eg. Sharpe 1964), option pricing theory (Black and Scholes 1973) and agency theory (eg. Fama 1980), and their implications on capital budgeting decisions, capital structure policy, corporate leasing policy and dividend policy indicate that they are mainly intended to address problems encountered by large companies in making investment and financing decisions during normal business operations. Of late there has been some attempts (Pettit and Singer 1985; Wijst 1989; Walker 1989; Ang 1991; Keasey and Watson 1992) made to extend the theories of corporate finance to SMEs.

The above introductory discussions highlight the gap that exists both in terms of knowledge and application of crisis management theories and principles to SMEs in Australia or elsewhere and the need for more research in this area. The purpose of this thesis is therefore to develop a new approach to crisis management involving various tools and techniques (given in Chapters 3, 6, 7 and 8) based on a new framework to be discussed in Chapter 2 and the experience of some SMEs, as will be presented in Chapter 5. Greater emphasis than found in previous research will be given to financial aspects of abrupt crises.

1.3 Limitations of Current Literature and Motivation of the Research

At present, what is available to most SMEs in difficult financial circumstances caused by a manmade or natural disaster is nothing but an insurance cover (assuming there is one in place and it is adequate), which generally takes several months to collect. Apart from the time and effort involved in receiving the payouts due to the involvement of

loss adjusters[1] in this process, the judicious use of the cash flows, the optimal asset replacement process and the protection of market share and other intangible assets, require the application of certain financial crisis management techniques that should be able to minimise the impact of the disaster on the financial health of the SME including its obligations towards other stakeholders.

This thesis is designed to answer several questions. However, the major questions are:

1) What is the best approach to financial crisis management resulting from a disastrous situation to the productive assets of SMEs?

2) What are the elements that make up the best approach to financial crisis management of SMEs in an abrupt crisis mode?

The existing literature in crisis management, corporate failure prediction model and corporate finance does not provide adequate answers to these questions because it suffers from the following limitations:

1) Crisis management concentrates on strategic management issues and to a certain extent on operational matters. The financial activities of business organisations in crisis mode have received little attention or are assumed to be easily manageable provided that management is capable of applying strategic crisis management principles.

2) Crisis management tools and techniques give much emphasis to smouldering or non-event related crises and preventative mechanisms. While preventative measures are cheaper and prudent to consider, it is not always possible to avoid crisis because of cost, organisational imperfections and lack of control over the external environment.

3) Crisis management plans are designed and developed from a large organisation's point of view with abundant internal and external resources. Strategic crisis management requires the development of plans and procedures that can be obtained in most cases with the help of external professional firms at high cost

1 Loss Adjusters provide ancillary services to insurance companies by way of assessing and validating insurance claims made by individuals and business organisations that have suffered a loss as a result of human or natural disasters.

and ongoing commitment of resources to their maintenance and testing. Such plans and procedures are most unsuitable for SMEs and beyond their means.

4) The various statistical and other techniques developed by Beaver (1966) and Altman (1968), etc are mainly intended to serve as an early warning for corporate failures rather than providing tools and techniques to deal with financial difficulties.

5) Corporate failure prediction models deal with accounting data and the financial characteristics of companies in 'chronic financial crisis' rather than the impact and sudden deterioration of financial activities caused by abrupt crisis.

6) Corporate failure prediction models are based on accounting and financial characteristics of large corporations – public listed companies. There are no tested models applicable to SMEs in Australia and for that matter in other developed economies due to lack of reliable data (Altman 2002) and minimal interest from potential users such as bankers and lenders.

7) The principles of corporate finance are mainly applicable to investment and financing decisions during normal business operations rather than financial activities that occur during a crisis period.

8) The theories of corporate finance such as portfolio theory, CAPM and agency theory, are mainly the reflection and features of large corporations rather than SMEs. There are limited materials that have been directed towards the financial activities of small businesses.

9) Finally, the general approach to crisis management is narrowly focused, as most of the literature attempts to address a single issue such as top management policy or operational matters instead of all aspects of organisational functions and resources including financial, material, human and informational activities.

As will be discussed in great details in the following section, the major motivation behind this thesis is to develop a new approach (including suitable instruments) to crisis management that overcomes the above limitations and helps SMEs in the process of restoration of their tangible and intangible assets lost as a direct result of disastrous events.

1.4 Aims of the Research

The main purpose of this thesis is to study the financial activities of SMEs in an abrupt financial crisis resulting from natural or man-made disasters in order to be able to develop a financial crisis management model that can assist in the restoration of all types of assets lost in an unfortunate incident. The aim is simply to restore the value of the business organisation as measured by the following formula:

$$V_o(SME) = \sum_{i=1}^{n} \frac{DF_i}{(1+k)^i} + L - D \qquad (1.1)$$

where: $V_o(SME)$ = expected value of business
DF = expected net cash flow per year
k = cost of capital
L = liquid assets
D = current debt
n = a life time in years

1.4.1 General Aims

The general aims of this thesis are to:

1) Develop a financial crisis management approach based on: (i) a new framework involving multi-disciplinary theories and principles; (ii) corporate planning format; (iii) systems approach; and (iv) the experience of some SMEs that went through abrupt financial crises following a disaster such as fire, flood, storm, and accidental damage.

2) Identify various phases and elements of business interruptions following a disastrous situation as described above.

3) Use the model to provide financial management tools, plans and techniques that are applicable during various phases of the crisis management process and that can improve the financial fortune of SMEs in an abrupt financial crisis mode as described above.

1.4.2 Specific Aims

The specific aims of this research are to:

1) Identify the major elements of organisational resources that need to be restored in order to be able to get back to normal business operations, and the stages and activities involved in restoring these assets.

2) Develop cash optimisation models that can be used as effective cash management tools in identifying cash flow requirements and conserving this very important asset.

3) Develop optimal post-loss investment models and techniques to help with the reinstatement of tangible assets damaged or destroyed due to a disaster.

4) Outline the impact of different financing alternatives and factors that should be considered during abrupt financial crises.

5) Identify appropriate marketing strategies during various phases of business interruption given the level of sales, production and service provisions.

6) Identify effective communication strategies with different stakeholders mainly shareholders or partners, employees, customers and suppliers.

7) Identify the basis for establishing adequate insurance policies as a major risk management strategy and control.

1.5 Significance of the Study

Research in the area of financial crisis is of great significance, given the possibility of bankruptcy (and its associated effects on businesses and households) following a major natural or man-made disaster. The current body of literature falls short of dealing with financial optimisation techniques that can be applied to business organisations in financial crisis. This study will therefore make some significant contributions, which can be summarised as follows:

- The current strategic crisis management perspectives are designed and developed from large business organisations' point of views and require further

investigations in order to be applied to SMEs. This research will analyse the current practices and establish a financial crisis management model suitable for application to SMEs.

- The current literature in corporate finance deals with financial optimisation techniques that can be applied mainly to large business organisations during normal business operations. This research will look into a systematic study of the financial activities of small business organisations in financial crisis mode and develop the optimum path that should be followed during different phases of a financial crisis management process.

- A comprehensive study of all aspects of the restoration of tangible and intangible assets is required, as there is no well-established research that encompasses all areas of business activities, following a major disaster. Current literature tends to concentrate on certain aspects of crisis management practices ie. non-financial activities and public relations.

- The development and application of a financial crisis management model is particularly important due to the frequency and severity of disasters in the various sectors of the Australian economy. Research in this area will help to minimise the direct and indirect impact on various parties, including: SMEs (their owners, employees, customers, suppliers and other important stakeholders), insurance companies, and government agencies and departments.

1.6 Methodology of the Research

The broad methodologies adopted by this research involve case studies, computer programming and simulation, financial ratio analysis, corporate planning format and systems approach to financial crisis resulting from manmade or natural disasters such as fire, flood, storm and accidental damage. This research is also based on the experience of small and medium sized business enterprises, SMEs.

The case studies will involve a survey of 20 SMEs that suffered financial and or other losses since the 2001 calendar year as a result of an isolated disastrous situation. But the

analysis will be restricted to 12 SMEs and the definition provided by the Australian Bureau of Statistics (2002) will be followed in classifying them. Efforts will be made to survey SMEs involved in manufacturing, service and retail industries. The case studies will utilise a questionnaire to conduct face-to-face interviews with the owner manger and observations will also be made to gain better insight into the internal workings of the SMEs including their culture, management style and business practices.

Using the Microsoft Excel spreadsheet software program and Decision Tools Software for risk analysis, this research will attempt to develop a cash flow optimisation model and an optimal post-loss investment model on the basis of financial data derived from profit and loss statements, balance sheets and cash flow statements. Also references will be made to data extracted during a crisis period, as some historical data will no longer be useful for decisions to be made in a crisis mode. The optimisation models will make use of the theories and principles of corporate finance and mathematical programming in that the ultimate purpose of the optimisation models is to minimise the impact of the crisis, maximise the resources (mainly cash) needed for the continuation of the business operations, and restore the value of the business within a short period of time. It will be imperative in certain circumstances to apply simulations to financial activities of SMEs during business disruptions.

Corporate financial failure prediction models (Beaver 1966; Altman 1968; Altman 2002) generally attempt to discriminate failing from non-failing companies on a statistical basis such as a univariate model (Beaver 1966) or multivariate model (Altman 1968). These techniques are traditionally used in relation to public companies and for the purpose of early warnings and monitoring of the performances of large corporate entities. The current research will look into these techniques to establish their applicability and suitability to SMEs and financial activities of similar entities during business interruptions.

This research will attempt to establish a new paradigm in relation to the study and application of crisis management principles and techniques by adopting a system and multi-disciplinary approach. Attention will be paid to the restoration of all types of business assets, and to the theories and principles developed by strategic crisis management, accounting, corporate finance, operations management, organisation theory and practice, corporate governance and corporations law.

1.7 Structure of the Research

This thesis is divided into nine chapters for the purpose of developing a new framework for crisis management planning and financial crisis management model applicable to SMEs in Australia. Chapter 2 deals with the basic concepts, the literature review, the new framework involving theories and principles applicable to financial and non-financial activities of SMEs in crisis mode, and the basic skeleton of the new financial crisis management model and its phases. Chapter 3 provides detailed analysis of the elements of the new approach to financial crisis management. Chapter 4 introduces the research methodologies adopted and the process involved in data collection, analysis and model building.

Chapter 5 is designed to deal with the case studies of the 12 SMEs that outline general information, ownership structure, nature of management, product and services offered, the structure of their industry, financial performances, the nature of incidents and the actions taken to mitigate the losses. The case studies help as a stepping-stone in developing the remaining chapters of the thesis and establish the general criteria against which the financial crisis management model will measure its performance.

To serve its purposes, the financial crisis management model needs to utilise various optimisation models that will facilitate the full recovery of the business at minimum cost and time. The most important asset that plays a major role in the achievement of the above goal is the cash flow of the business organisation in a crisis mode. Chapter 6 is devoted to the development and application of a cash flow optimisation model and other elements of cash flow management. Chapter 7 addresses the theoretical and practical issues regarding the restoration of any tangible assets that might have been lost as a direct result of the incident.

In Chapter 8, a number of non-financial activities of SMEs and crisis management issues relating to crisis preparedness, crisis management phases, and strategies and policies in crisis management, are discussed. Also organisational functions of SMEs including human resources management, accounting and finance, productions or operations, marketing and IT are discussed in the light of the crisis management process during different phases of the crisis. Chapter 9 provides conclusions by summarising the major findings, implications and contributions of this research.

Chapter 2
PLANNING FOR CRISIS MANAGEMENT: A NEW APPROACH

2.1 Introduction

In this chapter, various concepts, theories and principles will be analysed in detail to establish a new approach to financial crisis management, a new theoretical framework upon which this study is based, and a financial crisis management model to be used throughout this thesis.

In Section 2.2, the basic concepts of crisis, financial crisis and risk analysis will be provided, outlining the nature and the scope of the research. A brief review of existing literature, including its limitations, will be provided in Section 2.3. The elements of the new approach are listed in Section 2.4 (and discussed in detail in Chapter 3), with the theoretical framework for the new approach being discussed in Section 2.5. Section 2.6 provides a planning model for crisis management, the generic financial crisis management model, its phases and approach. Before making a conclusion, the advantages of the new approach will be given.

2.2 The Basic Concepts

In this section, the concept and nature of crisis and risk will be analysed in order to understand the basic issues, methodologies and strategies in financial crisis management planning and processes.

2.2.1 The Concept of Crisis

The Macquarie Dictionary (1997) defines crisis as *"a decisive or vitally important stage in the course of anything; a turning point; a critical time or occasion; a political crisis, a business crisis"*. Various authors have attempted to define crisis for the purpose of understanding and managing crises before they occur, or during or after the crisis period. The following two definitions provide a comprehensive picture of crises, as they are understood by academia and the business world.

Table 2.1 Major Crisis Types

Economic	*Informational*	*Physical (loss of key plants and facilities)*	*Human Resources*	*Reputational*	*Psychopathic Acts*	*Natural Disasters*
Labour strikes	Loss of proprietary and confidential information	Loss of key equipment, plants, and material supplies	Loss of key executives	Slander	Product tampering	Earthquake
Labour unrest	False information	Breakdowns of key equipment, plants and machinery.	Loss of key personnel	Gossip	Kidnapping	Fire
Major decline in stock price and fluctuations	Tampering with computer records	Loss of key facilities	Rise in absenteeism	Sick jokes	Hostage taking	Explosions
Market crash	Loss of key computer information with regard to customers, suppliers, etc. (Y2K)	Major plant disruption	Rise in vandalism and accidents	Damage to corporate reputation	Terrorism	Typhoons
Decline in major earnings			Workplace violence	Tampering with corporate logos	Workplace violence	Hurricanes

Source: Mitroff (2001)

Shrivastava (1987, p. 194) defines that *"a crisis is a low probability, high consequence event that is capable of threatening organisational legitimacy, profitability and viability"*. Reid (2000, p. 17) provides a definition of crisis as *"any incident that can focus negative attention on a company and have an adverse effect on its overall financial condition, its relationship with its audiences or its reputation in the market place"*.

From the above definitions it is evident that a crisis is an incident that is not desirable and an event that must be managed in order to minimise its impact on any form of organisations and its financial, material, human and informational resources. Therefore crisis is an event, revelation, allegation or set of circumstances, which threatens the integrity, reputation, or the bottom line of an organisation (Fink 1986). Crisis challenges the public's sense of safety, values or appropriateness (Sapriel 2003). The actual or potential damage to the organisation is considerable and the organisation cannot, on its own, put an immediate end to it in most cases.

Mitroff et al. (2001), a leading researcher and academic in the area of strategic crisis management, classifies all crises into seven major families or types and argues that all organisations should be prepared for at least one crisis in each family in order to effectively manage any crisis. Table 2.1 is provided in respect of this classification.

On the basis of the theory of punctuated equilibria in biology (Gould and Eldredge 1977) that states that species go through extended periods of stability interrupted by short, discrete period of changes, Hwang and Lichtental (2000) identified two sources of corporate crises: **abrupt crises** that strike suddenly and catch management off-guard, versus, **cumulative crises** that accumulate stressors and eventually erupt.

Table 2.2 The Characteristics of Abrupt and Cumulative Crises

Key Dimension of Crisis	*Abrupt Crisis*	*Cumulative Crisis*
Build-up speed	Rapid	Gradual
Predictability	Low	High
Specificity	Focused	Nebulous
Crisis recognition	Clear	Fuzzy
Trigger point	Specific events	Threshold-limit
Probability of occurrence	Time-constant	Time-increasing
Misalignment with environment	One/few aspects	Many aspects

The same authors also provided some important characteristics of abrupt and cumulative crises for the purpose of devising proper crisis management strategies during the periods preceding and following the crisis. These characteristics of abrupt and cumulative crises are provided in Table 2.2. Rike (2003) divides the possible threats and hazards that cause abrupt crises into three categories (see Appendix 2.1).

According to Mitroff and Pearson (1993), operationally all crises pass through **5 distinct phases**. As can be seen later in this thesis, it is essential to identify the different phases of any type of crisis as different strategies, tools and skills are required to effectively manage an organisational crisis during its various stages.

- **Phase 1: Signal Detection**
  The sensing of early warning signals that, in advance of the crisis itself, announce its possibility of occurrence.

- **Phase 2: Preparation and Prevention**
  Doing as much as possible both to avert crises and to prepare for those that do occur. It involves careful and continual probing of operations and management structures for potential *"breaks before they are too big to fix"*.

- **Phase 3: Damage Containment**
  Intended for the purpose of keeping a crisis from affecting uncontaminated parts of an organisation or its environment.

- **Phase 4: Recovery**
  Involves the implementation of short-term and long-term business recovery designed to help resume normal operations. These include the identification of the basic services and procedures necessary to conduct minimal business, assignment of related business-resumption accountability, and designation of alternative operating sites.

- **Phase 5: Learning**
  Concerned with the examination of critical lessons learned from the organisation's own experience and from the experience of other organisations.

In this research, crisis is related to business, in particular to financial activities of business organisations. It should also be noted that the focus of this research is to analyse and devise effective financial management tools in the event of abrupt financial crisis. The crisis types that are relevant to this research belong to two of the seven families of crises as identified by Mitroff et al. (2001): physical (loss of key plants and facilities) and isolated disaster at a firm level. The impact of natural disasters at the macro level will not be addressed in this dissertation.

2.2.2 The Nature of Financial Crisis

Business organisations might face financial crisis for a number reasons as discussed in the previous section. The impact of any financial crisis needs to be managed with maximum managerial and financial skills as it generally leads to the deterioration of the value of business organisations and to their collapse in more serious cases.

It is also essential to understand how the value of a business organisation is generally determined at this stage, as this is going to help in the development of the theoretical framework for financial optimisation in the event of abrupt crisis. Chew (1997) states that the most widely used valuation models for determining a firm's market value are based on the discounted cash flow (DCF) method. Under the DCF method, the value of a business organisation is obtained by adding the present value of future cash flows to be generated by the business organisation's existing and potential assets. Following the mathematical methodology adopted by Doherty (2000), this relationship can be shown as follows:

$$V_o(E) = \sum_{i=1}^{no} \frac{K_o r_o}{(1+k)^i} + L - D \qquad (2.1)$$

where:
- $V_o(E)$ = value of business based on existing assets
- K_o = existing cash flow generating assets
- r_o = expected rate of return on assets K_o
- L = liquid assets
- D = current debt
- k = cost of capital
- no = a life time in years

Assuming that the business organisation makes investments in new assets K_t, and each of these new investments makes a subsequent expected annual rate of return r_t over the asset's life time of n_t, the net cash flow generated in some future t, from investments made from assets not currently in place is shown as follows:

$$V_t(F) = \sum_{t=1}^{no} \frac{-K_t + V_t(K_t; r_t)}{(1+k_t)^t} \tag{2.2}$$

The above two formulas can now be combined to provide the total value of a business as shown below:

$$V(B) = \sum \frac{K_o r_o}{(1+k)^t} + \sum_{t=1}^{no} \frac{-K_t + V_t(K_t; r_t)}{(1+k_t)^t} + L - D \tag{2.3}$$

Doherty (2000) points out that a business organisation might face reduced cash flow and lose its value as a direct result of one of the following factors:

a) Destruction of existing productive assets: eg., fire, storm and earthquake.

b) Transfer of value to third party: eg., liability loss and credit loss.

c) Shock to the cost function: eg., currency change, interest rate change and regulatory change.

d) Shock to demand: eg., change in taste, currency change, interest rate change, regulatory change, new entrant to market and change in economy.

It should be noted that the above factors are manifestations of the seven families of crisis as identified in the previous section. For example, the physical (loss of key plants and facilities) and natural disaster related crises are directly related to the destruction of existing productive assets. Economic, informational and human resource crises can lead to shock to cost function. The other two crisis types, reputational and psychopathic acts can lead to shock to demand and transfer of value to third party.

Once again the destruction of existing assets will be the focus of this research and the term 'abrupt financial crisis' will be used in order to be able to distinguish this type of financial crisis from any other crises that might face business organisations due to

cumulative impact of all the other five families of crises excluded from this research. Specifically, an abrupt financial crisis is used in this research as *a financial crisis that has come about as a result of a manmade, an accidental or an isolated natural disaster with a sudden negative impact on the financial and trading capabilities of small and medium-sized business organisations.*

Various authors have sought to describe financial failure or financial distress rather than financial crisis directly. For instance, Beaver (1966) states that, operationally, a firm is said to have failed when any one of the following events has occurred:

- bankruptcy;
- bond default;
- an overdrawn bank account; or
- non-payment of 'preferred stock' dividends.

In this research, the term 'financial crisis' excludes the bankruptcy aspect (element) of the above definition, as the main purpose of the models to be developed is to avoid or minimise the chance of experiencing bankruptcy by a business organisation in an abrupt financial crisis. Probably the most elaborative description of the financial health of business firms was propounded by Lau (1987). Instead of the conventional failing/non-failing dichotomy, Lau (1987) used five financial states to approximate the continuum of corporate financial health, as described below:

State 0 - Financial Stability

State 1 - Omitting or Reducing Dividend Payments

State 2 - Technical Default and Default on Loan Payments

State 3 - Protection under Chapter X or XI of the Bankruptcy Act

State 4 - Bankruptcy and Liquidation

The short-term impact of any human or natural disasters on a business organisation can in the short term lead to financial state 1 or 2 as described by Lau (1987), depending upon the severity of the impact, the financial capabilities of the business involved or its risk management practices. These financial states lead to bankruptcy unless financial resources, among other things, are properly managed using some advanced financial

management techniques and tools. Laitinen and Laintinen (1998) state that all these events (states) originate in the cash management functions of a firm that fails to fulfil the cash balance requirements.

In this dissertation, the various variables identified and used in corporate failure prediction models will be revisited in relation to the development of a financial crisis management model to be developed and applied during various stages of a crisis.

2.2.3 The Nature of Risk Analysis

It was discussed in Chapter 1 that any business organisation that has experienced a disaster would face a disruption of business that would impact, among other things, on its ability to generate revenue and cash, maintain customer service and market share, and retain key personnel. In short any damage to the assets of a business organisation leads to 'new' financial and operational risks that need to be understood for the purpose of managing crisis effectively.

The literal meaning of risk is danger; chance of disaster or loss. In finance literature, risk is usually defined as the volatility of returns, measured by parameters such as variance, standard deviation, or mean absolute deviation (Markowitz 1952, 1959). Van Horne et al. (1995) describe risk as the possibility that the actual return from holding a security will deviate from the expected return. They further point out that risk arises from a wide range of factors: the economy in general, economic factors peculiar to investment, competition, technological development, consumer preferences, labour conditions and all sorts of other circumstances.

Doherty (2000) states that risk is present when the outcome of some defined activity is not known and it refers to the variation in the range of possible outcomes; the greater the potential variation, the greater the risk. He further argues that risk, in an economic sense, does not refer to the adverse quality of some outcome (loss instead of profits), but rather to the lack of knowledge about which of several outcomes may prevail.

When a risk exposes business organisations to volatility, but the volatility is all in one downside direction, then that risk is termed as *pure risk*. Partial or full destruction of physical assets, due to fire (for example) leads to financial loss, not financial gain and should be treated as pure risk or more specifically as an *insurable risk*.

The modern capital market theory divides risk into systematic and unsystematic risk. Systematic risk may be caused by an occurrence such as inflation, interest rate changes, and recessions – factors that tend to affect all business organisations simultaneously. Unsystematic risks are essentially random events, such as fires and lawsuits, which at the time of occurrence are unique to a particular organisation (Meyer and Power 1983).

Aupperle and Dunphy (2003) argue that risk is best understood by looking at it from three perspectives: economic, business and financial. This view of risk is broader in that it applies to the overall financial health of a business organisation and is probably more relevant to this research than the financial market focused meaning of risk which is described as variability in stock return.

Doherty (2000) argues that the classifications of risk can be arbitrary and often have overlaps or gaps, but it is useful to do so for several purposes. First, it helps in conducting a risk survey and where to look for risk so that no stones can be left unturned. This exercise is an essential early step in the risk management process. Second, classification can be useful in designing an organisation structure to manage risk. Different professional skills are needed for dealing with different types of risk.

In the theory of finance, a lot of effort has been made over the last 50 years in understanding financial risks and their implications to the investing community. One such effort was made to identify and classify financial risks into: (i) market risk; (ii) currency risk; (iii) credit risk; (iv) liquidity risk; (v) sector risk; (vi) volatility risk; (vii) event risk; (viii) regulatory risk, (ix) management and operations risk; and (x) residual risk (Dahl, Meeraus and Zenios 1993; Fong and Vasicek 1997).

Vose (2000) asserts that financial and other risks including uncertainty are key features of most organisational problems and need to be understood for the purpose of rational decision-making processes. In other words, risk analysis must be conducted in order to make informed decision whenever businesses face uncertain circumstances and/or alternative course of actions. According to Kabus (1981, p. 43), *"risk analysis is a technique for quantifying the risks resulting from the uncertainties in the inputs relevant to making a choice among alternative courses of actions"*. Lave (1992) states that interest in risk analysis has grown as it has become the basis of modern finance, accident analysis and the assessment of the risks of cancer and other diseases. In short, much of the current world of risk analysis is a mixture of probability theory, economics, psychology and mathematics.

Lave (1992) further explains that risk analysis is applied to a situation with multiple, uncertain outcomes and is primarily concerned with three major tasks: (i) to specify the relevant attributes; (ii) to estimate the probability distribution of outcomes associated with each attribute; and (iii) to evaluate uncertain outcomes in order to facilitate choice. The same author provides a good example of the application of risk analysis in different situations.

In finance, risk analysis for traded security estimates the covariance of the security with the market average and facilitates the assembly of portfolios of securities with a risk-return efficiency frontier. In case of a project, risk analysis deals with the process of estimating the mean and the timing of cash flows. In insurance the task of risk analysis is to estimate the distribution of payouts for a policy and for the portfolio of policies. Risk analysis applies various tools and techniques in quantifying, either quantitatively or qualitatively, the probability and the potential impact of some sort of risk. Lave (1992) advocates the use of four primary tools that can be used in the assessment and analysis of risk.

So far a review of the nature of risk and risk analysis has been made both from total firms and financial markets' viewpoints and can be concluded that risk analysis is an integral part of the overall management of business organisations. It can also be pointed out that business organisations that suffer a loss of physical assets as a direct result of some sort of disaster require a proper analysis of operational, economic (or market), pure and financial risks due to an increase in the overall risk during the disruption period.

2.3 Literature Review

As stated in Chapter 1, the major aim of this research is to develop a financial crisis management model based on a new approach. As a result, a brief review of existing literature including its limitations will be undertaken in this section.

2.3.1 Existing Literature

A review of existing literature is based on two major areas of studies of corporate crises: strategic crisis management theory and practice, and financial distress analysis, due to their relevance and applicability to this research.

Crisis management, as a separate area of specialisation not attracted very many authors until recently as most of the publications started to appear in the late 1970s and 1980s (Billings, Milburn and Scaalman 1980; Milburn, Schuler and Watman 1983; Fink 1986; Clark 1988; Shrivastava and Mitroff 1987; Mitroff 1988). Only a few articles appeared in the 1960s by Hermann (1963, 1969). However, over the last 20 years a vast body of materials is available in various journals and other publication including books (ICM 2004). In Australia, the work of McDonald and Hartel (2000) on the Australian crises experience and recently by Coleman (2004) on the frequency and cost of corporate crises can be mentioned as good examples.

Hwang and Lichtenthal (2000) state that previous research on organisational crisis generally falls into three categories. The first is an ad hoc approach that views crisis from a piecemeal, case oriented perspective (for example, Starbuck and Milliken 1988; NyBlom 2003). The second common approach is to develop typologies of crises by classifying them into distinct categories based on observations of their similarities. Studies in this category include Shrivastava and Mitroff (1987), Mitroff (1988), Shrivastava and Siomkos (1989) and Mitroff and Anagnos (2001). The third approach examines crises based on definition, focusing on characteristics that constitute a crisis situation (Hermann 1969; Billings, Milburn and Schaalman 1980; Rike, 2003).

In relation case oriented approach, Shirvastava and Siomkos (1989) found that managers pass through four distinct phases as they deal with disaster situations: crisis recognition, crisis definition, planning and reaction. They further stated that corporations might take one of these four positions as crises occur. Managers may attempt to contain damage aggressively by taking actions such as immediate product recall, technical damage control and the offer of relief to victims.

Sapriel (2003) tries to show that most business crises today are non-event-related or smoldering crises and that they originate mostly with management inaction and/or neglect. As a result, there is a growing recognition among corporations that crisis management must be institutionalised and that all key business functions (operations, human resources, legal, IT, health and safety and environment, sales and marketing, communications and reputations security), must address crisis prevention and management formally as part of business planning.

NyBlom (2003) states that the goal of crisis management planning is for the business organisation to survive the crisis with its reputation and assets intact. However, experience shows that many organisations do not address the planning process adequately enough to prepare for response. The importance of proper planning is demonstrated after a crisis has occurred.

According to NyBlom (2003), crisis management involves planning, organizing, leading, and controlling the assets and activities in the critical period immediately before, during and after an actual or impending catastrophe to reduce the loss of resources essential to the organisation's eventual full recovery. The crisis management planning includes: risk identification, risk assessment, crisis planning and preparation, mobilization and response, recovery, and plan testing.

Both Sapriel (2003) and NyBlom (2003) recommend that the overall responsibility should be assigned to an individual who will be the point person for the entire project. Both mention 'business continuity planning' (BCP), as an integral part of the crisis management planning process. BCP allows an organisation to continue to meet business objectives and customer obligations, and to maintain market share.

Finally, Spriel (2003) notes that not all crises are preventable, but having effective risk and issue management process in place will help organisations foresee, plan scenarios, be more proactive and decide on whether to take, treat, transfer or terminate the risk. Actual crisis management planning deals with the loss, just as disaster recovery and BCP deal with the situation after the loss. Crisis management is about being prepared to handle adversity and minimise the impact most effectively and facilitating the management process during chaos.

Typology based approach to crisis management seeks to explore the underlying similarities of crises. Based on the premise that each crisis results from organisation-environment interactions involving social and technical factors, Shrivastava and Mitroff (1987) classified crises along internal-external and technical-social axes.

As shown in Table 2.1, Mitroff and Anagnos (2001) classify crises into 7 major families and suggest a Best Practice Model for crisis management. This model involves five factors: types/risks, mechanisms, systems, stakeholders, and scenarios that must be managed before, during, and after a major crisis. The authors argue that there has not

been a single organisation that does well on every one of the key factors and as such the model is also designed to serve as a benchmark against which all organisations should measure their current crisis management performance.

The studies regarding the definition based approach portray crisis as a fundamental issue in dealing with the crisis concept. As a pioneer in this area, Hermann (1969) defines a crisis as a situation with a high-threat and a short decision time that surprises the members of the decision-making unit. Based on this work, other authors (Billings et al. 1980; Milburn et al. 1983; Clark 1988; Rike 2003) developed the framework for crisis management further. For example Clark (1988) attempted to develop a tentative definition for crises by identifying three major elements: threat to goals; reduced ability to control or direct the environment; and perceived time pressure.

Rike (2003, p. 26), using the US Code of Federal Regulations, defines a disaster as *"an unexpected occurrence inflicting widespread destruction and distress and having long-term adverse effects on agency operation"*. The same code defines an emergency as *"a situation or an occurrence of a serious nature, developing suddenly and unexpectedly, and demanding immediate action"*. Following a disaster, Rike (2003) recommends that a process of recovery and salvage, which involves four steps, should be undertaken. These steps are: (i) assess the damage; (ii) stabilise the environment; (iii) activate the in-house recovery team; and (iv) restore the area.

In most disastrous situations such fire and storm, an organisation's staff do not participate in the actual recovery process, where the processes require the use of hazardous and dangerous chemicals or knowledge of detailed salvage methods. It is, for example common here in Australia that various premises built in the 1960s, 1970's and early 1980s have asbestos roofs and require specialised expertise in accessing them, making the area safe and removing debris. Therefore it is important for internal staff to know how to act quickly and effectively in obtaining outside help and supplies.

On their part, Hwang and Lichtenthal (2000) propose an alternative path of crisis research grounded in the theory of punctuated equilibria that addresses the dynamics of the evolution of species and argue that the adoption of this view of crises allows one to explore the root causes of crises with rich managerial implications. For the purpose of this thesis, the first three approaches will later be reviewed in this chapter, as they are

more commonly used in all types of business organisations and crisis situations.

In general, the various approaches to the development and application of crisis management plans and procedure share the following common characteristics.

The first one is that all of the approaches adopted by various authors have similar objectives in that they all attempt to develop an effective crisis management plan that can respond to different crisis situations. In that sense they are all complimentary rather than alternative methods of crisis management practices and procedures.

Secondly, the other obvious similarities in various approaches to crisis management are the classification of crisis management period into three: pre, during and post crisis periods. This approach is quite useful in the identification process of various activities that must be undertaken in order to control crisis.

In the third place, it is vital to note that crisis management is transcendent in that it affects and is affected by various organisational policies and functions including corporate governance, human resources, IT, accounting, etc.

Fourthly, the plans are developed or designed from large organisations point of view with abundant internal and external resources. Emphasis is placed in most cases on large organisations and high profile cases (for example, BHP/Ok Tedi contamination of Fly river system and the Boxing Day Tsunami as early as last year). These types of crises are generally low probability events (Shrivastave 1987) that do not characterise crises at SMEs' level.

The fifth point refers to the emphasis given to smouldering or non-event related crisis, prevention mechanism and public relation (PR) exercise. It is obvious that from current research materials (for example, Sapriel, 2003), the majority of the crises (65%) emanate from non-event related incidents. However, it is not clear whether the same classification is true for SMEs. While prevention is always preferable to cure, it is not always possible to rely on it given the number of risky events that happen every year. Also PR experts and 'spin doctors' are mainly accessible to large corporations instead of SMEs in the suburb.

From a financial crisis point of view, various researchers over the last 35 years have

attempted to develop different statistical techniques and models that can be used to discriminate between bankrupt and non-bankrupt firms for the benefit of investors, lenders and bankers (Beaver 1966; Altman 1968 and 2002; Ohlson 1980; Zmijewski 1983; Gentry, Newbold and Whitford 1985; Casey and Bartczak 1985; Zavgren 1985; Lau 1987; Laitinen and Laitinen 1998).

The techniques referred to range from simple individual financial ratio analysis (univariate ratio analysis) conducted by Beaver in 1966, to multivariate analysis (Zeta or commonly known as Z-Score) by Altman (1968, 1993, 2002) and to more complicated multinomial logit analysis undertaken by Lau in 1987. Other authors such as Gentry, Newbold and Whitford (1985) adopted a different approach in analysing corporate failures by developing an expanded cash flow model. Laitinen and Laitinen (1998) contend that the cash management behaviour of a firm offers incremental information over traditional variables in bankruptcy prediction, and should be regarded as the main focus of future research.

In Australia, Castagna and Matolcsy (1981b) developed and tested various Zeta models based on 21 listed public companies that failed during the period 1963 to 1977. The Australian study suggested that it is difficult to identify a unique model that can predict corporate failure without specifying the level of Type I/Type II, or the overall error rate of a failure model. However, Altman and Izan (1981) and Izan (1984) analysed Australian companies and concluded that their models (which were quite similar to the Altman (1968) model) were good enough to predict company failures across industries. All these techniques and models were mainly intended to provide early warnings for corporate failures during the course of normal business operations, say 3 to 5 years before the actual failure.

In short, the main focus of financial distress analysis is to serve as an early warning for public listed companies rather than providing tools and techniques to deal with financial crisis due to the partial or full destruction of productive assets. They are also based on accounting and financial characteristics of large corporations and are not tested in relation to SMEs in Australia and for that matter in other developed economies due to lack of reliable data (Altman 2002) and minimal interest from potential users such as bankers and lenders.

2.3.2 Limitations of Existing Literature

Further to the limitations of the current of body of literature discussed in detail in Section 1.3, the following summary provides the limitations of the existing literature to help the materials provided in this chapter.

1) Crisis management concentrates on *strategic management issues* and to a certain extent on operational matters.

2) Crisis management tools and techniques give much emphasis to *smouldering or non-event related crises* and preventative mechanisms.

3) Crisis management plans are designed and developed from *a large organisation's point of view* with abundant internal and external resources.

4) The various statistical and other techniques developed by Beaver (1966) and Altman (1968) are mainly intended to serve as *an early warning system.*

5) Corporate failure prediction models are based on accounting and financial characteristics of *large corporations – public listed companies.*

6) Finally, the general approach to crisis management is *narrowly focussed,* as most of the literature attempts to address a single issue such as top management policy or operational matters.

Given the above limitations, the difference between smouldering and abrupt crises as shown earlier in this chapter, and the SMEs' financial and operational characteristics, there is a need for a new approach to crisis management that can be applied to SMEs for the purpose of managing abrupt financial crises effectively and efficiently. This new approach is based on some theoretical elements to be discussed in the following three sections.

2.4 The Elements of the New Approach

Following the need for the development of a new approach to crisis management as outlined above, this section presents the various theoretical elements that make up the basis of the financial crisis management model to be developed later in this chapter. These elements are grouped into two major categories.

The first category is based on the financial management theories and principles that are considered most critical in relation to the new approach and listed below. Detailed discussions will follow in Chapter 3.

1) Risk management;
2) Insurance;
3) Financial engineering;
4) Capital budgeting;
5) Optimal post-loss investment decision
6) Abandonment, salvage and disposal cost;
7) Cash flow management; and
8) Optimal capital structure.

The second category includes non-financial management strategies identified below and discussed in Chapter 3.

1) Strategic crisis management;
2) Corporate governance;
3) Business ethics and stakeholders analysis; and
4) Marketing management.

2.5 The Theoretical Framework of the New Approach

From Chapter 1, one of the specific aims of this research is to develop financial optimisation models that can be utilised in the event of an abrupt financial crisis resulting from an isolated damage to the physical asset(s) of small and medium sized business organisations. It also attempts to identify non-financial crisis management tools that can be applied in an effort to minimise the impact of a partial or full destruction of the assets of the business in respect of all operational and financial matters.

Crises occur as a result of risky events. A failure to manage crises effectively leads to the occurrence of more risky events and eventual collapse of the business organisation

that has faced the initial crisis at tremendous expenses to stakeholders who have depended on that business for their livelihood directly or directly. This clearly shows the relationship between risk and crisis and the need for understanding both variables, and the tools, techniques and theories developed to explain, analyse and manage them for the purpose of maintaining and maximizing the wealth of business organisations.

Figure 2.1 shows the tools and techniques required to manage abrupt financial crises and it is based on major theoretical elements identified as financial distress analysis, capital structure, risk management, financial engineering, capital budgeting, crisis control mechanisms, corporate governance, business ethics and stakeholders analysis, and marketing management. It should be noted that these areas of discipline evolved out of well-established field of studies and professional practices such as economics, statistics, accounting, operations research, and organisation and management theory.

Therefore, the following areas of business studies (the major theoretical elements of the new framework) play a major role in the development of financial crisis management model and its various instruments and strategies applicable to SMEs in crises mode. To summarise, a brief discussion of each element is provided below.

- **Risk Management:** Deals with monitoring and controlling various types of risk that can face business organisations during a normal or disrupted business environment. A business organisation with sound risk management strategies can easily withstand risky events and provides a basis for developing effective financial management strategies to deal with crisis (for example, Doherty 2000).

- **Financial Engineering:** This is a process of designing new financial instruments and processes, and developing creative solutions to problems in finance. As a result it forms one of the basis for developing appropriate financial management tools that can be utilised in the event of abrupt financial crises (for example, Finnerty 1988).

- **Capital Budgeting**: This is essential to understand, as partial or total destruction of productive assets necessitates replacements that have to be made in a value maximising way (for example, Peirson, Bird, Brown and Howard 2002).

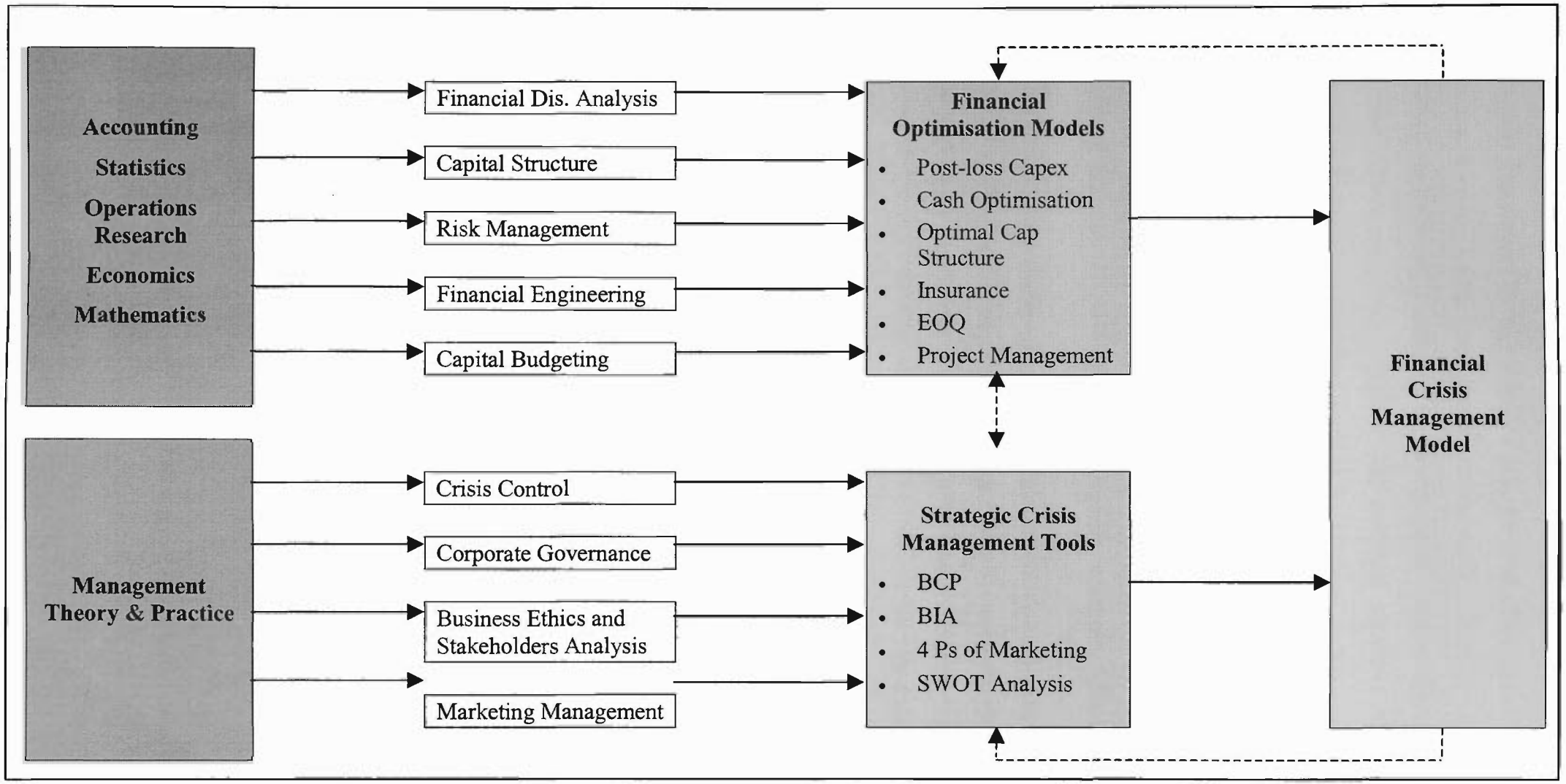


Figure 2.1
A New Theoretical Framework for Financial Crisis Management Model

- **Capital Structure:** In the event of loss of productive assets and inadequate insurance cover, business organisations can be forced to use external funds to finance replacement assets and or new projects. Hence, the understanding of optimal financing policy is one of the essential elements of designing and applying financial management tools in the event of abrupt financial crises (for example, Scott 1976).

- **Financial Distress Analysis:** Various financial ratios are used to predict corporate failure due to financial distress. Such techniques can be used to assess the financial health of business organisations in abrupt financial crises and adjust financial management policies and practices (for example, Altman 2002).

- **Corporate Governance:** The principles of effective corporate governance can also be applied to SMEs with multi-layer management structure and salaried managers and executives. These principles become more important in crisis situation due to competing interests of various parties (for example, Allen and Gale 2001).

- **Crisis Control:** The understanding of existing strategic crisis management theory is imperative in designing preventative measures and exploring the techniques and methods available to deal with non-financial aspects of crisis impacts (for example, Mitroff 1988).

- **Business Ethics and Stakeholders Analysis:** The theory of business ethics help business owners and managers to critically analyse their obligations and make the right decisions in relation to their own interest and that of employees, customers, suppliers and local community in crisis mode (for example, Smith and Hasnas 1999).

- **Marketing Management:** The various theories developed in relation to marketing management can be useful in the event of a crisis, as business organisations need to step up their efforts in marketing their business and products (for example, Kotler 2003).

Having formulated the new theoretical framework for the financial crisis management model, its main characteristics (the planning format and systems approach) and the general financial crisis management model will now be covered in the following sections.

2.6 Planning Models for Crisis Management

Pidd (1996, p. 13), following the work of Ackoff and Sasieni (1968), attempted to define a model in general terms as *"a representation of reality intended to be of use to someone in understanding, changing, managing and controlling that reality"*. This definition shows that a model is based on a representation of reality that can be expressed in different forms. Various research materials and books (for example, Render, Stair and Hanna 2003) on finance and engineering reveal that there are basically four types of models: (i) Physical Model; (ii) Scale Model; (iii) Schematic Model; and (iv) Mathematical Model.

Planning models are generally characterised as mathematical models and will be discussed in the following subsections.

2.6.1 Planning Format

Naylor (1979) describes a corporate planning model in terms of the variables that make up the model: output variables (endogenous variables), external variables (exogenous variables), policy variables and random variables. Fox, Sengupta and Thorbecke (1973) present a corporate planning format using two major classifications: target variables (goals) and instruments. For the purpose of the financial crisis management model to be developed, the main target is the restoration of physical and non-physical assets of the business lost or damaged as a direct result of risky events.

More specifically, the target of the model to be developed in a crisis situation includes: restore physical assets in a value maximising way, maintain cash flows, maintain market share, retain key personnel, maintain profitability, maintain production efficiency and so forth. These parameters can be set at levels prior to the crisis or can be revised during the crisis period depending on the level of business activities.

The model intends to achieve the goals set during the planning stage by utilising instruments such as cash flow optimisation model, optimal post-loss investment model, optimal capital structure, EOQ and PERT/CRT. These models, tools and techniques should be used selectively during different phases of a crisis (as will be outlined in Section 2.6.3) and with better understanding of strategies such as corporate governance, stakeholders analysis and corporations law.

2.6.2 Financial Crisis Management Model

From the literature review presented so far in this chapter, it should be clear that any crisis would involve the loss of one or all types of assets. For the purpose of this research, the general classification of assets into tangible and intangible assets is followed.

Tangible assets include, amongst other things, all physical assets of a business organisation including stock of raw materials, finished goods, plant and machinery, office equipment, furniture and fittings. Intangible assets cover goodwill, more specifically market share and reputation. In this research, the main focus is an abrupt financial crisis caused by a loss of physical assets, hence tangible assets. However for the sake of this model, it is also important to note that an abrupt financial crisis can be caused by a loss of market share or customer withdrawal as a result of certain incidents such as sexual allegations, bad reputations, or any other misconduct.

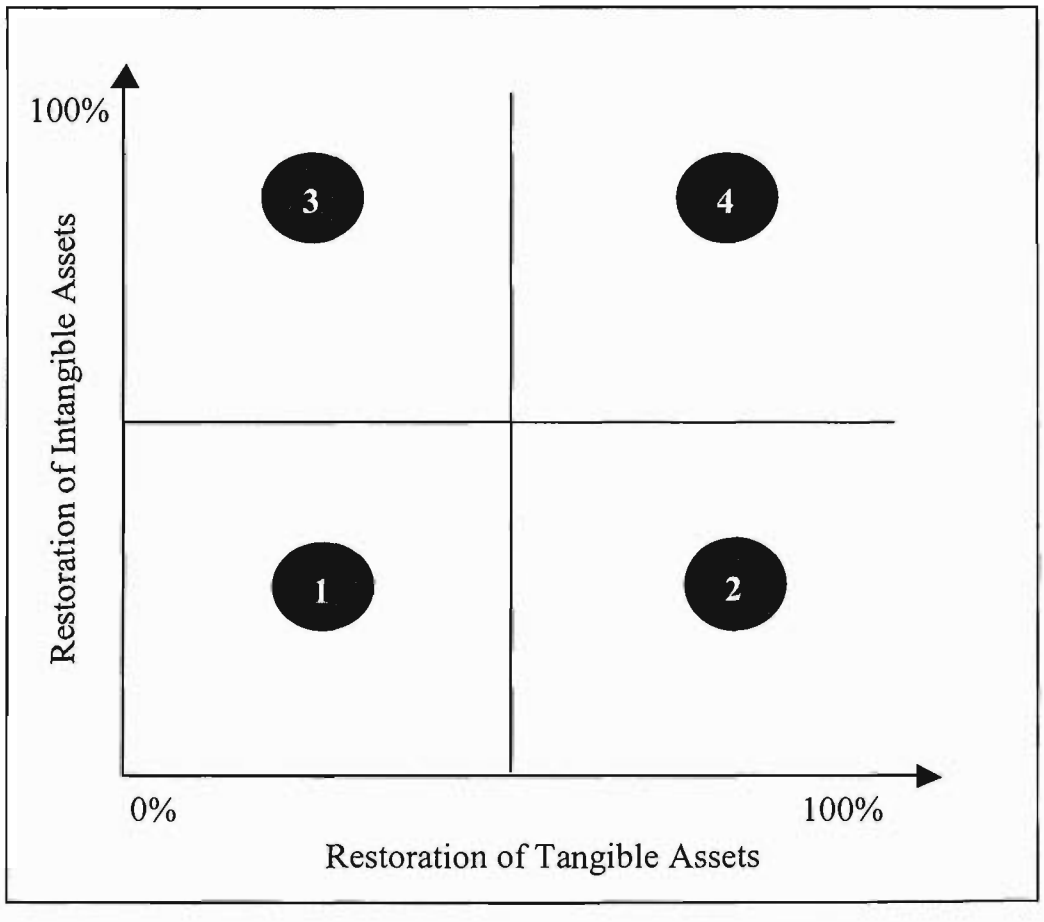


Figure 2.2
The Financial Crisis Management Model

In both cases, a business organisation in a crisis needs to restore both assets in order to be able to trade normally, and generate the same cash flows as before the crisis in the shortest possible time. The following financial crisis management model depicts both scenarios and what might be needed in order to restore normality.

Figure 2.2 shows four different positions where a business organisation might find itself in relation to crisis situation:

Position 1 – Represents destruction or loss of both types of assets.

Position 2 – Represents loss of intangible assets only.

Position 3 – Represents loss of tangible assets only.

Position 4 – Represent normal position.

2.6.2.1 Financial Crisis Management Curve – Scenario 1

The first scenario is the worst position of the four as the business organisation is in deep crisis due to a loss of both types of assets. From here, the organisation has three different choices to rebuild its both types of assets. These three choices are shown with the help of the following three financial crisis management curves.

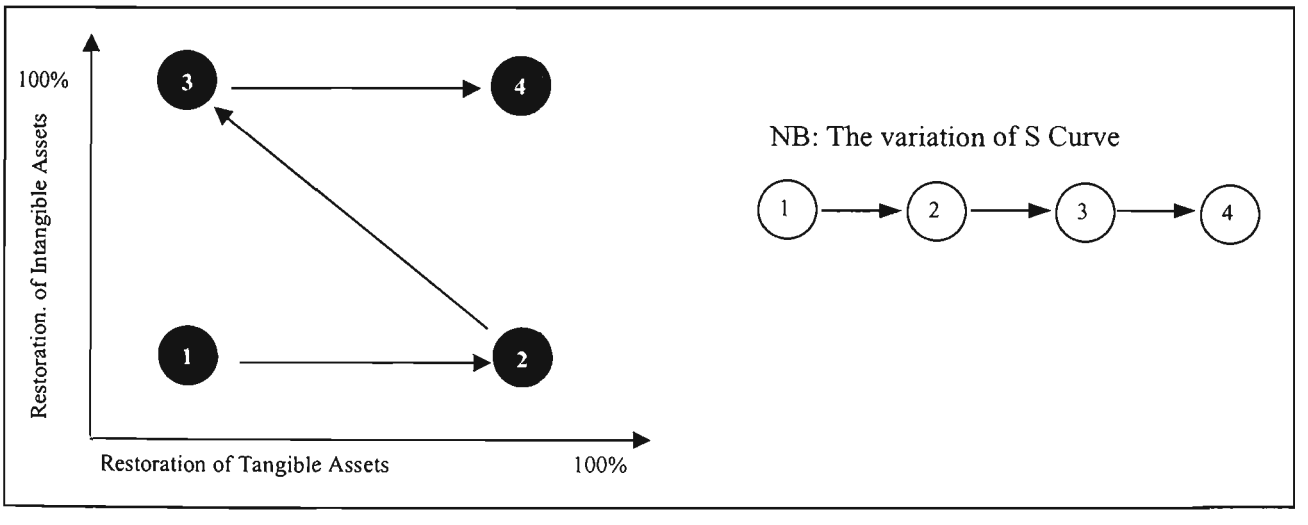


Figure 2.3
The Financial Crisis Management Curve (the S Curve)

The 'S Curve' (Figure 2.3) shows that the business organisation needs to rebuild its tangible assets first and then embark on the restoration of its intangible assets.

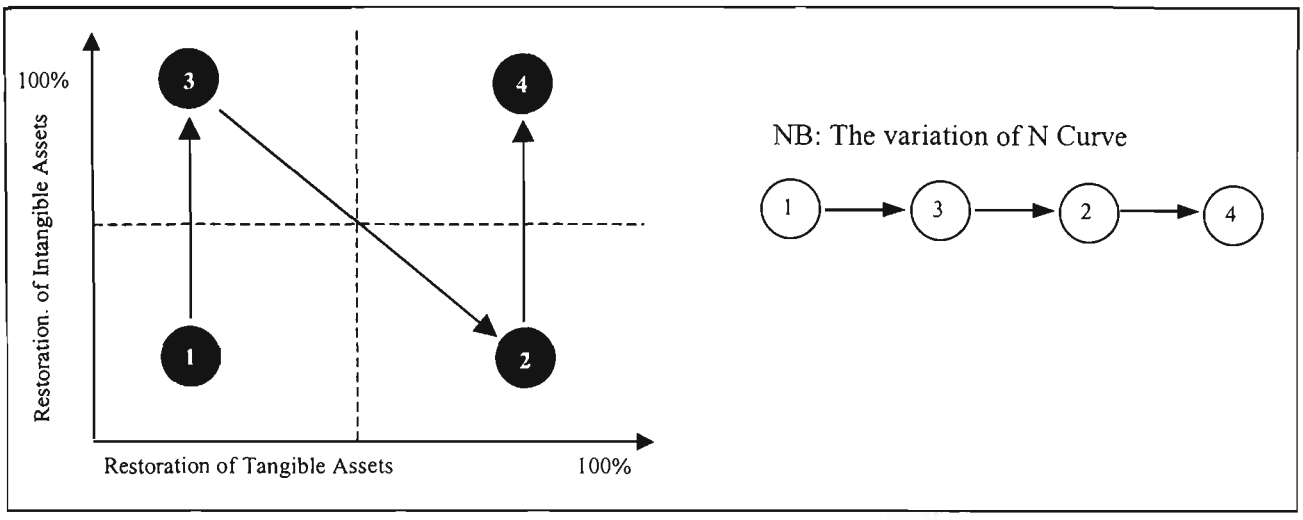


Figure 2.4
The Financial Crisis Management Curve (the N Curve)

The 'N Curve' (Figure 2.4) is the opposite of the 'S Curve' in that the viable strategy for this business is to regain back its reputation and market share through the use of some third party products, etc. and then rebuild its assets. The following figure shows this path to the final desirable position, 4.

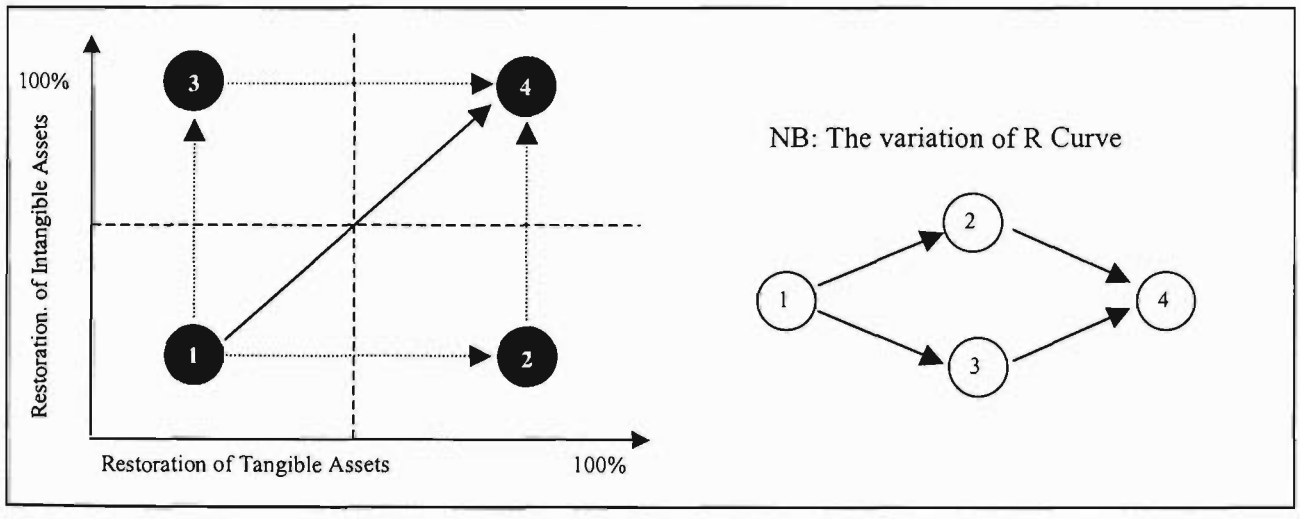


Figure 2.5
The Financial Crisis Management Curve (the R Curve)

The last alternative, which is called the 'D Curve' (Figure 2.5), is based on the gradual restoration of both types of assets at the same time. This choice is the preferred course of action provided that the business organisation is able to handle both activities effectively and simultaneously. It should be noted that this does not mean that both assets should be restored at the same rate.

2.6.2.2 *Financial Crisis Management Curve – Scenario 2*

The second quadrant of the Financial Crisis Management Model represents the loss of physical assets while the organisation's intangible assets are still intact. In this case, the business needs to rebuild its productive assets in the shortest possible time without damaging its intangible assets. Figure 2.6 shows the path to recovery.

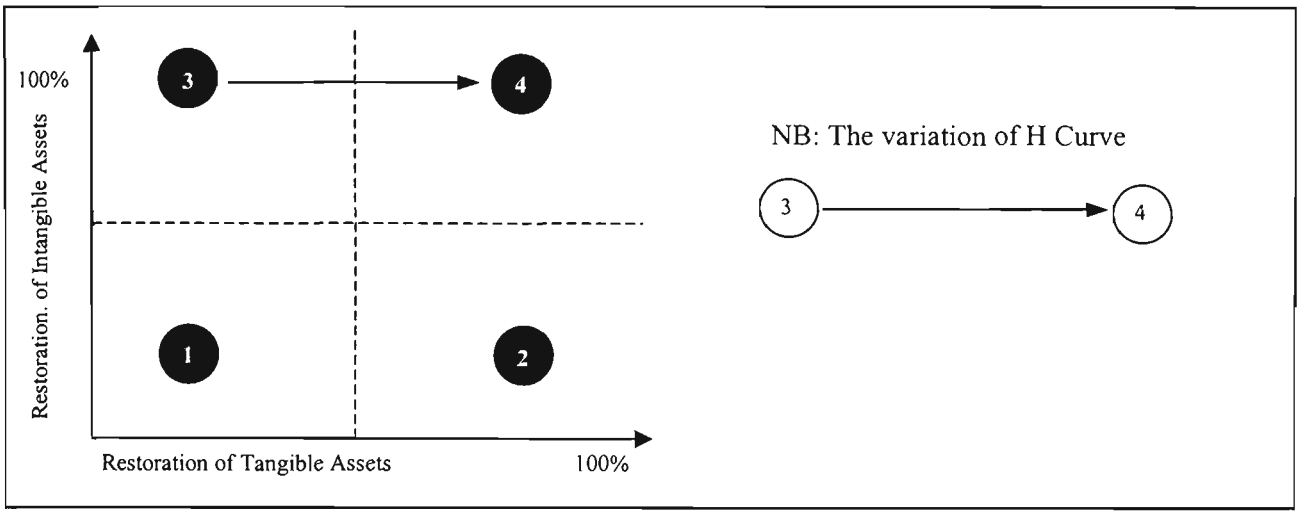


Figure 2.6
The Financial Crisis Management Curve (the H Curve)

2.6.2.3 *Financial Crisis Management Curve – Scenario 3*

The third position is where the business organisation has suffered a loss as a result of the loss of customers following some sort of bad publicity. In this case the battle is for a move upward from 2 to 4. Hence, it is called the 'V Curve'. Figure 2.7 shows this scenario.

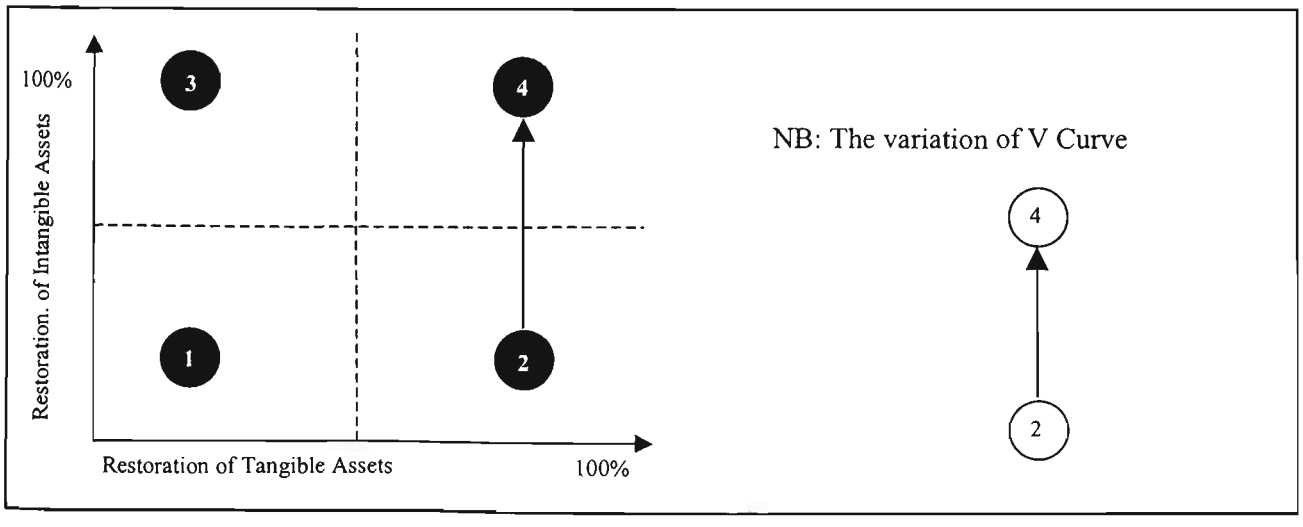


Figure 2.7
The Financial Crisis Management Curve (the V Curve)

2.6.3 Financial Crisis Management Phases

In the previous section, it was stated that SMEs could use different phases of a crisis as a strategy for applying different instruments identified as part of the financial crisis management model. In this research, a crisis is divided into 6 phases both for planning and implementing the model: (i) assessment of incident; (ii) crisis Management planning; (iii) temporary resumption of operations; (iv) replacement and reconstruction of tangible assets; (v) marketing and promotion; and (vi) permanent resumption of operations.

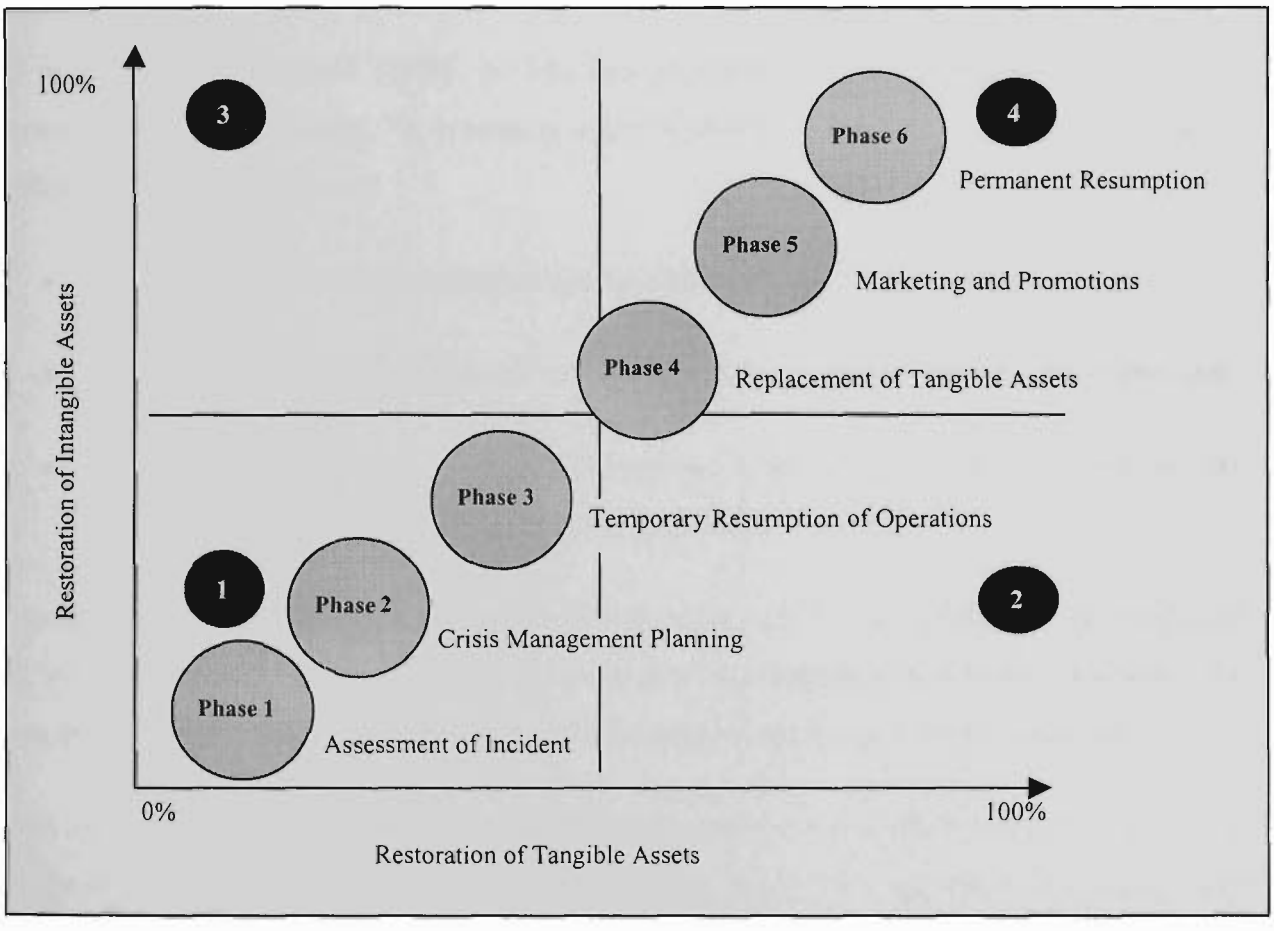


Figure 2.8
Financial Crisis Management Model and Crisis Phases

Figure 2.8 shows a diagram integrating both the financial crisis management model and the crisis phases. Further discussion of the various phases of financial crisis management process will be provided in Chapter 8, following a presentation of the case studies.

2.6.4 Systems Approach to Crisis Management

To apply a systems approach to crisis management planning and implementation, it is imperative to understand the nature of systems theory and application. For more than 50 years, several authors (for example, Boulding 1956; Bertalanffy 1968) have been providing different but related definitions of 'system'. Skyttner (2001, p. 53) provides a practical definition of system, which *"is a set of interacting units or elements that form an integrated whole intended to perform some function"*. He further points out that a system is a structure that exhibits order, pattern and purpose. A system's purpose is the reason for its existence and the starting point of measuring its success.

It is argued that Ackoff (1981, p. 15) has provided a more scientific definition of system. According to him, "a system is a set of two or more elements that satisfies the following three conditions:

- The behavior of each element has an effect on the behavior of the whole.
- The behavior of the elements and their effects on the whole are interdependent.
- However subgroups of the elements are formed, all have an effect on the behavior of the whole, but none has an independent effect on it."

On the basis of the above definition, the systems approach to crisis management is required in order to be able to treat all aspects of crisis problems **together in a rational manner** by combining theory, empiricism and pragmatism (major benefits of systems approach).

Previous studies in crisis management (Hickman and Crandall 1997; Mitroff et al. 2001) adopted the systems approach in very limited ways. For example, Hickman and Crandall (1997) recognised that an organisation is composed of a series of subsystems interlinked with one another and the effectiveness of the organisation, or total system, is only as strong as its weakest link, or subsystem. They further point out that when a disaster hits a firm, a number of departments (subsystems) receive the impact and top management needs to take control and manage the subsequent crisis taking into account the crisis mode functions of each system within the total system, the organisation. According to Hickman and Crandall, the main subsystems of an organisation that must be considered in planning crisis management are information systems, human resources, public information, and operations.

Mitrfoff et al. (2001) consider systems as one of the five components of a Best Practice Model for Crisis Management and argue that this approach is a key in understanding any complex organisation. They outline five components or layers of an organisation: technology, organisational structure, human factors, organisational culture, and top management psychology that determine its crisis management performance. According to these authors (Mitrfoff et al. 2001), the deepest parts of an organisation reside in its culture and in the psychology of its top management, which are very difficult to get at, and for that reason, are the most critical determinants of an organisation's crisis management performance. This study mainly focuses on the managerial behaviour of an organisation, the components that influence this behaviour and ultimately its relationship to crisis management.

In this thesis, a systems approach will be applied both to SMEs as an organisation composed of people, machines and material tied together by communication links for the purpose of achieving a specific goal, and crisis management program developed to restore the tangible and intangible assets of the business organisation damaged by a human or natural disaster. In other words, the approach adopted in this thesis views SMEs as a system (which is similar to other studies) and it also views the crisis management program as a system as well.

2.7 The Advantage of the New Approach

The new approach to financial crisis management and its theoretical framework developed in this chapter is intended to overcome the shortcomings of previously developed approaches to and theoretical frameworks for crisis management because it offers the following main features

1) It incorporates all the relevant issues facing SMEs in an abrupt financial crisis including financial and non-financial activities in crisis mode; hence it is comprehensive in its approach.

2) Given the elements included in the development of the framework, it is obvious that the framework is multi-disciplinary in nature and integrative in its application.

3) It adopts a planning model and thereby enhances its effectiveness by identifying the targets to be met and the instruments to be used during various phases of a crisis.

4) It applies a systems approach to SMEs as entities comprised of various subsystems and crisis management program to be implemented. This framework is superior and more effective than the previous ones as it has the capability to consider interdependencies at organisational and crisis management program levels.

2.8 Conclusion

Previous crisis management studies and strategies are mainly designed from the point of view of large organisations, tend to be preventative in nature and public relation (PR) orientated in action, and concentrate on high profile and less frequent events such as the Newcastle earthquake in 1989 and the Ok Tedi river system contamination reported in 1994. However, the small business sector, which provides more than 47% non-agricultural employment and 50% of the total GDP in the Australia economy, suffers severely and frequently as a result of abrupt financial crises resulting from manmade or natural disasters such as fire, storm, flood, contamination and accidental damage.

As a result, this research has identified a gap and set out to develop a financial crisis management model based on a new approach designed to overcome the shortcomings of the existing crisis management models applicable to SMEs. For this purpose, a theoretical framework is developed on the basis of a multidisciplinary approach, including financial distress analysis, portfolio theory, risk management, financial engineering, capital budgeting, business ethics and stakeholders analysis, corporate governance and corporations law.

The financial crisis management model has some important characteristics in that it adopts a systems approach at organisational and crisis management levels, and follows a planning format. The model analyses the interactions among various subsystems of an SME in relation to a crisis and attempts to develop an effective plan that can minimise the impact of the crisis on various resources controlled by the business. The system

approach also extends to various phases of a crisis identified earlier in this chapter, and guides the management of an SME in a crisis, systematically and methodically, until the crisis is over, based on the criteria also developed in this thesis.

By following a planning format, the new model identifies the targets to be achieved, the instruments to be applied and the strategies to be followed during each phase of the financial crisis management process. The two broad targets of the financial crisis management model are the reinstatement of the tangible assets of a business, which are partially or completely destroyed by the occurrence of the risky event, and the restoration of the intangible assets such as market share, sales growth and reputation.

The model applies various instruments developed to assist in the restoration of all types of assets. The most prominent instruments analysed and applied in Chapters 6 and 7 are the cash flow optimisation model and the post-loss investment optimisation technique, respectively. Some broad strategies and policies will also be discussed in Chapter 8.

In general, the new approach, the theoretical framework and the financial crisis management model developed in this thesis, are quite superior to the existing models as they are designed to overcome the shortcomings of the previous models. The current model, employed in this thesis, is also highly effective as its elements and methods are selectively developed to minimise the impact of abrupt financial crises that SMEs might face in Australia or elsewhere, with minor modifications to strategies and policies applicable in a different economy.

Chapter 3
THE ELEMENTS OF THE NEW APPROACH

3.1 Introduction

In Chapter 2, the necessary elements of the new approach were identified and provided under two categories. Section 3.2 provides elements of the first category, which is a wide area of financial management theory and practice, including risk management, insurance, financial engineering, capital budgeting, optimal post-loss investment decisions, abandonment, salvage and disposal cost, cash flow management and optimal capital structure will be covered. The identification of these elements is a very important step towards the development of the new approach to financial crisis management as, without the financial management tools derived from these theories and principles, the new model cannot be effectively applied to SMEs in crisis mode.

In Section 3.3, the elements of the second category are presented. These elements assist in dealing with non-financial activities undertaken during a crisis, and in setting the right policies and strategies to be applied before, during and after an abrupt financial crisis.

In conclusion (Section 3.4), the main features of the elements of the new approach to crisis management will be shown.

3.2 The Elements of the New Approach I: Financial Strategies

This section concentrates on the theories, instruments and tools of corporate finance that are identified to aid the financial crisis management model to be applied to SMEs in crises mode. A model based on such elements is considered to be more effective and superior compared to existing theoretical and practical crisis management tools that suffer from the shortcomings discussed in Chapter 2 briefly and in Chapter 1 extensively.

3.2.1 Risk Management

The most critical element of crisis management is the adoption of sound risk management strategies because such strategies have a significant impact on the cause and frequency of any crisis, the pace of recovery and future preparedness. Risk management is concerned primarily with the process of controlling a risk or minimizing its impact on the value of the assets held. Mason, Merton, Perlod, and Tufano (1995) argue that all risk management activities can be represented as a combination of three pure methods of managing risk that are known as *"**the three dimensions of risk management**"*. These risk management activities are:

- reducing risk by selling the source of it;
- reducing the risk by diversification; and
- reducing the risk by buying insurance against losses.

Vose (2000) suggests that regardless of the techniques or tools to be used, a risk analyst needs to follow certain risk assessment processes in order to implement the appropriate risk management strategies. In terms of corporate finance, risk management strategies and models are used to select portfolios with specified exposure to different risks. For this purpose, there are several financial optimisation models that can be applied. For example, Dahl et al. (1993) identify seven optimisation models used for this purpose:

1) Bond portfolio immunisation models
2) Factor immunisation models
3) Bond dedication models
4) Worst-case analysis of option positions
5) Mean-variance models
6) Utility models
7) Multiperiod, stochastic planning models

A close look at the above models shows that the models' main concern is to address the risk encountered by security holders and in particular the models listed from 1 to 5 are intended to hedge against different forms of financial risk. It should be noted that the

above optimisation models are used to develop risk management tools such as options, futures, forwards, swaps, and various complex combinations of these basic types thanks to the emergence of financial engineering.

Apart from financial risk, SMEs face operational risk that can lead to a disruption of their business activities but with the help of non-financial risk management strategies such as better warning systems, improved safety standards, regular risk and threat analysis, strategic issue management, and best practice emergency and security standards, they can reduce and in some cases eliminate crisis (Campbell 2004). Fearn-Banks (2002) identifies several crisis prevention tactics but states that business organisations should also be prepared for those crises that cannot be prevented.

In any case, risk management is a very important element of the new approach to crisis management as it can play a great role in crisis prevention and control to be discussed in Section 8.2 (Chapter 8). Earlier in this section, insurance was mentioned as one of the three dimensions of risk management, and it will be introduced in the next section as one of the elements of the new approach to financial crisis management.

3.2.2 Insurance

This section provides a brief review of insurance, the most important risk management tool that has been in use by business organisations of all sizes for centuries in relation to insurable risk (pure risk, unsystematic risk or diversifiable risk).

Insurance can be treated as a derivative instrument or a type of hedging that is offered in the form of a policy or a contractual agreement between an insurer and the insured. Hedging refers to the use of off-balance-sheet instruments such as forwards, futures, swaps, and options to reduce the volatility of firm value (Nance et al. 1993).

An insurance policy is a forward policy that provides a cover for changes due to insured perils such as fire, storm, etc. Insurance companies issue insurance policies or accept a transfer of risk in consideration for insurance premiums. More specifically, insurance policies involve the sacrifice of actual wealth in order to avoid the possibility of a loss of larger wealth.

Following portfolio theory, Meyer and Power (1983) question the value of insurance given the nature of unsystematic risks that can be avoided by investors and large firms

through diversification. More specifically, the capital asset pricing model (CAPM) states that insurable loss is uncorrelated with aggregate wealth or the market portfolio, that is, the risk has zero beta. In this, the risk can be borne effectively at no cost by an investor who can diversify the unhedged risk simply by their choice of investment portfolio. Accordingly, hedging the risk has no value to shareholders (Doherty 2000).

Despite this proposition of the modern theory of finance that attaches *"little"* or *"no"* value to insurance, small and large corporations acquire insurance policies at hefty prices especially after the collapse of HIH in Australia and 'September 11' worldwide (McMullan 2002, ARIMA 2003, NIBA 2003). Various authors (Gay and Nam 1998; Doherty 2000; Nance et al. 1993; Grillet 1992; Mayers and Smith 1987) argue that uninsured risk gives rise to a set of transaction costs that lower the expected value of the firm's cash flows. In other words, insurance contracts enable business organisations to minimise:

- increased tax burden from risky cash flows;
- increased costs of bankruptcy;
- agency costs that arise from potential financial distress and lead to inefficient investment decisions;
- underinvestment problems associated with casualty losses; and
- inefficiencies that arise from managerial risk aversion.

Doherty (2000) argues that modern corporate risk management uses the technology of both finance and insurance to address the whole range of corporate risks – financial, insurable, operational, and business risk. In its coverage, this new approach is a comprehensive or integrated strategy in treating risk. The characteristics of this new integrated approach are the following:

- **It is diagnostic**. The starting point for the current treatment of risk management is a diagnosis of the corporate costs of risk. Risk can be managed by removing the risk that is, by contracting with a counter-party such as an insurance firm to assume the risk. But this is often expensive or unavailable in the current insurance market. Therefore, risk management strategies should be extended to explore complimentary or substitute options for risk transfer.

- **It is designed to support optimal investment**. The new risk management is based largely on the proposition that, when the firm is exposed to risk, it may be unable to make optimal investment decisions. This can occur in two ways. First, risks impose the possibility that the firm will run out of cash and be unable to finance new and replacement investment. Second, the risk may give rise to opportunistic behaviour as shareholders and managers seek investments that maximise their welfare at the expense of creditors. With these problems recognised, risk management strategies are designed to ensure that the firm makes optimal post-loss and pre-loss investment decisions.

- **It is transaction cost based**. Other costs of risk arise because risk enhances certain transaction costs. Risk can increase expected taxes. Risk increases bankruptcy costs and can promote frictional costs between shareholders and creditors, thereby increasing the cost of debt. This can be done by removing risk, by tax management, or by changing the financial structure of the firm.

- **It is inclusive**. The reasons why risk is costly to the firm do not depend on the source of the risk. Loss of a substantial amount of money might break the firm whether it resulted from a liability suit, a sudden change in exchange rate or fire. Usually the new risk management embraces all types of risk: financial risk, business risk, insurable risk, etc.

- **It is coordinated but discriminating**. The need for coordination arises from the basic feature of risk: that individual risks cannot be isolated. Many cash flows can be volatile. But the combined risk from all these cash flows is not simply the sum of the parts. Risk does not simply 'add up'. The ability of a firm to tolerate any one risk is determined by its current exposure to other risks. Even if risks are independent of each other, they combine to impose less total risk than the sum of their parts. This is the basic principle of diversification.

The practice followed by SMEs in procuring insurance will be introduced in Chapter 5 (Section 5.3.4) and further discussions regarding the types, set-ups and applications of insurance policies in Australia will be given in Section 8.2.2.

3.2.3 Financial Engineering

Financial engineering is a part of risk management strategies used to structure new financial instruments in order to target specific investor preference, or to take advantage of arbitrage opportunities (Dahl, Meeraus and Zenios 1993). Finnerty (1988, p. 14) defines financial engineering as a process that *"involves the design, the development, and the implementation of* **innovative** *[author's emphasis] financial instruments and processes, and the formulation of creative solutions to problems in finance"*.

The above descriptions imply that the main feature of financial engineering is being innovative or new in nature. Following this feature of financial engineering, Mason et al. (1995) describe it as the means for implementing financial innovation. They further elaborate that financial engineering is a systematic approach used by financial service firms to find better solutions to specific financial problems of their customers.

Whilst the majority of the authors (Dahl et al. 1993; Mason et al. 1995; Walmsley 1998; Shapiro and Balbirer 2000) concentrate on the innovative aspect of financial engineering in relation to financial products and processes, Finnerty (1988) views financial engineering as an instrument of financial management theory and practice that encompasses three principal types of activities:

1) Securities innovation or product innovation, as the development of new products. For example, zero coupons, currency options and mortgage-backed securities (MBS).

2) Process innovation, as a change in the process of financial markets (Walmsley 1998). Examples of innovative financial process include the development of SWIFT (Society for Worldwide International Financial Telecommunications) for international payments and the deregulation of commissions on the New York Stock Exchange.

3) Formulating creative solutions to corporate finance problems. Finnerty (1998) argues that this aspect of financial engineering covers innovative cash management strategies, innovative debt management strategies and customised corporate financing structure, such as those involved in various forms of asset-backed financing.

Form the above discussion, it is easy to see the applicability of financial engineering techniques, particularly its capacity to develop innovative cash management strategies and debt management strategies in relation to SMEs in an abrupt financial crisis resulted from human or natural disasters as described earlier in this dissertation.

Given the different emphasis to different parts of financial engineering activities, it is necessary to canvass the views of various leading authors including Silber (1983), Van Horne (1985), Miller (1986), Ross (1989), Dahl et al. (1993), Walmsley (1998) and Shapiro and Balbirer (2000) over the last 20 years or so.

To Silber (1983), innovative financial instruments and processes entail corporate activities undertaken to lessen financial constraints. These constraints are either imposed by governments or the market place to a large extent, and by firm itself to a lesser extent. Financial engineering products designed in response to such constraints include capital notes issued by banks that qualify as capital for bank regulatory purposes.

Van Horne (1985) argues that for a new financial instrument or process to be truly innovative, it must enable the financial markets to operate more efficiently or it must make them more complete. He also points out that some innovations led to apparent benefit that only resulted in change of accounting treatment of certain transactions such as off-balance sheet debt and substantial fees reaped by investment bankers and other promoters of financial innovators.

Finnerty (1988) observes that Miller (1986) characterises financial innovations as basically 'unforecastable improvements' in the array of available financial products and processes. He suggests that financial innovations often come into prominence as a result of unanticipated external shocks to the economic environment, such as sharply rising interest rates. To him significant financial innovations should endure beyond the expiration of the initial impulses that gave rise to them.

Financial innovation is explained in terms of agency theory by Ross (1989) in that securities innovation takes place when financial institutions serving as an agent for individual investors create new securities out of existing ones by repackaging their income streams, selling the new securities, and reinvesting the proceeds so as to rebalance their portfolios in order to achieve a more acceptable portfolio composition and degree of risk exposure. Financial institutions therefore provide a valuable service by taking certain opportunities that are not available to individual investors.

Dahl et al. (1993) see financial engineering as an additional aspect of risk management in that the later is a process of creating a portfolio of securities with certain attributes, from existing attribute packages. However, the resulting portfolio is not sold as a standardised product, while the objective of financial engineering is to design products that are added to the market. To Dahl et al. (1993) the main driving force behind financial engineering is the continued deregulation of financial markets, the increased volatility and the intensified competition in the financial industry.

Walmsley (1998) classifies financial innovation as aggressive or defensive. Aggressive innovation is the introduction of a new product, or process, in response to a perceived demand. According to Walmsley, a very large part of innovation since at least the 1970s is aggressive innovation, in the sense that many securities firms and banks have been scrambling to secure market share by showing an ability to innovate. Defensive innovations are a response to changed environment or transaction costs. For example, much of the transformation of the London system in 1983-85 could be seen as defensive innovation.

Shapiro and Balbirer (2000) purport that financial innovation segments, transfers, and diversifies risk. It also enables companies to tap previously inaccessible markets and permits investors and issuers alike to take advantage of tax loopholes. More generally, financial innovation presents opportunities for value creation. However, they argue that financial innovation may not be a sustainable form of value creation, though it enables the initial issuers to raise money at a below-market rate.

The approach adopted by Mason et al. (1995) probably sums up the views expressed by most of the above authors in that they express financial innovation as the central mechanism pushing the financial system toward its goal of improving performance of what economists call the 'real economy'. They further elaborate that financial engineering products and services improve economic performance.

Walmsley (1998) listed more than 184 financial engineering products and services since the World War II and summarised the major effects of financial innovations into the following four categories.

1) **Risk Transfer:** Financial innovations that allow investors or traders to transfer the price or credit risk in financial positions. Such innovations include interest

rate and foreign exchange futures and options, currency and interest rate swaps. Risk transfer also includes transferring credit risk by way of tradable loans.

2) **Liquidity Enhancement:** Financial engineering products in this area include mortgage backed securities (MBS) that have made mortgage effectively liquid assets and other facilities that have improved the negotiability of financial instruments.

3) **Credit Generation:** Credit-generating innovations widen the supply of credit. This is achieved either by mobilizing dormant assets to back borrowings, or by tapping previously untouched sources of credit.

4) **Equity Generation:** The innovations in this area are limited but include variable rate preferred stock and the growth of global depository receipts (GDR).

From the above discussion, it can be seen that financial engineering can be quite useful by devising and applying creative solutions to financial management problems that encounter SMEs during different phases of an abrupt financial crisis. The cash flow optimisation model and post-loss optimal investment models presented in Chapter 6 and 7, respectively, are a good example of the application of financial engineering to financial crisis management problems.

3.2.4 Capital Budgeting

Capital budgeting and post-loss investment decisions are related topics in that both of them deal with the same problem but under two different scenarios. For ease of presentation, capital budgeting is first discussed followed by optimal post-loss investment decision.

In a capital budgeting problem, a decision maker is presented with several potential projects or investment alternatives and must determine which projects or investments to choose (Ragsdale 2001). The investment or projects typically require different amounts of various resources or upfront cost and/or ongoing cash outflows, and generate different cash inflows to the company. The problem is to determine a set of projects or investments that maximise the investor's wealth.

In modern finance textbooks, several capital budgeting techniques are discussed. The most commonly used methods are: (i) the average rate of return; (ii) payback period; (iii) internal rate of return (IRR); and (iv) net present value (NPV).

Various literature states that the NPV method is superior to other capital budgeting techniques since it consistently selects those projects that maximise shareholders' wealth. The NPV of a project represents the expected increase in the value of the firm as a result of adopting the project. Thus, the NPV technique is consistent with the goal of wealth maximisation (Chadwell-Hatfield et al. 1997).

Chiu and Park (1998) argue that conventional capital budgeting techniques such as NPV deals with deterministic models in which all the investment proposals are modelled as exact numbers. However, in practice precise information concerning future investment projects is rarely obtained. As a result, they propose a capital rationing model under uncertainty in which cash flow information is specified as a special type of fuzzy number – triangular fuzz numbers (TFNs). Zadeh (1965) first introduced the 'fuzzy set theory' in order to deal with uncertainty in such a way that the representation of uncertainty and inexact information can be expressed in the form of linguistic variables. Fuzzy numbers are used to quantify the inexact information such as *"around"*, *"very"*, *"little"*, etc.

Karsak (1998) proposes that the NPV method needs to be supplemented with a payback method or duration analysis to assess liquidity risk. He further states that a fuzzy economic evaluation criterion based on the fuzzy payback period and fuzzy duration analysis should be used as secondary decision criteria to rank investment alternatives, for which preference cannot be expressed in terms of fuzzy present worth.

A study of capital budgeting techniques used by small business organisations in the 1990s in the US by Block (1997), shows that the majority of small businesses still use the payback method. However, the level of sophistication increased as over 27% of them were using discounted cash flow techniques when the study was undertaken in 1997. As a result, it is reasonable for the purpose of this research to continue to use NPV as the appropriate method of capital budgeting technique that needs to be understood by SMEs that face reinvestment decisions in the post-loss environment.

3.2.5 Post-Loss Investment Decisions

The optimal post-loss investment decision is not different from the normal capital budgeting procedure in that it is concerned with the process of selection of projects or investments that maximise the value of the firm after the occurrence of a risky event such as the destruction of the physical assets of a business organisation as a result of fire, etc. Post loss investment decision includes both reinvestment in destroyed assets and decisions on new investment.

Doherty (2000) states that the optimal post-loss investment decisions follow the normal capital budgeting procedure; that is, the NPV should be positive. Once again by following the methodology adopted by Doherty (2000) and previous discussions in this chapter, it is possible to develop a post-loss investment optimisation model.

In Equation 2.3, the pre-loss value of a business organisation was provided which is now expanded to include transaction costs *T (financing cost)* as follows:

$$V(B) = \sum \frac{K_o r_o}{(1+k)^t} + \sum_{t=1}^{no} \frac{-K_t + V_t(K_t; r_t)}{(1+k_t)^t} + L - D - T \qquad (3.1)$$

Following a destruction of an asset and a decision to replace the same, the above model needs to be modified to reflect the new reality. The first one is the cost of reinvestment in the destroyed or damaged asset, which is denoted by '*C*'. The second modification is required to differentiate the future magnitude of cash flows from the cash flows prior to the loss. For this purpose, primes (') will be used to denote value after the loss given optimal decision-making. The value of the business after the loss is now shown as:

$$V'(B) = -C + \sum_{t=1}^{no} \frac{K'_o r'_o}{(1+k)^{'t}} + \sum_{t=1}^{no} \frac{-K'_t + V'_t(K'_t; r'_t)}{(1+k_t)^{'t}} + L - D - T' \qquad (3.2)$$

It is noted that post-loss investment decisions include both reinvestment in destroyed or damaged assets and new investments. For new investments the decision criteria is the usual capital budgeting rule, which is applied using after-loss information:

$$NPV = \left(\sum_{t=1}^{no} \frac{-K'_t + V'_t(K'_t; r'_t)}{(1+k)^{'t}} \right) - T \qquad (3.3)$$

Assuming that the firm's management responds to the loss in a value maximising way, they make the optimal decision on whether to replace assets destroyed in the loss and make a decision for new investments that are value maximising in the post-loss environment.

From the above discussions and expressions, the post-loss reinvestment decision can now be made using the following equation:

$$NPV = -C + \left[\sum_{t=1}^{no} \frac{K'_o r'_o}{(1+k)^{t'}} \right] - \left[\sum_{t=1}^{no} \frac{K'_t - V'_t(K'_t; r'_t)}{(1+k_t)^{t'}} \right] + L - D - T' \qquad (3.4)$$

Chapter 7 provides a detailed analysis and application of post-loss investment model with respect to the SMEs surveyed by this research.

3.2.6 Abandonment, Salvage and Disposal Cost

In making optimal post-loss reinvestment decision, it is vital to consider the abandonment option, salvage value of the damaged asset or its cost of disposal due to their impact on the value of the objective function.

Abandonment refers to the decision to discontinue some activity, be it the firm itself or some project. Bonini (1977) states that a project can be abandoned, at some future date, either because the physical life of the asset has been achieved or because the current and future cash flow no longer justify the project. It is also not necessary for cash flows to become negative before the project is abandoned. Abandonment itself may produce positive cash flows such as tax effects for depreciation write-offs, sale of equipment, return of working capital, or the use of space by more profitable projects. Hence, a project would be abandoned in any year if estimated future cash flows (appropriately discounted) did not exceed the current abandonment value. If a business organisation decides to abandon a project based on new information, then the choice to abandon is treated as a real option.

A real option is a major consideration in the post-loss environment for a number of reasons including: (i) appreciation of abandonment value; (ii) revision of cash flow estimates; (iii) revision of risk costs; or (iv) phasing out of an old project (Doherty 2000).

Damage to a productive asset can generate salvage, or there may be disposal costs that must be undertaken by the business organisation if the damaged asset is not replaced. Salvage arises in the event that the remnants of the damaged asset have some market value. The disposal cost becomes necessary where the business organisation has to incur further costs in order to get rid of the damaged assets. In both cases the post-loss investment optimisation model needs to be modified to account for these variables.

Section 7.4 (Chapter 7) deals with the above issues and sheds more light on their application and operation in analysing investment alternatives in the post-loss environment.

3.2.7 Cash Flow Management

One of the objectives of this thesis is to find a better method of the utilisation of cash by SMEs in an abrupt financial crisis, as the demand for cash outstrips its supply during this period given a reduced capacity to generate cash inflows and increased costs of working.

Barbosa and Pimentel (2001) state that cash flow management is a complex and important problem faced by companies of different sizes, by governments and by individuals, usually requiring distinct approaches and proper tools according to the nature and complexity of the operations. Shapiro and Balbirer (2000) point out that despite the increased sophistication that is now being brought to the task, the objectives of cash management remain the same as always: (i) bringing the company's cash resources within control as quickly and efficiently as possible; and (ii) achieving the optimum conservation and utilisation of these funds.

Stochastic programming models capture certain important factors about the future by considering the decision to be made today, given present resources and future uncertainties. Messina and Mitra (1997) argue that stochastic optimisation models help make a decision 'here and now' on the basis of the expected value of the 'wait and see'. In simple terms, stochastic optimisation models are developed to resolve decision problems that involve a multi-period under a condition of uncertainty.

In Chapter 6, detailed discussion of cash optimisation problems will be presented with the help of a hypothetical case first, and then real cases taken from the case studies

presented in Chapter 5. This research shows that by using a cash optimisation model during different phases of crisis, SMEs will be able to increase the much-needed cash and improve their chance of survival. Hence this will form one of the major elements of the new approach to financial crisis management.

3.2.8 Optimal Capital Structure

Modigliani and Miller (1958) hypothesized that the capital structure of a firm is irrelevant under certain strong assumptions: when there are no personal or corporate taxes, all investors are strictly informed, there are no transaction costs, and the investment policy of the firm is already determined. In a nutshell, under these strict assumptions they have successfully argued that there is no advantage for a firm to manipulate its debt-to-equity ratio since the total investment value of a corporation depends upon its underlying profitability and risk.

By relaxing the above assumptions, the capital structure becomes relevant because of taxes, information costs, transaction costs, or interdependence between the firm's financing and investment policies. According to the theory of optimal capital structure (Scott 1976; Miller 1977; Chen and Kim 1979; Myers 1984, Basin 1989), there is a trade-off between the opposing effects of the tax savings on debt finance and the cost of financial distress.

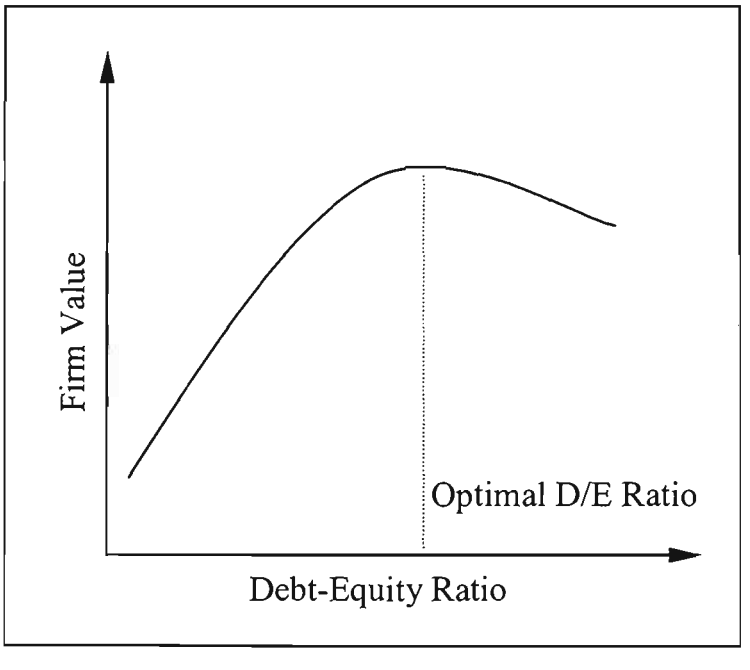


Figure 3.1
Optimal Capital Structure

The above theory assumes that the cost of equity capital k_e increases at an accelerating rate as leverage increases, and that the cost of debt k_d increases once some critical degree of leverage is passed. These assumptions lead to the result shown in Figure 3.1, where the value of the firm increases up to the point where the total cost of capital k_o is minimized or the optimal capital structure is attained. Beyond this point, the value of the firm declines as the total cost of capital rises.

Mathematically, the optimal financial structure of the firm is determined by the optimal financing level, ie the cost of capital or the weighted average cost of capital (k_o) is equal to the weighted average costs of alternative sources of financing. For a firm, if funds can be obtained from debt or equity and retained earnings, the optimal financial structure of the firm is given at the marginal investment, with:

$$k_o = k_e (E/V) + k_d (D/V) \qquad (3.5)$$

where: E = the market value of the company's equity capital

D = the market value of the company's debt

V = $(E + D)$ = the total market value of the company

In the event of abrupt financial crisis and nil or inadequate insurance cover in place to finance the loss of productive assets, the issue of the source and cost of finance becomes quite important. In other words, the optimal capital structure of the business organisation in crisis needs to be reviewed before a decision to replace the damaged/destroyed asset and/or new asset is made. The application of this element of the new approach will be discussed in Section 7.6 (Chapter 7).

3.3 The Elements of the New Approach II: Management Strategies

In the foregoing section of this chapter, the main elements of the new financial crisis management model to be developed in this thesis were identified with major emphasis on the financial activities of business organisations in an abrupt financial crisis. The success of financial crisis management depends among other things on organisational policies and strategies such as crisis control (Section 3.3.1) including business impact analysis and business continuity planning, good corporate governance (Section 3.3.2), business ethics and stakeholders analysis (Section 3.3.3) and marketing management (Section 3.3.4).

NyBlom (2003) states that crisis management is a comprehensive subject that encompasses all aspects of business, including operations, marketing and media relations, distribution and legal matters. In this section, a brief review of such elements of the new approach will be undertaken with a view to develop effective and efficient financial crisis management model.

3.3.1 Crisis Prevention and Control Mechanism

As was stated previously, modeling a crisis helps a business organisation to recognize and understand the numerous variables, characteristics, and events, which influence the crisis situation. The crisis control models developed in this field are numerous but similar in nature and applications. As such, the following three models: (i) Best Practice Model for Crisis Management by Mitroff and Anagnos, (2001); (ii) Multifaceted Approach to Crisis Management by Hickman and Crandall (1997); and (iii) Crisis Process Continual Improvement by Campbell (2004), represent the majority of the crisis control models and are discussed below.

3.3.1.1 ***The Best Practice Model for Crisis Management***

The Best Practice Model involves five key elements that must be managed before, during and after a major crisis. These five elements constitute a set of ideal benchmarks by which any organisation should evaluate itself and the scorecard that stakeholders may use to evaluate and to ask questions about an organisation's crisis performance. This model by Mitroff and Anagnos (2001) may be described as follows:

1) **Types and Risks of Major Crises**. The authors demonstrate that crises can be sorted into the general categories, families, or types as shown in Table 2.1. The authors argue that business organisations should plan for major crises and attempt to prepare for at least one crisis in each of the families.

2) **Mechanisms**. The various crisis management mechanisms are for anticipating, sensing, reacting to, containing, learning from, and designing effective organisational procedures for handling major crises. Like total quality management or environmentalism, if crisis management is not done systematically, then it is not being done well.

3) **Systems**. Most organisations are governed by five major systems: (i) technology; (ii) organisational structure; (iii) human factors; (iv) culture; and (v) top management psychology. It is necessary to understand these systems and their subsystems in designing an effective crisis management program. Of all the systems, the most difficult one to know is the deepest part of an organisation, which resides in its culture and in the psychology of its top management.

4) **Stakeholders**. Stakeholders involve the broad range of internal and external parties who have to cooperate, share crises plans, and participate in the training and the development of organisational capabilities in order to respond to a range of crises. Stakeholders range from internal employees to external parties such as city councils, insurance companies, loss consultants, state and federal government agencies. These parties need to be known in advance and the relationships with them needs to be worked on in advance.

5) **Scenarios**. Good scenarios are the 'integrative glue' that binds all of the preceding factors together. A good crisis management scenario is the 'best case, worst case' scenario that one can construct with regard to how a crisis will affect an organisation.

The Best Practice Model for Crisis Management can be shown with the help of a diagram provided in Appendix 3.1 for further information.

*3.3.1.2 **Multifaceted Approach to Crisis Management***

Hickman and Crandall (1997) advocate that crisis can be effectively controlled if managers approach organisations as an entity composed of a series of subsystems interlinked with one another. They list 5 systems that must be considered in preparing for and handling a disaster. The diagram that illustrates a multifaceted approach to crisis management is provided in Appendix 3.2.

According to the above authors, there are two main organisational systems that should be considered very well in a pre-crisis period. These are strategic management system and information systems. They argue that it is essential to form a crisis management team, develop the worst-case scenarios and create a crisis management plan as a part of

the strategic management system. The information system of an organisation should also be able to backup all computer files and locate a host site. From an SME's point of view these activities are not hard to follow if management thinks that a major disruption to the company can create a mayhem and it is possible to control the situation with a bit of planning.

For example the 13-point plan for operations management developed by Hickman and Crandall (1997) can serve the purpose of SMEs in preparing for crises before they happen.

*3.3.1.3 **Crisis Process Continual Improvement***

Campbell (2004) describes his model as a five-stage flexible process, which can be simplified into three stages of before, during and after. The before stage is crisis planning, gaining company-wide awareness and preparedness and setting roles and responsibilities – all those initiatives which limit the possibility of crisis, warn of its onset, or, if it hits, limit its effect and duration. During is the activation of those plans and responses, and the after stage is aimed towards implementing business recovery strategies, and integrating any lessons learnt into the updated crisis plan.

Table 3.1 shows the elements of the model developed by Campbell (2004).

Table 3.1 Element of Crisis Process Continual Improvement

Period	*Activities/Elements*
Before	1) Identification/discovery
During	2) Preparation/planning 3) Response/control 4) Recovery
After	5) Learning

In developing the new financial crisis management model and the theoretical framework, the strategic crisis management models discussed in this subsection should be taken into account in order for the new model to be comprehensive and effective in all crisis situations. More specifically, the models play a greater role in preventing crises where it is technically possible and financially viable, and in preparing SMEs for crises

so that their impact can be controlled and lessened, where it is impossible to prevent them from happening. Section 8.2.1 provides the relevant discussion of these models in relation to the case studies presented in Chapter 5.

3.3.2 Corporate Governance

Banks (2004) defines governance in its strictest sense as the structure and function of a corporation in relation to its stakeholders generally, and its shareholders specifically. In its broadest sense, Banks states that governance might be said to include performance, maximising enterprise value and conformance, and ensuring proper accountability and responsibility. From both definitions, it is evident that corporate governance is not only about stockholders, but also about a large group of stakeholders including employees, retirees and pensioners, bank creditors, clients, suppliers, regulators and broader communities.

Allen and Gale (2001) state that the major concern of corporate governance and finance is how to make managers do what shareholders want. This shows that the issue of corporate governance is mainly related to what is described as the principal agent problem (Agency Theory) in finance. Herzel and Shepro (1990) point out that directors as the agent of the shareholders have a conflict of interest in that they want to protect their own jobs, are prone to be in cahoots with the CEO and lack the information and incentives required to provide consistent and effective corporate governance. The agency problem also involves other stakeholders such as creditors and clients.

Based on a recent history of corporate failures in the US, Europe and Asia, Banks (2004) identifies various general factors the have caused governance failures:

- Unethical conduct within a company, where directors, executives, and/or employees exhibit poor judgment or behaviour.
- Weak boards that can be influenced and cajoled by powerful (and often charismatic) chief executives, and that lack the expertise to actively manage and challenge.
- Inattentive directors who fail to focus on issues of importance, and conflicted directors who derive personal gain from their ties to executive management.
- Ineffective internal controls that cannot detect or prevent problems or that are unable to set or enforce proper standards.

The above and other literature in finance describes a number of methods that shareholders can apply to ensure that managers can govern in their best interest. The most important of these are the board of directors, executive compensation, the market for corporate control, concerted holdings and monitoring by financial institutions, debt, and product market compensation (Allen and Gale 2000). Other authors (Shleifer and Visney 1997; Islam 2002) in finance characterise corporate governance as a two-level decision system representing the shareholders and managers, and suggest that a multi-level general equilibrium model can be used to address the underlying decision making problem.

For instance, Islam (2002) argues that an integrated multi-level model should be applied in analysing corporate governance, on top of a financial incentive system, to solve the agency problem. In this model, Islam assumes that both shareholders and managers engage in optimising behaviour for making decisions: the shareholders attempt to maximise their share earnings and managers optimise their criteria functions such as maximisation of profit and minimisation of cost.

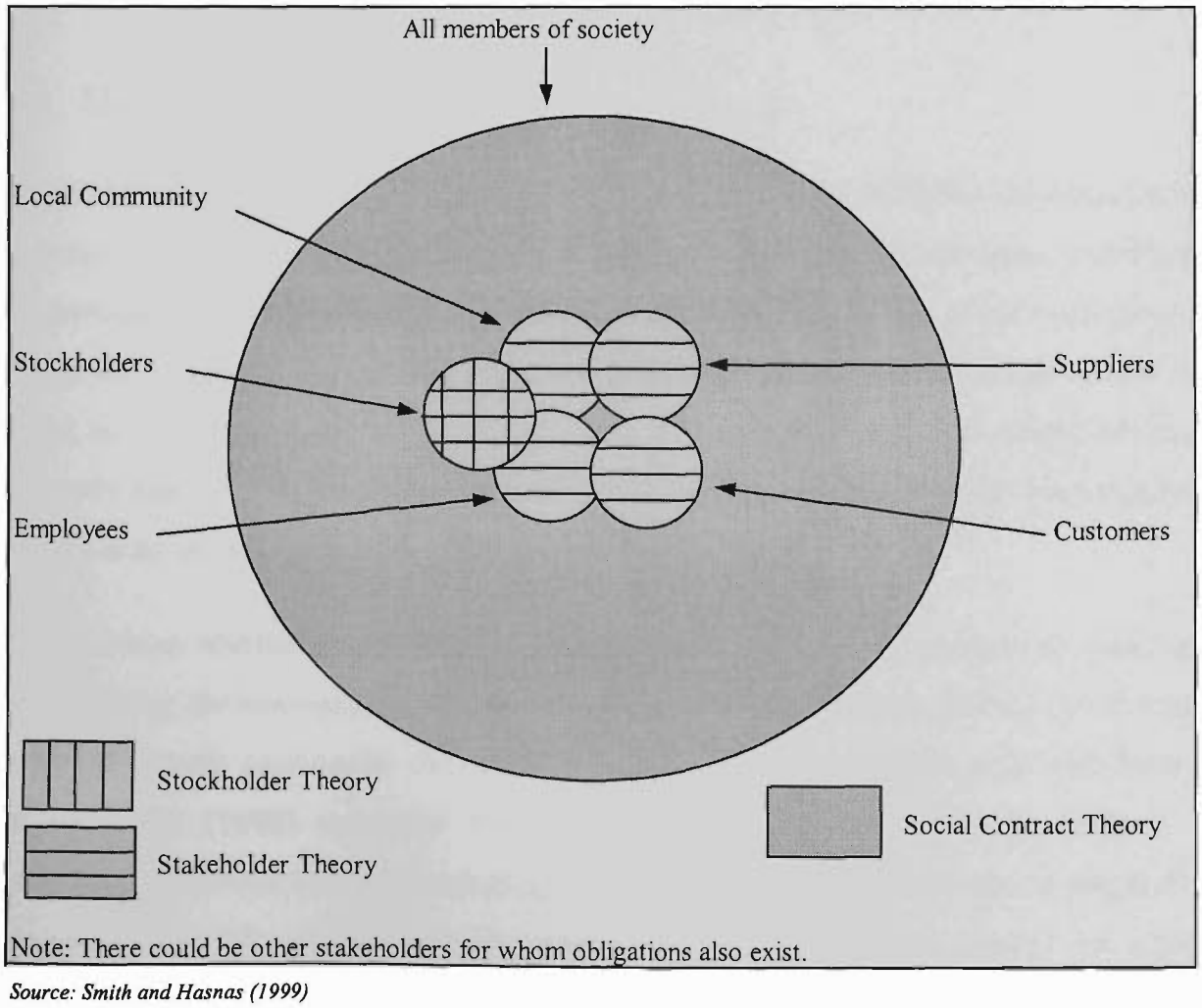
Once again, the new approach to crisis management needs to be aware of the concept and principles of corporate governance so as to be more effective and efficient than the existing crisis management models. SMEs are corporate entities and require better corporate governance practices in crises mode than in the normal business environment. Section 8.4.2 deals with this issue using the concepts and theories established here.

3.3.3 Business Ethics and Stakeholders Analysis

In any business organisations including SMEs, there are various individuals and groups who are directly or indirectly depend on them for one reason or another. Unless the interests of these various parties are handled ethically and appropriately, a serious conflict can arise and lead to imbalance in the organisational system. SMEs in crises mode are prone to issues and conflicts (Ray 1999) due to pressure on owners and management in allocating scarce resources in some cases and strained communications in other cases. As a result, the understanding and inclusion of business ethics and stakeholders analysis as one of the elements of the new approach to crisis management is quite justifiable.

Normative theories of business ethics deal with interactions that involve business relationships and attempt to define obligations that managers should fulfill (Smith and Hasnas 1999). Generally, there are three leading normative theories of business ethics: (i) stockholder theory; (ii) stakeholder theory; and (iii) social contract theory. Figure 3.2 sheds some light on these three competing theories and shows the scope of obligations of business organisations towards various groups.

As a theory of organisational management and ethics, the stakeholder theory asserts that managers should take into account the interests of not merely corporation's stockholders, but also the corporation's stakeholders – anyone who has *"a stake in or claim on the firm"* (Evan and Freeman 1988). Smith and Hasnas (1999) argue that although the term 'stakeholder' has been defined in the past to include any group or individual who can affect or is affected by the corporation, it is currently understood in a narrow sense as referring only to those groups that are either vital to the survival and success of the corporation or whose interests are vitally affected by the corporation.



Source: Smith and Hasnas (1999)

Figure 3.2
Scope of Obligation

Phillips (2004) follows a similar line of argument in defining 'stakeholder' and states that at a minimum, stakeholders are those groups from whom the organisation has voluntarily accepted benefits, and by doing so, the organisation has incurred obligations of fairness to attend to the well-being of these stakeholders – at least insofar as their well-being is affected by interactions with the focal organisation. According to Phillips, these groups include financiers, employees, customers, suppliers, and local communities. He also identifies a separate group of stakeholders that he refers to as derivatively legitimate stakeholders because of their abilities and likelihood of exerting influence over the organisation's success or failure. There are also other classifications used such as primary and secondary stakeholders.

The derivatively legitimate stakeholders include groups such as competitors, the media, and environmentalist, and managers should be alert in familiarising with them because they can be sources of harm or benefit. As will be seen further in Chapter 8 (Section 8.4.1), the identification of such groups is essential due to their significant impact on the success or failure of an abrupt financial crisis management process following an unfortunate event.

3.3.4 Marketing Management

As was stated in Chapter 2, the restoration of intangible assets of SMEs requires mainly the design, development and application of appropriate marketing strategies. Marketing and promotion also form one of and the six phases of the financial crisis management process developed in the previous chapter. Hence, marketing management should be treated as one of the major elements of the new approach intended to effectively and efficiently manage the business affairs of an SME in an abrupt financial crisis resulted from a partial or full destruction of productive assets.

The American Marketing Association defines marketing as *"the process of planning and executing the conceptions, price, promotion, and distribution of ideas, goods, and service to create exchanges that satisfy individual and organisational objectives"*. Siu and Kirby (1998) comment that this definition confines marketing only to a management function and that marketing should also involve the concepts of interactive processes, strategic directives and competitive positioning. A number of other marketing literature also reflects the same views (Hooley and Saunders 1993; Wilson et al. 1992; Bernard 1987; Porter 1980).

Gaujers et al. (1999) attempt to express marketing in its most simple form as *"the business of being in business profitably"*. By extending this expression, they argue that the essence of marketing is finding out what customers want, and then setting out to meet their needs, provided it could be achieved profitably. In order to apply this during abrupt financial crises, it is ideal to go back to what is known as the 4 Ps of marketing or marketing mix: product, price, place (distribution) and promotion that will be discussed in conjunction with the case studies in Section 8.3.5.

3.4 Conclusion

In the previous sections of this chapter, the major elements of the new approach to crisis management were presented under two headings: financial strategies and management strategies.

The former category dealt with the financial matters of a business organisation in crisis mode, offering effective solutions to the most pressing issues such as cash flow management and reinvestment decisions.

The elements under the second category either serve as instruments for dealing with the crisis or assistance in formulating management strategies and polices with the application of appropriate tools during different crisis management phases.

For example, the 4 Ps of marketing mix can be treated as a managerial tool designed to formulate marketing strategy while corporate governance or stakeholders analysis set the broad polices and strategies to be followed. The elements under both categories are complementary in nature and highlight what makes up an effective and efficient financial crisis management model. The applications of these elements to the SMEs surveyed in this thesis will be presented in greater detail in Chapters 6, 7 and 8, and show how they come together to form the basis of the new approach designed to minimise the cost of an abrupt financial crisis or the time required to restore the balance amongst various systems of small to medium sized enterprises affected by an isolated disastrous situation.

Chapter 4
RESEARCH METHODOLOGY

4.1 Introduction

This chapter is designed to provide a general picture of the methods, models, observations, design and procedure of this thesis. The broad methodology adopted in this research consists of the following:

a) 12 case studies of SMEs and interviews with their owners/managers.

b) Computer simulation and programming: optimisation of cash flows and optimal replacement of assets.

c) Financial ratio analysis.

d) Strategic analysis of crisis management options.

The following points illustrate the detailed methodology adopted in this study.

1) Identifying and analysing the various phases of business crises resulting from sudden incidents such as fire, storm, flood, contamination and accidental damage, and risk management implications at each stage.

2) Identifying and developing an appropriate cash optimisation model that can be used at various stages during business interruption. The cash management model is based on a special case of stochastic money management model developed by Thomson and Thore (1996).

3) Analysing other working capital items including trade debtors, stock and supplies and trade creditors, as well as invoicing, terms of credit, discounting policies and so, on during various stages of financial crisis.

4) Developing capital budgeting strategies based on optimal post-loss investment models and techniques.

5) Analysing abandonment options following the destruction of income-producing assets.

6) Outlining and analysing short-term financing options available to small and medium business organisations in Australia in an abrupt financial crisis mode. Consideration was also given to other forms of financing, such as hire purchase and leases.

7) Developing a mechanism by which sales, selling price and profit margin are monitored during various stages of business interruption.

8) Identifying and analysing appropriate promotional strategies during various phases of business interruption, given the level of sales, production and service provisions.

9) Analysing temporary relocations, outsourcing and machine hire during various stages of business interruption.

10) Analysing the implications of various communication strategies with different stakeholders, mainly shareholders or partners, employees, customers and suppliers.

11) Identifying various commercial insurance policies available to SMEs in Australia as a major tool of risk management and control.

12) Identifying the benefits of crises and any other opportunities that might arise during various phases of business interruption.

In Chapter 5, case studies will be presented to identify the main characteristics of the SMEs involved in abrupt financial crises and their implications. Chapter 6 uses various elements of cash flow to map out an optimal path for the purpose of judicious use of cash. Other cash management strategies and working capital items will also be discussed in the same chapter.

Following a destruction of physical assets such as production facilities, it is essential to strategically analyse the various alternatives available in relation to their replacements, including the abandonment options, by applying optimal post-loss investment techniques. Also, the forms of financing to be used in the process of asset replacement are important issues to be considered. As a result, both of these forms of decisions (investment and financing) will be discussed in Chapter 7.

The development of techniques and methods that can be used to maintain sales and profit by producing some of the pre-loss products and services at the same or reduced rate, or all of the products and services at a reduced scale, should be an integral part of an effective crisis management plan. A business organisation in an abrupt financial crisis might be able to achieve this by using its own remaining facilities and/or temporarily outsourcing. In addition, increased promotional activities or new activities can be used to protect the business from long-term downturns. Chapter 8 will deal with these issues in detail.

Chapter 8 will also deal with policies and strategies that might be necessary as a result of the application of various financial crisis management tools and instruments (as identified in Chapter 2) during different crisis phases. These strategies and policies include: corporate governance issues; communication policies with stakeholders; and corporations law.

4.2 General Research Methodology

Research methodologies generally depend on the type of research undertaken. The two broad types of research are quantitative and qualitative research. A quantitative research is objective in nature and concentrates on measuring phenomena. On the other hand qualitative research is more subjective in nature and involves examining and reflecting on perceptions in order to gain an understanding of social and human activities (Collis and Hussey 2003). On the basis of the above definition, this research is both quantitative and qualitative in nature in that it makes use of both quantitative and qualitative data.

It should be noted that this research can also be classified based on its paradigm, purpose or logic using the materials developed by Collis and Hussey (2003), Cavana, Delahaye and Sekaran (2001), Punch (1998) and other authors. However, no further attempts will be made to classify this research, as the main classification of research into quantitative and qualitative research serves the purpose of this thesis.

Using a quantitative approach, this thesis builds financial models that make use of quantitative data such as elements of cash flows and interest rates for the purpose of determining optimal cash positions during different stages of business interruption. The

necessary input data that are used to build the financial models in this research were collected using surveys conducted over a period of 2 to 3 years. The surveys were conducted on the basis of the questionnaire attached in Appendix 4.1. The survey group includes 20 small and medium sized enterprises in Australia. Further information regarding the survey group will be provided in Section 4.4.

The qualitative aspect of this research is necessitated due to the descriptive and exploratory analysis conducted in relation to the non-financial activities of small and medium business organisations in a sudden financial crisis caused by human or natural disasters such as fire, storm, or flood. The qualitative analysis is based on 12 case studies built around the same business enterprises that have been surveyed for the purpose of quantitative analysis. The same questionnaires were also used to conduct interviews with the owners/managers to collect qualitative data including but not limited to crisis preparedness, the involvement of claims preparers and the attitude of loss adjusters.

Notes were also taken during numerous encounters made with the owners and senior employees of the companies as the researcher was involved professionally in helping the companies surveyed in this thesis to prepare and present their insurance claims. This professional-client relationship gave the author a tremendous opportunity in making various observations including the human and emotional aspects of dealing with crises. As the aims of this research do not go far enough to cover the emotional and psychological trauma that SMEs owners encounter during crisis, no attempt will be made to deal with these issues.

Given the objectives of the research provided in Chapter 1 and the research methodologies discussed in the previous section, the research problems do not require the development of hypothesis and application of statistical techniques such as hypothesis testing.

4.3 Case Studies

A case study is a common form of qualitative research technique aimed at gathering detailed information about the unit of analysis, often over a very long period of time, with a view to obtaining in-depth knowledge (Collis and Hussey 2003). In this thesis,

12 SMEs that suffered financial losses due to sudden damage to their physical assets are studied in order to understand their loss experiences and establish an effective and efficient financial crises management plan.

As was noted in the previous section, the case studies are built on the outcome of the interviews conducted with the owner managers before the end of the crisis period and observations taken over a period of 12 to 24 months of professional relationships with the companies surveyed. In Chapter 5, the case studies will initially be presented on an individual basis by covering the following information and then on a comparative basis using common characteristics drawn from the analysis of the following:

- General information about the business including its own age.
- Ownership structure and legal status.
- Nature of management, level of specialization and number of staff.
- Products and services offered, and nature of customer base.
- Structure of industry including general competition, government regulation or intervention.
- Financial performances in terms of sales and profitability.
- The nature of incidents.
- Loss mitigation strategies and actions.

4.4 Sample Selection and Sample Size

The businesses surveyed in this research are small and medium sized enterprises (SMEs) in manufacturing, service and retail industries. For the purpose of this research the definition provided by the Australian Bureau of Statistics (ABS) is used to classify business organisations into small, medium and large. The ABS (2002) defines a small business as a business that employs less than 20 people with the following management or organisational characteristics:

- Independent ownership and operations.
- Close control by owners/managers who also contribute most, if not all the operating capital.

- Principal decision-making by the owners/managers.

The ABS further classifies small businesses into one of the following three categories:

1) Non-employing businesses – sole proprietorships and partnerships without employees.
2) Micro-businesses – business employing less than 5 people, including non-employing businesses.
3) Other small businesses – businesses employing 5 or more people, but less than 20 people.

The Bureau also classifies other businesses into medium and large based on the following criteria:

1) Medium businesses: businesses employing 20 or more people but less than 200 people.
2) Large businesses: businesses employing 200 or more people.

It is also interesting to see the classification of businesses provided by the Corporation Law. Section 45A of the Corporations Act 2001 refers to either small or large business organisations, and states that:

"A company is a small proprietary company for a financial year if it satisfies at least two of the following criteria:

- *the consolidated gross operating revenue for the financial year of the company and entities it controls (if any) is less than $10 million;*
- *the value of the consolidated gross assets at the end of the financial year of the company and the entities it controls (if any) is less than $5 million; and*
- *the company and the entities it controls (if any) have fewer than 50 employees at the end of financial year."*

The companies surveyed were selected from a list of SME's that suffered a financial loss as a result of isolated incidents such as fire, flood, storm, contamination and accidental damage in 2001 to 2003. The list was maintained by a consultancy firm

situated in Melbourne and engaged in providing risk management and claims preparation services to SMEs, large corporations and government agencies. It should be noted that neither the source of the list, nor the incident periods (2001 to 2003) have any bearing on the process or the outcome of this research. Table 4.1 provides a summary of the businesses surveyed.

Efforts have been made to survey as many as 20 SMEs in manufacturing, service and retail industries. However, the analysis has been restricted to 12 business organisations on the basis of availability and depth of the information available and collected.

Table 4.1 Details of Businesses Surveyed

Company	*Industry*	*Cause of Incident*	*Year of Incident*
Company A	Manufacturing	Fire	2001
Company B	Manufacturing	Contamination	2001
Company C	Manufacturing	Fire	2001
Company D	Retail	Fire	2001
Company E	Manufacturing	Storm	2002
Company F	Retail	Fire	2001
Company G	Manufacturing	Accidental Damage	2002
Company H	Retail	Flood	2001
Company I	Service	Fire	2001
Company J	Retail	Fire	2001
Company K	Service	Bush Fire	2003
Company L	Service	Fire	2002

Table 4.1 shows that five out of the twelve businesses were manufacturing, four retailers and three of them were involved in the service industry. The sample selection was dictated by the occurrence of sudden crises in various industries and the ability to access information. It is also evident from the above table that the majority of the causes of the incidents were fires but this was not deliberately selected. It is common in Australia that the majority of non-agricultural businesses are affected by fire than by any other disastrous phenomena as reported by CPA Australia in their Small Business Survey Program in 2003.

From the above discussion, it is noted that the selection process was not made on a random basis, as the most suitable companies (availability of information, size and

location) were approached for the purpose of this research. Specifically, the sample is a purposive sample selected as a result of the experiences of the companies.

4.5 Sources and Type of Data Used

This section identifies the sources and type of data to be used in the subsequent chapters of this thesis.

4.5.1 Data Sources

The data collected in this thesis mainly come from internal sources such as balance sheets, profit and loss statements, cash flow statements, management reports, secretarial files and computer records. All of the companies surveyed produce and maintain such information for their day-to-day managerial and operational use. In other words, these data are secondary in nature and are readily available within the business organisations.

The other secondary sources include information published by the financial market in a newspaper such as the *Australian Financial Review*, and information available online on web sites such as CPA online and other various internet sites on the world wide web (www).

The primary data regarding the crisis, the process of crisis and experience during the crisis are obtained from observations and interviews with the owner managers.

As was stated above, a larger proportion of the data was extracted from internal company financial records and management reports on accounting, administration and production functions, and corporate governance affairs. It should be noted that SMEs are generally treated as non-reporting entities for the purpose of preparing financial reports. Statement of Accounting Concept (SAC 1 – issued by CPA Australia as a part of Members' Handbook) states that reporting entities are all entities (including economic entities) in respect of which it is reasonable to expect the existence of users dependent on general purpose financial reports for information which will be useful to them for making and evaluating decisions about the allocation of scarce resources.

Section 41 of SAC 1 further states that reporting entities shall prepare general-purpose financial reports, which shall be prepared in accordance with Statements of Accounting

Concepts and Accounting Standards. On the other hand non-reporting entities are not expected to comply with Statement of Accounting Concepts and Accounting Standards. This implies that the financial reports prepared by SMEs can be less precise and may not be consistent over time and hard to compare without scrutinizing the underlying accounting policies used in their preparation. In this thesis no attempt has been made to verify the accuracy of the financial reports or the appropriateness of the accounting policies adopted.

4.5.2 Type of Data Used

Given the nature of this research, both quantitative and qualitative data are required to develop the new approach to financial crisis management described in the previous chapters.

4.5.2.1 ***Quantitative Data***

For the purpose of building financial models that will help in the optimisation of the financial activities of business organisations in an abrupt financial crisis, the following variables are identified with reference to the financial statements prepared by SMEs in the course of their business operations. It is anticipated that a shortlist of these variables will be developed and used as part of the optimisation process. In Table 4.2, the elements of **balance sheets** that may be necessary, are shown.

Table 4.2 Elements of Balance Sheets

No.	*Details*
1	Cash
2	Marketable Securities
3	Accounts Receivable
4	Stock (including raw materials and finished goods)
5	Other Assets
6	Trade Creditors
7	Sundry Creditors
8	Non-Current Liabilities
9	Net worth

The elements of **profit and loss statements** identified for the purpose of this research are listed in Table 4.3.

Table 4.3 Elements of Profit and Loss Statements

No.	*Details*
1	Sales
2	Cost of Sales
3	Gross Profit
4	Operating Expenses
5	Other Expenses
6	Net Profit

The elements of **statement of cash flows** shown in Table 4.4 are considered in this thesis.

Table 4.4 Elements of Cash Flow Statements

No.	*Details*
1	Cash Inflows from Sales
2	Other Cash Inflows
3	Cash Outflows due to Operating Expenses
4	Other Cash Outflows

In their study of a review of *"testing corporate model prediction accuracy"* based on New Zealand companies, Nash, Anstis and Bradbury (1989) selected a series of **financial ratios** due to their frequent use by model builders and relevance to listed and unlisted companies. These financial ratios are shown in Table 4.5 on the next page.

Table 4.5 Financial Ratios

No.	*Details*	*No.*	*Details*
1	Net Profit after tax/sales	11	Funds flow/interest
2	Net profit after tax/total assets	12	Total liabilities/total assets
3	Net profit after tax/shareholders funds	13	Shareholders funds/total assets
4	EBIT/sales	14	Current assets/total assets
5	EBIT/total assets	15	Working capital/total assets
6	EBIT/shareholders funds	16	Current assets/current liabilities
7	EBIT/interest	17	Quick assets/current liabilities
8	Funds flow/sales	18	Sales/stock
9	Funds flow/total assets	19	Sales/receivables
10	Funds flow/shareholders funds	20	Sales/total assets

4.5.2.2 *Qualitative Data*

The qualitative data used in this thesis come in different forms. For example, Morris (1990) propounds the use of some non-financial variables shown in Table 4.6 for predicting bankruptcy. These variables and other information obtained during interviews with the owners/managers, including observations, communication styles with various stakeholders and marketing strategies, will be used as part of the qualitative analysis.

Table 4.6 Non-financial Variables

No.	*Details*
1	Age since incorporation
2	The degree of diversification
3	Changes in line of business
4	Changes in company name
5	Rate of organic growth
6	Closure and redundancy costs
7	Years since a profit was last reported
8	Years since sales last increased

The data period covers at least two years (maximum five years) prior to the incident and the period leading up to the end of the crisis depending upon availability of information.

4.6 Models

This dissertation is intended to examine the major elements of financial statements in an attempt to optimise the financial activities of an SME or its sub-units in an abrupt financial crisis through the application of financial modelling techniques. Neild (1973) provides two definitions of a financial model. The first one states that:

> *"a financial model is any system of written statements, mathematical or merely qualitative, which relates to the money flows of all or part of an organisation's activities" (p. 12)*

The second one is more detailed and specific than the first one and states that:

> *"the term financial model will be applied only to mathematical models which are capable of assessing the effects of changes in the organisation's operations on the balance sheet, profit and loss account, budget, cash flow or funds flow of the company or one of its divisions" (p. 12)*

From the above discussions, it should be clear that this dissertation focuses on Mathematical Modelling also known as Mathematical Programming or Optimisation, that can be classified into three categories (Ragsdale 2001) as shown in Table 4.7.

Table 4.7 Categories of Mathematical Modelling

Category	*Form of* f(x)	*Values of Independent Variables*	*Management Science Techniques*
Prescriptive Models	Known, well-defined	Known or under decision-maker's control	Linear Programming, Network, Integer Programming, CPM, Goal Programming, EOQ Non-linear Programming
Predictive Models	Unknown, ill-defined	Known or under decision-maker's control	Regression Analysis, Time Series Analysis, Discriminant Analysis
Descriptive Models	Known, well-defined	Unknown or uncertain	Simulation, Queuing, PERT, Inventory Models

Source: Ragsdale (2001)

The financial models to be developed in this research can be treated as prescriptive models and play a great role in the management of financial crises by helping owner managers in minimising the impact of the loss of productive assets that would generally lead to diminished cash flows in the future and or a failure of the business in the form of bankruptcy. In the post-loss business environment, the two major financial issues to be dealt with in this thesis are the management of cash flows and optimal post-loss investment decisions, as identified in the theoretical framework.

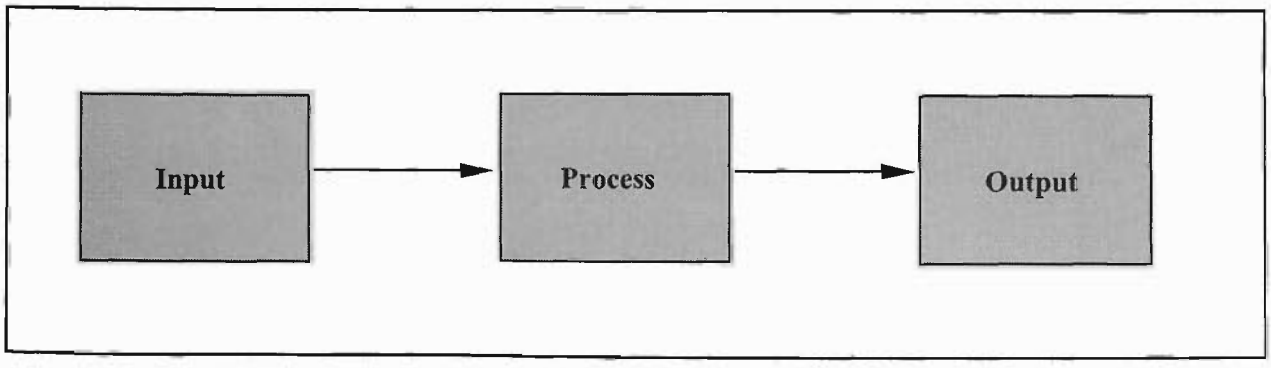


Figure 4.1
A Financial Modeling System

In planning crisis management, these models are treated as instruments that make use of instrument variables (input data that are generally characterised as non-controllable or exogenous variables) such as cash flows and interest rate to produce a certain output that can influence the target variables such as the cash balance at the end of the planning horizon, the value of a business as measured by a formula provided in Equation 2.3. In general terms, any model can be depicted as shown in Figure 4.1.

4.6.1 Cash Optimisation Model

In case of cash flow management, the issue revolves around the development of a cash optimisation model that can be utilised as a managerial tool given reduced cash flows of a business organisation due to interruption to its production facilities and trading capabilities as a result of partial or full destruction of its productive assets. The purpose of the cash flow optimisation model in this context is not to create new cash flows but to ensure effective cash flow management through short-term investment and borrowing vehicles available to SMEs in abrupt crises.

In other words, the model intends to maximise the cash balance at the end of the planning horison through the development and application of an appropriate cash optimisation model. For this purpose, a general optimisation model based on Mulvey (2001) can be shown as follows:

$$\text{maximise} \quad f(x) = (1-\eta)Z_1 - \eta Z_2 \tag{4.1}$$

$$\text{subject to:} \quad Z_1 = \sum_s p_s v^s \qquad \text{(expected wealth)}$$

$$Z_2 = \sum_s p_s (v^s - Z_1)^2 \qquad \text{(variance of wealth)}$$

$$\sum_j x_j = w_1$$

where:

w_1 = wealth at the beginning of time period 1,

η = tradeoff parameters for return and risk objectives,

$v^s = \Sigma\, r^s_j x_j$ wealth under senario s, end period 1.

4.6.2 Optimal Post-Loss Investment Model

As was discussed in the previous chapter, a business organisation in an abrupt financial crisis must make investment decisions regarding the replacement of assets damaged or

destroyed and any new investments in a value maximising way. It was also discussed that such investment decisions generally follow capital budgeting techniques such as NPV.

From the theoretical framework presented in Chapter 2, capital budgeting appears to be one of the essential elements of financial crisis management tools that must be applied by SMEs during certain stages of the crisis management process. Without the application of such models, SMEs in crisis mode would not be able to make optimal post-loss investment decisions and this research attempts to show that the application of such tools will ensure the maintenance of the value of the business and the chance of surviving following a major impact on the productive assets of the business organisation.

The general model for capital budgeting using the NPV method (base on the formula provided at Equation 2.1) can be shown as follows:

$$NPV = -K_o \sum_{i=1}^{no} \frac{K_o r_o}{(1+k)^t} \qquad (4.2)$$

Note that $-K_o$ represents the cost of investments. All other variables take the same meaning and descriptions as provided in Chapter 2.

4.7 Computer Programs

The various models to be developed and tested in the coming chapters will utilise the spreadsheet optimisation tools known as Solver. In this thesis, Microsoft Excel is used to formulate the optimisation problems and Solver is used to develop the optimal solutions. Solver is selected due to its ease of use and accessibility by SMEs.

A standard version of Solver comes with all Microsoft Excel spreadsheet programs and can be invoked from the 'Tools' menu. Advanced Solver is available separately for anyone who is interested in more sophisticated optimisation problems with several variables. Solver is developed and marketed by Frontline Systems and more information regarding this company and its products is available at www.frontsys.com.

Alternative optimisation tools such as GAMS, LINDO, MPSX, CPLEX and MathPro are also available in the market but are more complicated and more expensive than the standard Solver that is shipped with Microsoft Excel, Quattro Pro or Lotus 1-2-3. The following diagram (Figure 4.2) shows the location of Solver within Microsoft Excel and its main components.

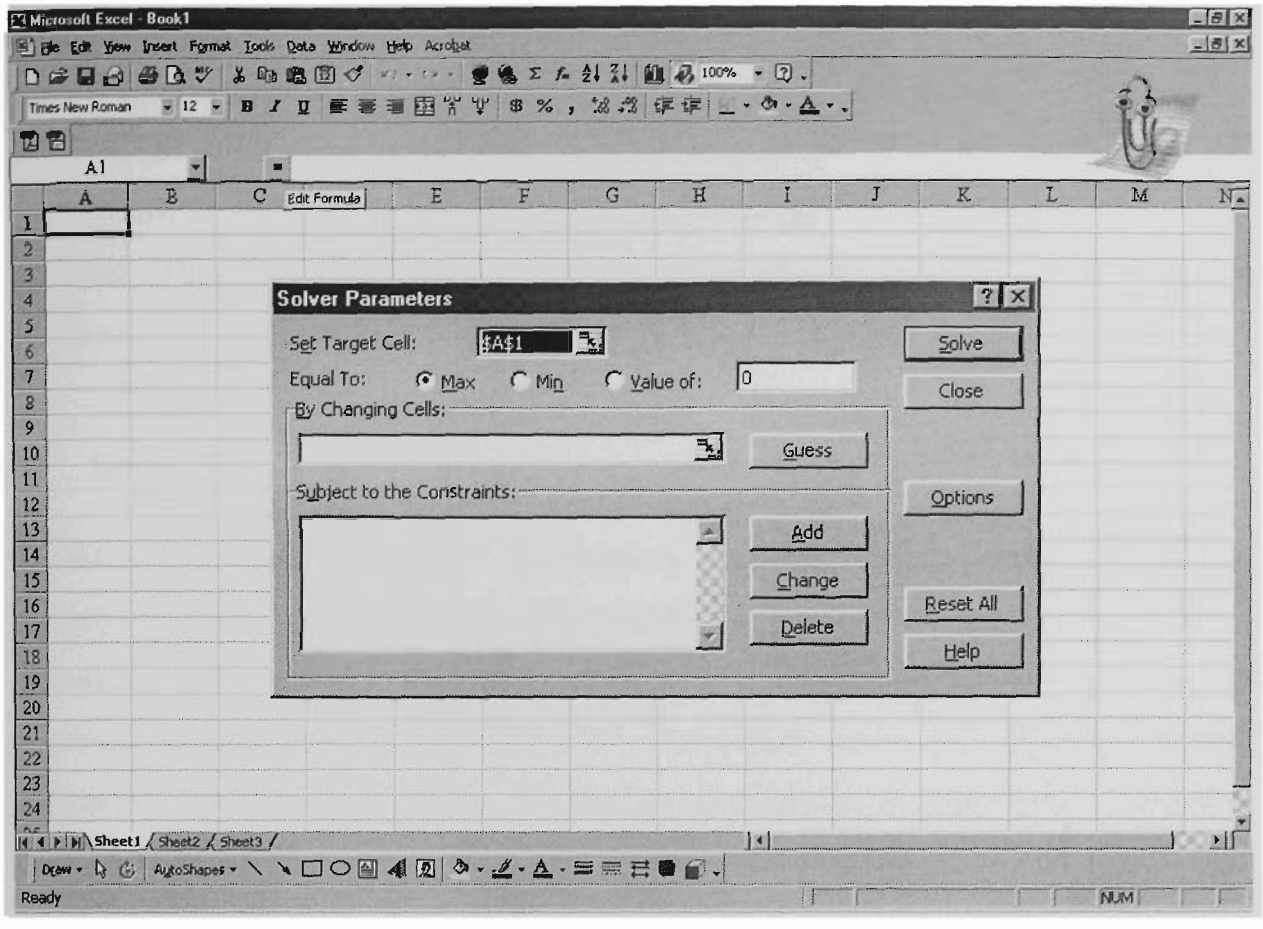


Figure 4.2
Microsoft Excel and Solver Windows

4.8 Systems Approach

In Chapter 2 it was stated that a systems approach would be adopted in this research in relation to organisational functions of SMEs and to the development and implementation of financial crisis management. This approach to crisis management has an advantage in that it provides a multidimensional framework (such as developed in Chapter 2, Figure 2.1) in which information from different disciplines and domains can be integrated without being forced into a one-dimensional mapping (Clayton and Radcliffe 1996).

Systems are generally classified as concrete, conceptual, abstract or unperceivable. A financial crisis management model can be perceived as a conceptual system intended to regulate the behavior of owner managers of SMEs in handling an organisational crisis resulting from a disastrous situation. The various mathematical and strategic elements of a financial crisis management system include cash optimisation model, optimal post-loss investment model, EOQ, PERT/CRT and so on.

The elements of a financial crisis management model can also be applied to the various activities undertaken during the six phases of the crisis management: (i) assessment of incident; (ii) crisis management planning; (iii) temporary resumption of business; (iv) replacement of assets; (v) marketing and promotion; and (vi) permanent resumption of business. The interactions among these various phases also reflect the systems relationship in the financial crisis management approach adopted in this thesis.

4.9 Conclusion

In this chapter, the objectives of this research are enumerated in order to be able to identify the topics to be covered in the following chapters. The research utilises both quantitative and qualitative data obtained from 12 SMEs that experienced some sort of disastrous incident between 2001 and 2003. The criteria used to classify these business organisations into small or medium is based on the definition provided by the Australian Bureau of Statistics.

Detailed analysis of the 12 SMEs will be undertaken in Chapter 5, analysing their experiences in relation to the crisis, their crisis management process, and identifying common patterns and best practice. This is dealt with in the form of case studies and in light of the crisis management models developed in Chapter 2.

As outlined in the theoretical framework, a successful financial crisis management strategy requires a new approach that is based on various elements identified in Chapter 2 and the application of effective financial and non-financial instruments such as cash optimisation model, post-loss investment model, optimal capital structure, EOQ and marketing techniques. The first two of these models will be developed, applied and tested in Chapters 6 and 7, respectively.

Chapter 8 analyses the critical marketing activities that can be used to restore the loss of market share, business reputation and growth. It also deals with the management of non-financial variables and strategic corporate crisis management issues in light of well-established practices of corporate governance, business communications, human resources management and corporation law.

Chapter 5
CASE STUDIES

5.1 Introduction

As discussed in Chapter 4, this research employs both quantitative and qualitative approaches in examining the nature of an abrupt financial crisis. To this end in this chapter, qualitative data and information, and some quantitative data regarding the SMEs that were surveyed, will be discussed. The information gathered using the interviews and questionnaire is presented in case study format in order to be able to undertake further analysis in the following chapters. Detailed qualitative analysis is specifically undertaken in Chapter 8.

The case studies presented here are designed to describe and explore the nature of the businesses studied and their experience during the disruption period. For ease of analysis, the case studies presented in this chapter follow the same structure and pattern based on the information gathered from interviews and observations. Also some information from secondary sources is used to provide a complete picture of the SMEs surveyed. This chapter first presents the case studies on an individual, descriptive and exploratory basis, and then provides further analysis of the main issues on a comparative basis in Section 4.3.

5.2 Case Studies of SMEs Surveyed

The case studies present general information, ownership structure, nature of management, product and services offered, the industry in which the businesses operate, financial performance in terms of sales, and the nature of incidents and the actions taken to counter act the impact of the crises.

As was discussed in the previous chapter, for privacy reasons the actual names of the businesses involved in this study will not be disclosed. Instead all the companies will be referred to as Company A, Company B and so on.

5.2.1 Company A

Company A Pty Ltd is situated in the eastern suburbs of Melbourne, in the state of Victoria. Prior to moving to these premises in late April 2001 in order to expand and streamline production, service and research and development, the company had run its business from another suburb for more than 25 years.

Company A is predominantly a family owned and operated company with a minor shareholding interest by senior employees and a German based company. The company was established in 1933 for the purpose of manufacturing RF coils, filters and chokes, an activity, which still continues. The father of the current Managing Director took over the ownership and control of the company in the 1970s after serving the company for several years as an employee.

Company A is now a hi-tech business that specialises in the design, production and distribution of safety and test equipment for telephone lines and pipe works. A strong emphasis is also given to research and development, which typically involves both long-lead times and substantial funds.

Before the deregulation of the telecom industry in Australia, Company A (Dutta and Heininger 1999) used to have a very narrow customer base as 90% of its products was sold to Telecom Australia. It now supplies its products to large public companies and end users including Telstra, Optus, Melbourne Water, and small contractors and subcontractors that are involved in providing services to large companies. Some retailers and wholesalers of electrical goods also buy high quantities of Company A products. The company also exports its products to more than 20 countries including Europe, the Middle East and Pacific Rim.

The company employs more than 30 engineering, production, marketing and administration staff. It has a regional office in Sydney manned by 2 salesmen. Other than the manufacturing staff, the employees of the company are highly qualified professionals in their respective area of specialisation.

Table 5.1 Company A Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1998	3,255,820	902,767	27.7
1999	6,619,333	2,098,513	31.7
2000	6,587,750	2,526,385	38.3
2001	2,160,288	-377,445	-17.5
2002	2,192,385	663,735	30.3

The turnover varied over years depending on Telstra's projects until a couple of years ago. As the figures in the Table 5.1 highlight, sales followed contracts won from this one major customer rather than any other pattern.

Realising this high dependence on one company and the opportunities created by the deregulation of the telecommunication industry, the directors of the company started formulating new marketing strategies in mid 2000. The relocation of the business in April 2001 and the opening of a sales office in Sydney with two fulltime employees around the same time were part of these grand strategies that aimed at broadening the customer base, and stabilising sales at $6 million plus.

In June 2001 a fire severely damaged the entire production facility, along with 75-80% of stock on hand. Despite the fire being quarantined into a relatively small area the devastation was high given its location in the production and stock holding areas and the extreme smoke damage from the high quantity of plastic materials. Also the company lost virtually all of the manufacturing equipment including drawings, models, production jigs and the QA system.

The business had only just moved into these facilities in late April 2001, having made a substantial investment by purchasing the current premises specifically to cater for the planned expansion. The directors intended to lease out parts of the premises including an auditorium and adjacent offices as these were superfluous to their needs and it was intended that they could provide significant cash flow towards the running costs of the much larger production facilities.

Following the fire, the company moved the remaining production facilities and stock into the auditorium and adjacent offices and started the rebuilding process. In an

industry such as this, the production facilities cannot be rebuilt overnight. Nor can raw materials be obtained in a short time frame, with 8-12 weeks being the normal lead-time for many items and 16-26 weeks for others.

With the loss of most stock and much of its production equipment, Company A approached this issue by prioritising product lines and reconstructing production facilities on a product-by-product basis. Products considered to have the greatest positive impact on turnover were given the highest priority. Combined with this, raw material and production equipment availability was considered and a structured rebuilding process was put into place. Priority was given to supplying existing customers particularly where contracts existed rather than sell to new customers or markets.

More than two years after the fire, Company A is still rebuilding production facilities for certain products. At the time of writing this case study, it was envisaged that the company would not be able to finalise the rebuilding process for another 12 months.

Financially the impact of the damage was severe due to the magnitude of loss across all types of assets that were built well over 30 years. The management and staff of the company managed to salvage some trading stocks as shown in Table 5.2 below valued at $72,996 compared to normal stock level of $492,150 for the most popular line of products shown below (product codes altered for privacy reasons).

Table 5.2 Company A Stock Levels

Item	*Normal Stock Levels (Qty)*	*Stock on Hand Post-Salvage (Qty)*	*Price ($)*	*Normal Stock Value ($)*	*Post-Loss Stock Value ($)*
BB1000	10,000	3,350	13.14	131,400	3,363
BB2000	1,000	185	150.00	150,000	27,750
BB3000	500	25	362.50	181,250	9,063
BB4000	50	3	540.00	27,000	1,620
BB5000	50	26	1,200.00	2,500	31,200
Total				492,150	72,996

The company moved back to its original premises after repairs that were unsatisfactorily completed in December 2001. The dispute is unresolved with the appointment of an engineering firm to check and report on the building works. The rebuilding of custom made tools, jigs and machinery is still ongoing and the directors feel that without their adequate insurance cover, professional help from claims prepares and their liquid fund of $1.2 just before the fire, the company would have been non-existent by now.

5.2.2 Company B

Company B was situated in the southern suburbs of Melbourne, in the state of Victoria before moving its manufacturing and operations to China in April 2003. The company operated its Victorian based manufacturing operation for more than 10 years from the same location.

Like a number of small Australian business ventures, the company was initially established, owned and operated by two related families. The structure continued to serve the interest of both families until the partners grew apart in their approach to the future of their business in Australia that has been under massive competition from imported products. A contamination incident that occurred in August 2001 also added to the pressure and forced one family to bail out and the company move its business offshore.

The current major shareholder and manager is a qualified printer with an extensive network in the textile printing industry. He is assisted by 3 other family members in the area of administration, sales and production. Before the incident, the business employed 14 people in total, 4 in administration and sales and the rest in production. Most of the production staff were semi-skilled in that their day-to-day activities were limited to assisting a couple of highly skilled textile printers.

The company was involved in providing textile-printing services to small, medium and large textile manufacturing enterprises throughout Australia since its establishment in 1992. Most textile manufacturers do not have either sufficient or any printing facilities as part of their production systems and as a result require the service of textile printers. Company B also used to win some major state and federal government contracts in the past where garments were sourced from overseas suppliers and printing work was to be

done here in Australia under the direct supervision of government officials for specification and quality reasons.

The printing process involves the preparation of film, forms and plates depending on the number of colours as well as the selection and mixing of ink as per the design and specification. The actual printing of the design then takes place followed by drying, sorting and rolling of the printed fabric. As a result such textile businesses require large premises due to the size of the machines and processes involved in printing and the area required for storing garment, ink and other supplies.

When the company was established in 1992, the textile industry was undergoing massive structural changes as the whole Australian manufacturing sector was opening up as a direct result of the government economic policy of deregulation, tariff reduction and import relaxation that were aimed at increasing the competitiveness of all economic sectors in Australia. During this period many textile manufacturing firms changed hands at very high level (for example Sara Lee (www.saralee.com) entered the Australian market by taking over the Linten group and King Gee), some moved overseas and others closed. This change continued until recently (2001/02) when the Bradmill Undare Group was taken over by American interests and was restructured with the closure of its various regional manufacturing plants and job losses (www.bradmill.com.au). It is also anticipated that there will be a major shake up in the textile and footwear industry when the tariff is reduced further in the coming years as per the information from AusIndustry enclosed in Appendix 5.1.

The owners of Company B who were familiar with the Industry decided to start this business in the middle of the shakeup in order to take advantage of their proximity to the remaining textile manufacturers in Australian market and compete on a speed of delivery basis rather than cost. The offshore suppliers are cheaper but slower in delivery due to distance and there are always urgent orders that manufacturers would like to fulfill from time to time.

Unlike the majority of textile printers in the local market, Company B had a major competitive advantage in that it had on-site access to a machine called Stentex that plays a vital role in the textile printing process and which was not readily available to the rest of its competitors. Stentex is used to treat ink so that it stays permanently on the

garment. This process is often operated as a separate business on its own. Having immediate and easy access to this process offers a great of competitive advantage over the other players in the industry.

On the basis of Company B's financial statements for the relevant periods, the business achieved the following financial performance.

Table 5.3 Company B Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1997/98	1,051,218	708,140	67.4
1998/99	1,374,820	1,050,835	76.4
1999/00	1,270,292	851,886	67.1
2000/01	1,248,956	854,986	68.5

On 4th August 2001, the landlord decided to get the roof of the premises from where the company was operating its business fixed. In this process, the tradesman damaged the roof made of asbestos. This caused a contamination and involved the Workcover Authority, who inspected the premises and issued an order to close the business until a successful decontamination was undertaken, another inspection was done upon its completion and a certificate was issued in verification of the same.

The decontamination of the premises and machinery took more than 6 months and the business was finally reopened in February 2002. By this time, half of the workforce had left the employment of the company and the contractor who owned and ran the Stentex machine decided to move out. On top of that the insurance company that provided cover initially declined to admit a liability under the policy in force and then accepted a liability some 13 weeks after the damage. This greatly added to the frustration of the owners and stopped them from encouraging the employees to stay until the operation was resumed.

Luckily the company did not lose much in the form of stock or raw materials as the business was mainly involved in further processing of other manufacturers' products and the main production input used by Company B was only ink. But the loss of 50% of the employees and the Stentex machine meant a lot as the business had lost its main

source of competitive advantage and its highly experienced workforce. While the loss of trade during the closure was to be recovered through the insurance policy, the permanent loss of some customers was a major below to the future viability and profitability of the business beyond the insurance indemnity period.

As a major loss mitigation strategy, the owners tried to keep in touch with as many of their customers and transferred the existing jobs at the time of the loss to friendly competitors. The owners even managed to get some jobs from sympathetic customers that they passed to the same friendly competitors that performed the task on their behalf at competitive prices.

Following the resumption of operations in February 2002, the pressure continued to mount on the owners as the business could not recover fully and operated on a less competitive basis. In December 2002 one family decided to take over the company and soon after, the controlling family decided that it was in the best interest of the company to relocate the manufacturing operations to China where labour costs much less than in Australia. They hoped that the business would prosper due to its ability now to reduce labour and occupancy cost and a wider customers base from around the globe.

5.2.3 Company C

Company C is an Australian owned and operated small cloth manufacturing and distributing business situated in an inner suburb of Melbourne. The company has been operating from this location for more than 20 years and specialises in the production and sale of causal wear such as T-shirts, polo shirts, shirts, jackets, pants, shorts, caps, and other clothing. It also produces and sells some sport and promotional products for corporate clients.

The current major shareholder and managing director took the ownership and control of the company after serving the company as an employee for more than 15 years. The managing director learned most of his managerial and operational skills while he was an employee of the company. He is now quite proud of his achievement as he transformed the company from a very small player with less than $1 million of turnover into a $7 million business in 2001/2002.

The company is primarily controlled by the managing director, but assisted by two

senior employees who hold a minor interest in the company and play the roles of marketing and accounting managers. Company C employs more than 35 staff in its various departments of designing, manufacturing, printing, accounting and marketing. Other than the qualified staff in the accounting department, the rest of the employees are semi-qualified trades persons in the area of textile manufacturing and printing.

Following the semi-deregulation of the textile industry in Australia, the company is under enormous pressure from those companies that directly import their products mainly from Asia and to certain extent from South America. This competition led Company C to alter its manufacturing and marketing strategies by:

- Shifting the production of some items to Chinese based contractors under a strict requirement for compliance with its own product specifications and quality standards.
- Introducing some imported items to complement its product range in the area of sports and promotional wears.
- Introducing a sales budget at a company and salesperson levels and monitoring performances on regular basis.

As Table 5.4 shows the company has been a small player in the manufacturing and selling of casual wear given the size of this market in Australia, which is estimated in billions of dollars.

Table 5.4 Company C Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1998/99	4,897,450	1,694,518	34.6
1999/00	5,842,333	1,902,591	32.6
2000/01	5,384,936	2,012,597	37.4
2001/02	6,787,616	2,086,746	30.7

From the above table it is obvious that the increase in sales was remarkable in 2001/02 representing 26.05%. The achievement was mainly due to the strategic move by the company in counteracting cheap imports, and introducing a number of changes as discussed above.

The disruption to this business occurred when the printing division was closed as a result of a fire that damaged the building as well as the printing facilities on 1st November 2001. The printing division reopened on 18th February 2002 more than three and half months after the loss. During this period, the management of the company outsourced all of their printing jobs to various printers around Melbourne and their own subcontractor who was able to organise printing facilities at his own premises.

The major difficulties the company encountered during this period were the inability to take as many orders as they would like to due to:

- Longer lead time for completion of the work.
- The quality of the work being done by most of the external printers.
- The total rejection of some deliveries by one of the Company's major customers and complaints from a number of other customers.

For instance, one of the major clients rejected promotional ladies singlet and men's t-shirts on two occasions for the one product. Consequently, this customer was highly disappointed and significantly reduced its orders. The company continued to struggle to regain the full confidence of this valuable customer well after the resumption of normal operation and stated that the loss would continue well beyond the end of 2002.

Despite the quality problem and a disappointment of one major customer, the decision to outsource printing jobs was the right one because without external help, the loss of turnover would have been in the vicinity of $2m for the three and half-month period, ie. until the building work was complete. The ongoing impact would have no doubt taken the company back two to three years.

5.2.4 Company D

Company D is a family owned retail business that operates from three main locations. The business trades under an unregistered trade name and operates from two Melbourne suburban stores as well as from a regional town of New South Wales. The business was established some 25 years ago by a migrant from the Middle East.

The owner is currently assisted by his wife and two sons who are involved in the

business on a full-time basis. His daughter also assists with the maintenance of bookkeeping duties and helps out in the shops from time to time. Other than the family labour, the business employs some casual employees here in Melbourne and a permanent shopkeeper in the regional town.

In addition, the family owns a truck from which they conduct a mobile retail business by regularly attending markets at different locations including Dandenong and Geelong. Over the years they have attended country markets including Leongatha and Tumut on a regular basis. A double garage at the rear of their home serves as a warehouse for the business.

As typical retail stores, the business depends largely on passing trade and draws its success from the variety of the stock it holds and price competitiveness. The two suburban shops in Melbourne sell mainly footwear for business, causal and sporting use plus complimentary products such as socks and shoe polish. The other shop in the regional town holds more products as it tries to cater for local needs other than the demand for shoes. Other products for sale include bird netting and shade cloth, which are popular during the months from November to February.

Due to the nature of the products offered to the market, the revenue generated by the business has been hovering around the $800,000 mark. Table 5.5 shows the company's financial performances during the four years ended 30th June 2002.

Table 5.5 Company D Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1998/99	840,451	290,796	34.6
1999/00	932,653	308,409	33.1
2000/01	762,262	348,354	45.7
2001/02	832,756	184,050	22.1

The owner had been operating his business in the regional town for more than ten years when an accident occurred on 6th October 2001. A motel proprietor adjacent to this property lost control of a fire while burning off grass between the two premises and the timber forming part of the rear of the premises caught fire and resulted in the total

destruction of Company D's business premises including its contents and stock of footwear, clothing, bird netting and shade cloth.

Following numerous enquiries the owner was able to sublet an area of another shop. While this area was much smaller (about 25% of the premises burnt) it had the advantage of being in a prime site, and did not need much money to spend on. After two months of complete closure the owner opened his business in the sublet area on 30th November 2001.

Given the size of this sublet area, the owner could not stock bulkier items such bird netting and shade cloth. The owners also travel more frequently than before due to limited space and smaller quantity of stock that could be stored at the premises. The owner is still operating from this sublet area as the original premises have not been rebuilt due to lack of funds.

5.2.5 Company E

Company E was incorporated in 1962 when the first owner established his first factory in an inner suburb of Melbourne. The highlight of these early times was the making of red and blue bows for a large Australian confectionery company. The bows on these chocolate boxes almost became a trademark.

In 1978, the current directors and second generation took over the company and continued to expand the business. In the past 20 years, the business has grown to become Australia's largest manufacturer and supplier of ribbon products and gift accessories. The company is 100% owned by the same family who succeeded the founder in 1978.

Like most family businesses, the company is managed by a couple, but primarily by the managing director who acts as a principal, salesman and public relation officer. His wife and co-director is responsible for administration, sales processing and finance. They are also assisted by other family members on a casual basis and other 3 permanent employees in their office and more than 10 staff in the factory.

The company's production capability includes a polypropylene extrusion line together with printing, laminating and ribbon conversion machines to make various ribbon-based

wrapping, packaging and florist-use products. The company can also custom design and manufacture to clients' requests. The business is seasonal with the majority of sales falling in the second half of the calendar year leading to Christmas. However, meeting the customer demand for the second half means production must remain on stream during the first half of the year.

Over the last ten years, the company has been under intense pressure from cheap imports from Asian manufacturers, in particular from those Australian companies that have manufacturing plants in China. Company E competes primarily on quality and speed of delivery basis as well as personal attention and long established relationships. While the company still perceives a major threat from imported products, the directors do not think there is need for a short-term response to this major threat. They envisage that in the long-term the development of retail outlets could be the correct strategic move to counteract the impact of the current competitive situation.

The business has been generating a steady flow of revenue over the last four years as shown in Table 5.6.

Table 5.6 Company E Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1999	3,035,688	913,742	30.1
2000	3,508,535	961,386	27.4
2001	2,946,645	860,355	29.2
2002	3,579,790	865,355	24.2

The disruption to the business was caused by a storm on 25th January 2002, which led to extensive flooding of the floor including channels for electrical cable to various machines. The major damage was to the main production machine being the extruding machine and the power to that machine. The initial cleanup and repairs did not reveal the nature and extent of the damage to the corona discharge and its transformer both of which are attached to and form part of the extruding machine.

The extruder was fixed in February 2002 but production continued to suffer until the end of June 2002, as the damage to the corona discharge and transformer was not identified until very late in May and not fixed until late June.

The long delay in production and delivery of orders resulted in the cancellation of orders and loss of turnover. The owners treat this as a major setback as it is generally hard to regain the confidence of the big stores once you fail to fulfil their orders. At a recent discussion with the owner it was revealed that one major customer was completely lost.

5.2.6 Company F

Company F is a retailer and repairer of jewelleries, casual and dressing watches for over 50 years. An Italian migrant established the company in the late 1950s. The company has been operating from the same inner suburb of Melbourne by moving from one premise to another.

The daughter of the first owner and her husband currently run the business by assuming different roles. The business employs 11 people including the two owners. Three employees serve on a part-time basis while the rest of the staff are permanent full time. Other than the two directors and their daughter who is mainly engaged in sales and bookkeeping, there are two other senior employees who assist the owners in running this successful business. One senior employee is a jeweller who helps the owner with repair work and technical details while the other senior staff is a senior salesperson. In this business, employees are not required to have or display formal qualifications other than having proven track record in their area of employment. The owners hold all of them in high regard and treat them as family members. Most of the employees have been with the company for more than a decade.

As pointed out above, the owners are very well known in their business and customer circles and mainly target middle class Greek and Italian families who reside in the north and northwestern suburbs of Melbourne. The owners are also renowned for their good quality Italian/Greek style jewellery and serve as a genuine and reliable supplier of such products to their loyal customers for many decades.

The company does not sell any particular brand of jewellery or watches as it attempts to be an independent retailer catering for varying tastes and requirements of its customers. Given the nature of its products and services as well as customer base, there is no real and immediate threat to the company's business. However, the directors feel that there

are both threat and opportunities from other jewellers who are now opening up stores close by. Demographic changes within these Mediterranean communities might also have some impact on their business down the track but they seem to be confident that their daughter is well positioned to know and experience these changes.

Table 5.7 Company F Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1998/99	1,370,986	871,947	63.6
1999/00	1,417,017	907,133	64.0
2000/01	1,150,417	695,343	60.4
2001/02	707,444	442,106	62.5

The success of Company F over many decades is reflected by their business performance over the fours years ended 30th June 2002. Table 5.7 provides a summary of its financial performances. It also reveals that the company achieved over $1.35 million in 1999 and 2000 but enjoyed less revenue and profit during the subsequent two years due to a family problem in late 2000 and a fire that devastated the business in 2001. The balance sheet is also quite strong for a small business that runs as a sole trade for all practical purposes.

On 15th November 2001, a fire significantly damaged the premises. A quick response by the Metropolitan Fire Brigade (MFB) on the day managed to save some stock but not equipment, tools and furniture. A lot of jewellery and dressing watches in the safe estimated at more than $600,000 escaped the fire due to this quick action.

The fire really hit the directors hard in that it made them feel like starting all over again given their limited energy and uncertainty surrounding the reconstruction of the damaged premises. After 5 to 6 months of awaiting a decision on the reconstruction of the old premises and no promising sign, they decided to look elsewhere for suitable premises within the street. They found one at a significant cost as the occupier demanded goodwill payout in order to vacate the premises and move to another location.

As a part of loss mitigation strategy the Insurance Company agreed to foot the bill and the refitting and refurbishment work started. In September 2002 Company F resumed

operations in time for the Christmas trade in the refurbished premises. The directors advertised in the local paper and invited selected customers to an opening party. Afterwards they felt that they had a good start and were confident that their loyal customers will be back sooner rather than later.

5.2.7 Company G

Company G is located in the southeastern industrial precinct of the city of Melbourne, Victoria. The company has been operating for more than 40 years from various locations in Melbourne until it finally moved to its current purpose built building in November 2001.

Like the majority of SMEs in Australia, Company G has been a family owned and operated business throughout its business life. Company G was established by the late father of the current two directors. These directors co-own the business with other family members but control and manage the company on a day-to-day basis. The succession took place in 1995 when the founder of the business decided to retire and pass on the mantle to his two sons who are university graduates and who have been in the business with him for many years.

The older brother assumed the position of managing director and is responsible for production and marketing. The younger brother looks after finance and administration. Both brothers are assisted by highly qualified personnel in all areas of the business operations including production, marketing and accounting. The business employs more than 70 employees at its current premises. A plan is underway to open a sales office in the US.

Company G is a commercial printer specialising in the horticultural industry in Australia with a growing export market in the US. The company's specialty is printing on plastic, which requires unique skills that have been built up over many years. In addition, it undertakes many commercial jobs, which also involves the use of plastics.

Packaging products made of plastics and promotional products such as wine holders are also produced by the company on an order-by-order basis and represent about 20% of total sales. Given the nature of Company G's products, the company has two main distinctive classes of products and three different market groups. The products are

horticultural products and commercial jobs. The markets cover nurseries, commercial customers and an export market, mainly US based nurseries.

Table 5.8 shows that the company enjoys modest growth and strong gross profit based on the financial information for the four years ended 30th June 2002.

Table 5.8 Company G Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1998/99	15,222,513	6,962,925	45.7
1999/00	17,155,421	7,218,401	42.1
2000/01	17,603,294	8,025,820	45.6
2001/02	18,674,044	8,100,942	43.4

The company had been dependent on one major printing press and two minor printing machines up to the time of the incident. The big machine accounts for 60% of the total production outputs. On 5th August 2002, the big printing press suddenly made stopped printing to the surprise of the production manager who had intimate knowledge of this machine with good maintenance record. The incident was reported to the company's insurer under accidental damage cover and authorization was received to go ahead with repair work.

The local repairers who came to visit the factory the next day confirmed that the damage was severe and would take months to fix, as the manufacturer's engineers would have to fly in from Germany with the necessary parts. They also reported that the damage occurred as a result of foreign object attached to the plastic sheet going through the press pushed the big rollers apart and caused damage to the bearings and shafts.

Realising that the main equipment would be out of order for several months to come, the directors embarked on loss mitigation strategies in consultation with their loss management advisers, which included the following actions:

- Outsourced work to competitors after having explained the situation and signed confidentiality agreement as to the process and technique of printing on plastic sheets.

- Hired an alternate machine of similar type but smaller capacity and printing stations (printing station refers to the number of pressing machines that can take a given number of colour in any one given set-up or production process; two stations can only print two colours at one time, and so on).
- Worked overtime by extending both manufacturing and designing hours.
- Wrote to all Australian customers in the horticultural (nursery) business and assured them that the disruption was only temporary and under control.
- Telephoned all overseas customers and advised them of the damage and the strategies being engaged.
- Decided not to contact the commercial customers.

After nearly four and half months, the breakdown was fully repaired and the printing press was re-commissioned in December 2002. All staff including the directors closed for the 2002 Christmas break with the full knowledge and optimism that the business would be as usual at upon their return. Strong planning and effective implementation paid off as no one had been disappointed with the exception of the insurer and its adviser who were required to pay for the repair and business interruption loss and initiate a recovery action against the supplier of the plastic sheet that caused the damage.

The directors also realised that their current practice of depending on one machine for a significant output of their production is a risky strategy and decided to order a similar machine at a cost of $7 million. The decision was also influenced by their growing export market.

5.2.8 Company H

Company H is a family business established in 1950s as a retailer of household products in an inner suburb of Melbourne. This outlet still operates from the same location under the management and control of the son of the founding entrepreneur.

The owner currently runs a number of retail outlets throughout Melbourne and in Victorian regional towns under a registered trading name, the original retail shop under

the same old name and a retail/wholesale store in a western suburb of Melbourne. In short the business has three divisions under three separate entities based on the wholesale/retail experience gained over the last 50 years and changing competitive forces within the industry.

The managing director is assisted by his wife and 3 senior staff who are based in his head office located in western suburb. The senior staff members are primarily concerned with purchasing seasonal and massive stock of household products that can be found in many outlets including Reject, Kmart, Dimmys and the like. There are also 5 more clerical staff who receive and process orders for the retail outlets spread throughout Melbourne. Each retail outlet has a shop manger, an assistant shopkeeper and some casual staff depending on the size and level of trading.

The business was mainly wholesale some 10 to 15 years ago as the company was the largest importer of Chinese household products into Melbourne and a major supplier of such goods to major retailers in Melbourne. As these customers gained experience overtime and started to import their own goods, the directors of Company H had also to devise a strategy that would counter act this move and defend their revenue base. One such move was to start opening up their own retail outlets and to compete head on with these retail giants. To this end, the directors have managed so far in successfully opening up more than 19 retails outlets in Melbourne and regional towns in the state of Victoria.

The accounting records of the business show that the company generated the following revenue during its three financial years ended 30th June 2002 from each of its wholesale business activities (which is the main focus of this study).

Table 5.9 Company H Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1998/99	14,567,790	1,427,643	9.8
1999/00	13,713,903	1,242,309	9.1
2000/01	3,235,942	392,202	14.9
2001/02	1,529,513	155.458	15.0

On Tuesday 26th March 2001, water pipes in the car park burst and flooded the entire office complex and showroom. The computer system went down and many records were destroyed. The owners completely removed all fixtures and fittings from all offices so that they could dry. Also, the owners used evaporative dryers for days to dry the floor. For about a period of 10 days, the staff could not sit in the office or the showroom due to unbearable smell and noise. They were not also able to operate the computer system due to excessive dust.

The flood occurred just before Easter. The trading period during Easter is always very important to the owners as the activities during this season generate a lot of business with a high profit margin. The owners encountered a major problem due to the flood as they were not able to display Easter eggs for wholesale and they were not also able to know the inventory levels.

When wholesale customers rang, the staff members were not able to instantly know whether or not they had stock. The same situation also applied to the owner's retail outlets. Customers who were reliant on Company H for their Easter eggs became hostile, as the company was unable to service them. These customers had to find alternative suppliers and in some cases held them responsible for having to pay higher prices to other suppliers.

A large number of eggs had a use-by date that would expire shortly after the Easter period. The directors managed to sell most of these eggs at heavily discounted prices by transferring them to their own stores and at the expenses of a reduced margin for other products. After the fire sale, 20 pallets of Easter goods were still left over and returned to the warehouse. The previous year only 8 pallets were left over after normal Easter trade.

The directors feel that the impact of the damage has ultimately caused the demise of the wholesale business that was struggling for a while from external competitive forces and internal structural changes. They are still looking forward to getting paid by their insurer for the loss of gross profit experienced in early 2001.

5.2.9 Company I

Company I is a small business in the regional town of northwestern part of the state of Victoria. Before acquiring the cafe, two unrelated families used to run the only bakery in the town for many years.

The ownership and nature of the business changed over time, as the two families who owned and operated the bakery took over the café in the town from another family in order to consolidate their business of making bread with the more profitable business of selling coffee and takeaways. The acquisition of the café took place in June 2001. In July of the same year, the owners moved the bakery to the rear of the café in order to run both businesses as one business and from the same premises. The other premise (the old bakery) was to be vacated when the lease was due to expire in 15 months.

In mid 2002, one of the families who was in the partnership sold out its interest and left the business. The café including the bakery is now currently owned by a single family and run by three members of the same family on a day-to-day basis. They are also assisted by a couple of fulltime and another couple of part-timers in the bakery and kitchen area.

The fortune of the business depends to a certain extent on the economic activities in the area and in particular the level of employment and farmers' income. The following table provides financial performance for three years from 1999/00 to 2001/02.

Table 5.10 Company I Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1999/00	119,469	63,558	53.2
2000/01	124,077	63,105	50.9
2001/02	482,054	220,299	45.7

After the acquisition of the café in June 2001, the owners expected their revenue to increase to $600,000 during their first year of combined business activities, ie. their existing bakery and the newly acquired café based on the sales document and discussions with previous owners.

On 14th August 2001 the principal business owner called in an electrician to check an old refrigerator that was malfunctioning. The electrician allegedly identified a faulty fan within the unit and instructed one of the employees to disconnect the unit from the power. The unit was left on, overheated during the night and a fire ensued. Two businesses including the adjacent news agency/post office (Company J discussed in the following section of this chapter) were reduced to rubble to the disappointment of the owners and their employees.

Luckily due to the backup kitchen/bakery at the old premises, the owners quickly relocated back to resume both operations at a much reduced level. The reconstruction of the destroyed premises was completed in September 2002.

5.2.10 Company J

Company J is a newsagency and Post Office owned and operated by a local family in a northwestern regional town of the state of Victoria.

The newsagency is primarily operated by a family and the postal service such as mail delivery is performed by subcontractors. Before the privatization of some local post office outlets in the suburbs and regional towns and the rationalization of mail delivery system, the owners used to run a typical newsagency business that provides households and business organizations including farmers in the town and surrounding area with newspapers, magazines, printing and stationery supplies.

The business also acts as an agent for Tattslotto and V-Line, which make a significant contribution towards the revenue basis. The revenue base will be further strengthened by new contracts from Australia Post as and when it gains confidence in the family's ability in meeting mail delivery requirements in relation to existing contracts.

The economic activities including employment and farmers' income in the region also have a strong impact on the level of revenue generated by the business from time to time. The following table is constructed to show the sales and gross profit generated by the business during the four financial years ended 30th June 2002.

Table 5.11 Company J Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1998/99	284,161	65,957	23.2
1999/00	307,547	68,890	22.4
2000/01	257,985	87,806	34.0
2001/02	274,026	65,960	24.1

On 14th August 2001 a faulty fan in an old refrigerator in the café discussed in Section 5.2.9 caused a fire, which destroyed both businesses.

The owners commenced operating in very limited form immediately from the front room of their home, as they could not afford to disrupt postal services regarded as one of essential public utilities in Australia. The family arranged for some alterations to their home, which included extending the front room to encompass the veranda and mounting the Post Office boxes in the front wall.

The business moved back to its original premises in September 2002 to resume normal operations.

5.2.11 Company K

Company K is a hotel in the Alpine region of the northeastern part of Victoria. The company is in the heart land of a National Park proclaimed by the State of Victoria over 100 years ago.

The hotel is open throughout the year as it offers various recreational activities designed to suit various seasons of the year. The hotel caters for all sorts of activities all year round including social functions and business engagements. The low season is during the months of May, June and October. July, August and January represent the high season and the remaining six months are regarded as a medium season.

The new owner/manger took over the business in March 2002 with a great deal of experience and enthusiasm to revitalise the hotel and restore the historic building to its heyday status in the 1930s.

During the winter period, the hotel caters for thousands of Victorians and interstate visitors who are interested in learning how to ski. The hotel also manages a snowfield that is supported by some chair lifts and generally regarded as a training ground for the big ski resorts in Victoria. The new owner had also a plan for establishing a tube park in the area adjacent to the snowfield, which was going to be the first of its kind in Australia.

The hotel employs 20 to 60 staff depending on the seasons. The number of employees peaks during winter period due to the sheer volume of business and activities undertaken at the hotel. Key personnel include the managing director and owner of the business and his two senior staff members that act as a general manager and operations manager.

The historical performance of the business based on the revenue generated by the previous owner is given in the following table.

Table 5.12 Company K Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1998/99	5,011,928	1,976,584	39.4
1999/00	5,068,490	2,025,647	40.0
2000/01	4,985,252	1,919,322	38.5
2001/02	4,701,661	1,927,681	41.0

It was widely reported in the media and it has also been the subject of an inquiry by the State Government of Victoria (Esplin, Gill and Enright 2003) that the bushfire in the Alpine region, which devastated lots of parkland, public and private properties in December 2002 and January 2003, could have been avoided or better controlled. Unfortunately some lives were also lost in fighting this bushfire.

Being in the bushfire affected area, the properties of the hotel including chair lifts, some accommodation and the gardens surrounding the main building were affected by the fire. Given the damage to the road from fallen trees, footpaths and other recreational facilities within the Park, Parks Victoria closed the national park from the time of the bushfire in early January to 14th February 2003. The business remained closed for further 2½ weeks until the entire cleanup was done.

The repairs to the chair lifts and under ground pipes started in earnest during the following months but could not be finalised by the time the winter season set in July/August 2003. Only two chair lifts operated during the snow season and the plan for the tube park failed to materialise due to cash flow problems and delayed construction of other hotel facilities that were damaged by the bushfire.

As the business could not recover from bad publicity including the closure of the café, employee resignations and poor credit management, the new manager/owner appointed an administrator to take over the business in February 2004 in accordance with Section 435A(1) of the Corporations Act 2001 (Cth). In March 2004, the administrator determined that the business could not trade out of its debt and put the business on the market as a going concern.

5.2.12 Company L

Company L is a video store situated in a regional town of Western Australia. The video shop is one of the multi-national franchising video stores that operate throughout Australia.

The current family that owns the business took over the store in February 2002, after recommendation from other relatives who had been involved in this type of business for many years. The overall responsibility for the management and operations of the business lies with the two directors of the company. A store manager and eight other employees who work different days and shifts assist the directors in successfully running the business.

The company generated revenue and gross profits as provided in Table 5.13 during the four financial years ended 30th June 2002.

Table 5.13 Company L Financial Performance

Year	*Turnover ($)*	*Gross Profit ($)*	*Rate of Gross Profit (%)*
1998/99	698,076	406,280	58.2
1999/00	722,262	430,468	59.6
2000/01	725,870	415,923	57.3
2001/02	620,406	357,353	57.6

The above figures show that the business has almost been stagnant in that the growth in revenue has been negligible during the three years ended 30th June 2001. The annual turnover for the financial year ended 30th June 2002 was affected by the impact of the incident and should not be compared to previous years' sales figures.

The expansion in revenue and increase in profitability largely depends on the activities undertaken by the franchiser due to common marketing and purchasing practices adopted at a national or international level by the parent company in the US.

The incident was fire damage at the business premises on 3rd May 2002. The premises were totally destroyed and nothing could be salvaged including contents and stock. Also all records such as computer records were destroyed. No backup information was stored off-site as the owners were in the process of upgrading their computer system.

Following the fire, the family moved to secure temporary premises in a vacant shop in the same complex. The premises did not have the same size, nor visibility as the previous premises and this had some detrimental effect on the trading of the business.

After some preliminary work to the temporary premises and procurement of stock, the owners resumed business on Monday, 5th August 2002. As was stated above, the temporary premises were in a less obvious location, which meant it was quieter and less convenient for customers. These premises also did not enjoy the proximity to the McDonalds restaurant that the destroyed premises had and helped the owners reap the benefit of passing trade.

The old premises took about 10 months to be rebuilt and the company relocated back to its original place of business in March 2003. The couple and two other family friends worked for more than 1,500 hours without pay on various asset reinstatement activities before moving back to the original premises. This huge personal sacrifice was mainly due to insufficient cover for the contents and stock destroyed in the fire.

In summary, the information obtained from the case studies will be used in developing the comparative analysis in the following section, optimisation models, and financial crisis management strategies in the following chapters of this thesis.

5.3 Comparative Analysis

This section deals with the main features of the case studies on a global basis, as drawn up from the previous discussions to analyse all the incidents based on some common variables or criteria and to identify their major crises experiences, similarities and differences. The following major headings are identified for these purposes.

- General Information
- Business Structure
- IT/Accounting System
- Risk Management
- Nature of Disruption
- Financial and Other Crises
- Crisis Management

5.3.1 General Information

The general information is intended to explore the age, structure of ownership, change in the ownership (or succession) since the establishment of the business, annual sales in dollar terms, value of total assets, net equity and number of employees of the business including family labour. Based on this information, the size of the business is also determined using the criteria already established in this thesis.

The table in Appendix 5.2 shows that the SMEs surveyed range in size from a sole trade in a suburban street with 3 employees, usually family members, to a medium sized business organisation with more than 70 employees. In total they employed more than 295 people, ie. 67 of them were employed by small business organisations and 225 by medium ones.

The group of businesses surveyed includes 7 small and 5 medium sized business organisations with total assets of $37.81 million at book value. The total annual turnover for all these business is estimated at $56.6 million. Both figures represent values at different times in that they are based on financial statements for the last year before the crises hit these SMEs. It is also interesting to see that 3 small businesses are already in deficit with negative net assets.

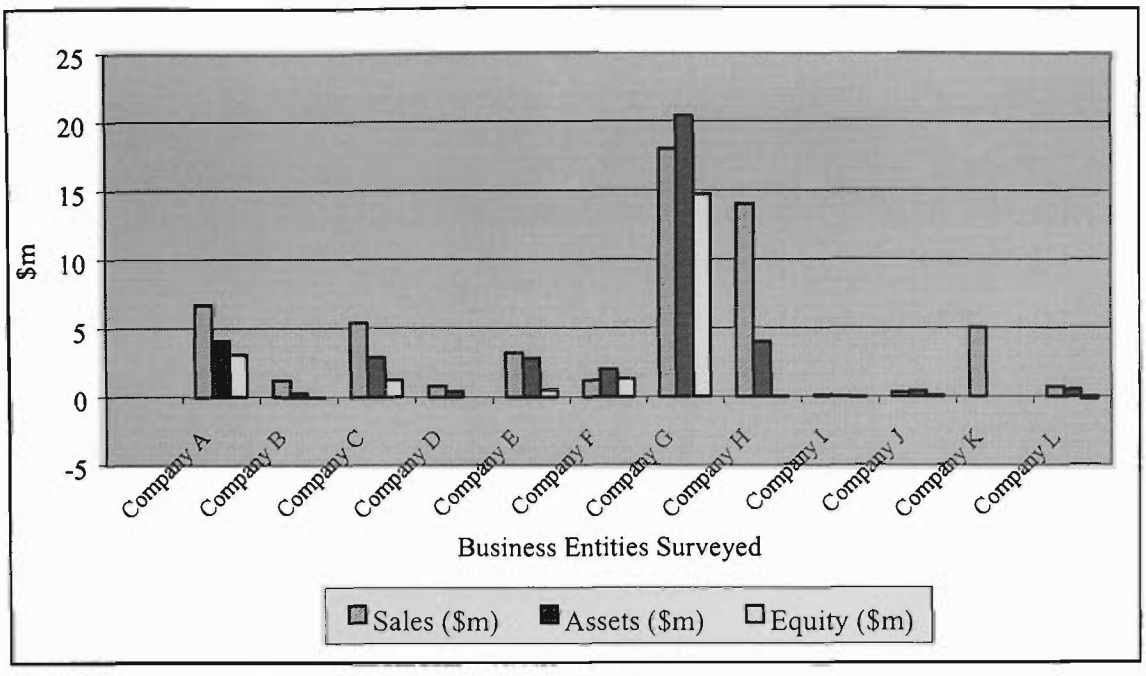


Figure 5.1
General Financial Information

The bar chart (Figure 5.1) provides further information on annual sales, total assets and net equities of all SMEs included in this survey. It is also fascinating to see that 4 out of 12 SMEs are around 50 years old and all of them are over 25 years old other than 3 business organisations owned by relatively young families and first time entrepreneurs. Five businesses are in the hands of 2nd generation of business families.

5.3.2 Business Structure

This subsection deals with the industry classifications, nature of competitors, competitive advantage enjoyed, products and services offered, customer base and nature, export and import opportunities, level of machine utilisation, level of labour utilisation and managerial skills within the company.

From the following pie chart (Figure 5.2) it is clear that the majority of the companies surveyed belongs to manufacturing industry (5 SMEs) followed by retail businesses representing 4 organisations and service orientated companies, which make up the remaining 3.

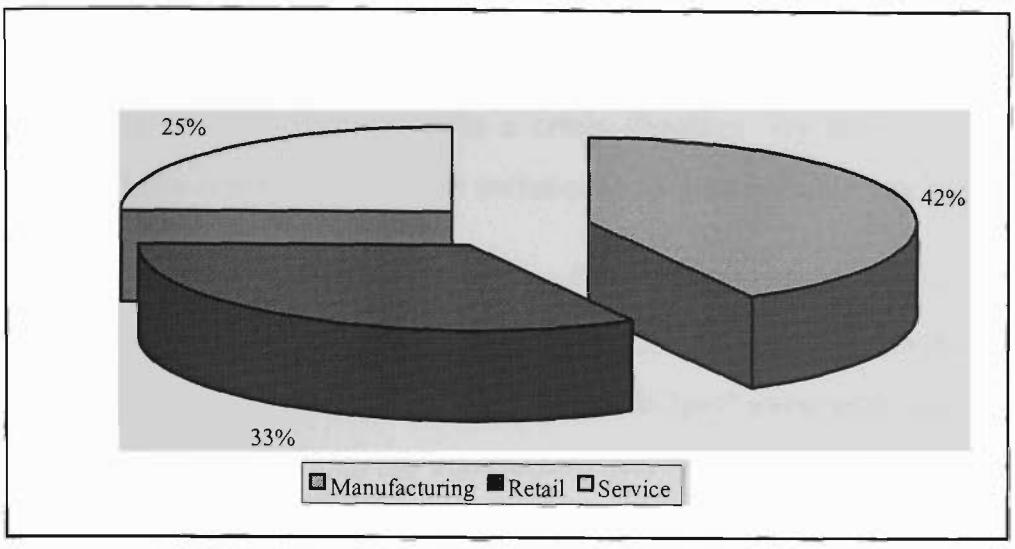


Figure 5.2
Industry Classification

From the table in Appendix 5.3, some important characteristics also emerge in that the business organisations that operate in highly competitive environment enjoy some sort of competitive advantage. Those small businesses that operate in relatively less competitive environment do not have any apparent competitive edge. Probably they do not need to have one, as there are no compelling market factors.

The products and services offered by the majority of the business organisations are quite limited due to their size and the level of resources they command. One medium business has multi-line products and another small business is involved in a single line of production, which is textile printing. The reason for the vulnerability of this business (Company B) and eventually permanent relocation to China could be explained in terms of its inability to offer multi-line products or services.

Two businesses (both medium organisations) were able to export at a low level and the crisis hit these export markets hard as both companies were more concerned with defending their local markets. The six companies that imported products to compliment their local product lines continued to do so after incidents in order to remain competitive.

5.3.3 IT/Accounting Systems

Under this heading the variables analysed include in-house accounting function, accounting package utilised, other specialised software used, level of use of spreadsheets internal/external IT support, development and use of budgets and projections and use of cash flows.

The variables explored under this heading are quite useful in that they show whether or not the businesses covered by this research can utilise IT based facilities and solutions including financial models applicable to a crisis situation. By inference, it will tell whether or not SMEs can apply the same techniques in similar circumstances.

Except for 4 of the small businesses, the rest of the SMEs undertake some accounting functions in-house and utilise accounting packages. One of the medium sized businesses utilises a custom made accounting package with multi-level passwords including highly secured Internet based access. All the other businesses use standard accounting software such as Attache and MYOB.

The interesting point to note is the fact that all of the businesses surveyed use general-purpose software such as spreadsheets. This is quite encouraging given what spreadsheet programs such as Microsoft Excel can do. Four business organisations use a budget but there are five of them who prepare cash flow projections. All of those who apply budget and cash flows projections are medium business organisations. Once again the preparation and application of these relatively advanced accounting functions depend on the level of the sophistication of managerial skills that lack in small businesses (see Appendix 5.3).

Appendix 5.4 provides detailed information regarding this aspect of the businesses surveyed. Figure 5.3 also shows some important aspects of IT/accounting utilisation rates.

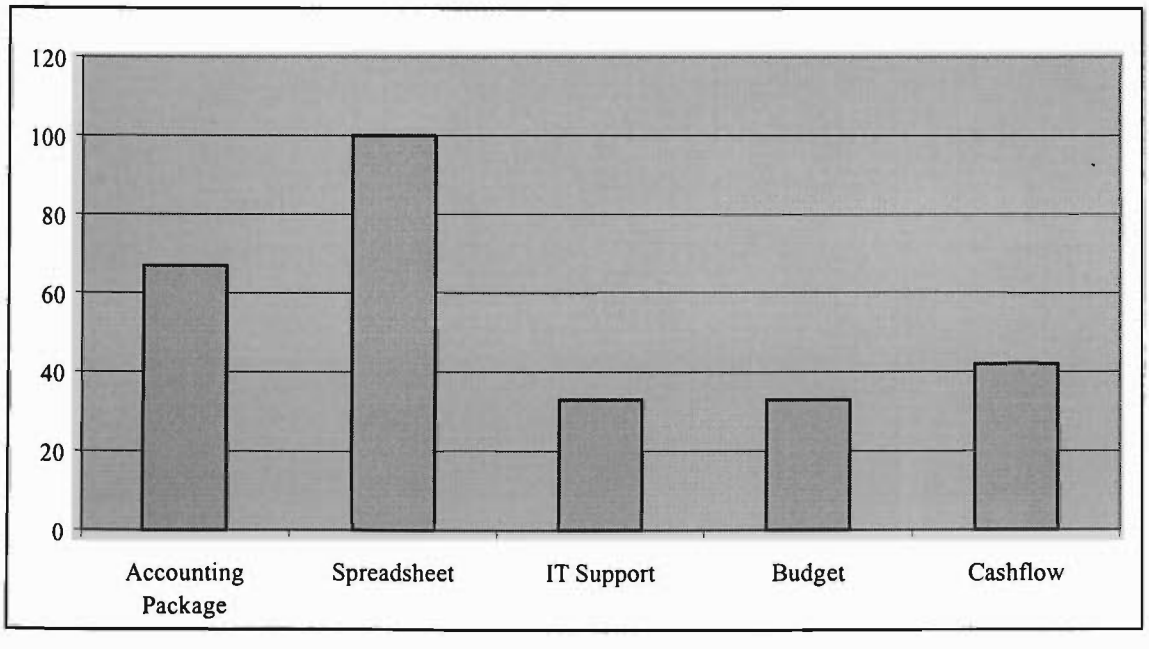


Figure 5.3
IT/Accounting Systems Utilisation Rate (%)

5.3.4 Risk Management Practices

The elements analysed here are mainly concerned with the use of insurance policies as a major tool of risk management and control. However, an attempt has been made to see whether the companies surveyed had also followed any other risk management and control system such as the development and maintenance of business continuity planning and back-up procedure.

Other than the mandatory third party insurance, all businesses had insurance cover in place before the incident for material damage including contents and stock. One small business had only material damage cover with no consequential loss cover in place. All the rest had business interruption cover (consequential loss or gross profit cover). But only 50% of the businesses that had losses had adequate insurance cover in place for both material damage and business interruption. In some cases, the level of inadequacy is as high as 70%.

A survey by CPA Australia (2003) shows that only 40% of small business had insurance cover for specific crisis such as loss of power or phone in place. This rate is as low as 28% when it comes risk preparedness for such incidents. Out of 12 businesses, only one medium business prepared a Business Continuity Plan (BCP) after the crisis that devastated its machinery and plant built over 30 years. Though the use of IT is widespread, only 41% of the companies surveyed follow regular back-up procedure.

Further to the table provided in Appendix 5.5, the following figure, Figure 5.4 shows a summary of the result.

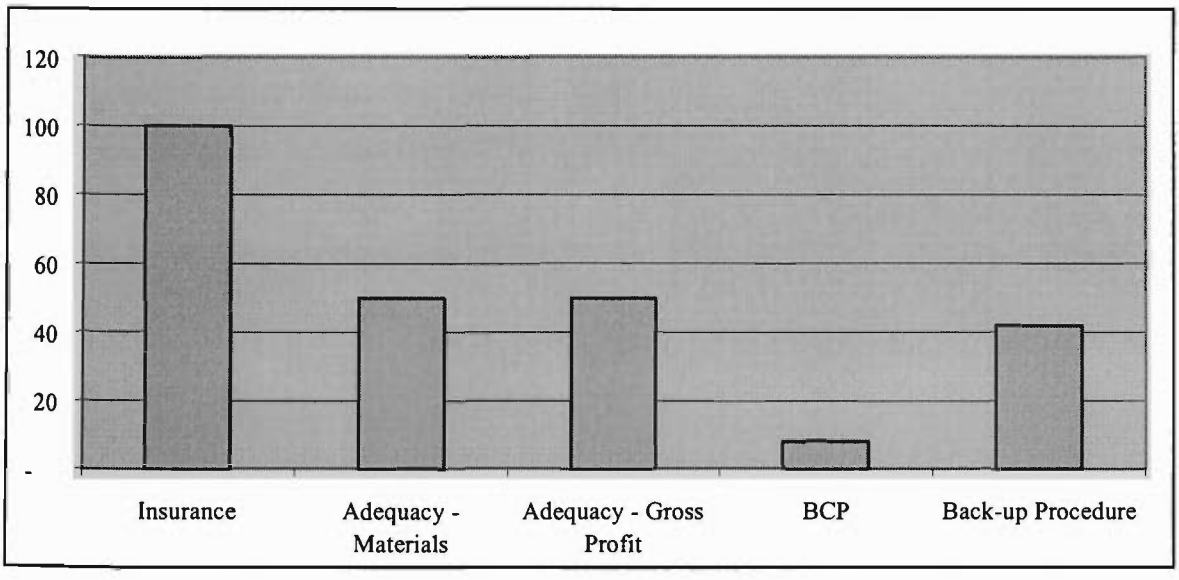


Figure 5.4
Risk Management Practices (%)

5.3.5 Nature of Disruption

The nature of disruption covers cause of incident, date of incident, level of damage, business shutdown, duration of shutdown, duration of disruption and previous incident during the past 10 years.

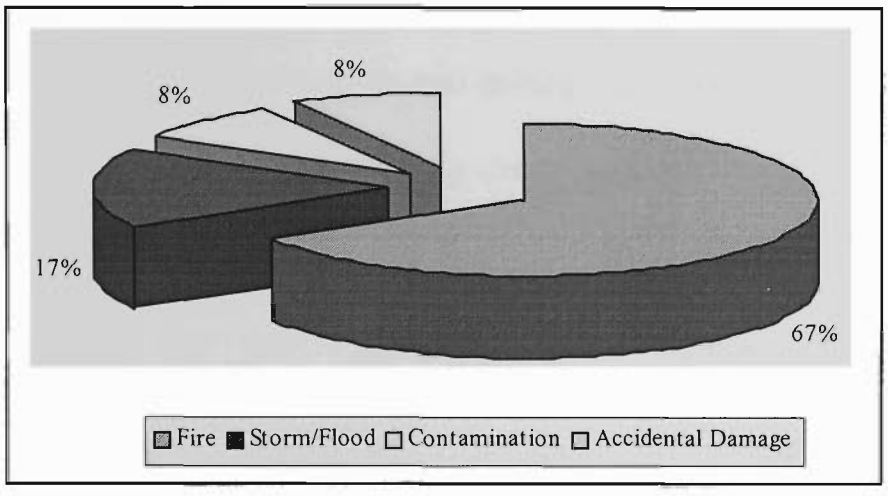


Figure 5.5
Cause of Crises

The level of material damage refers to the degree of the destruction of the physical assets and production or service facilities of the business and is classified as *minor damage/impact, medium damage/impact, severe damage/impact and total damage/impact.* The classification is based on some objective and subjective criteria such as the level of the destruction of the physical assets or their contribution to production or sales. The level of the impact of the damage refers to the consequential loss and follows the same classification. No quantifications were undertaken by either the owners/managers or the researcher in the classification processes.

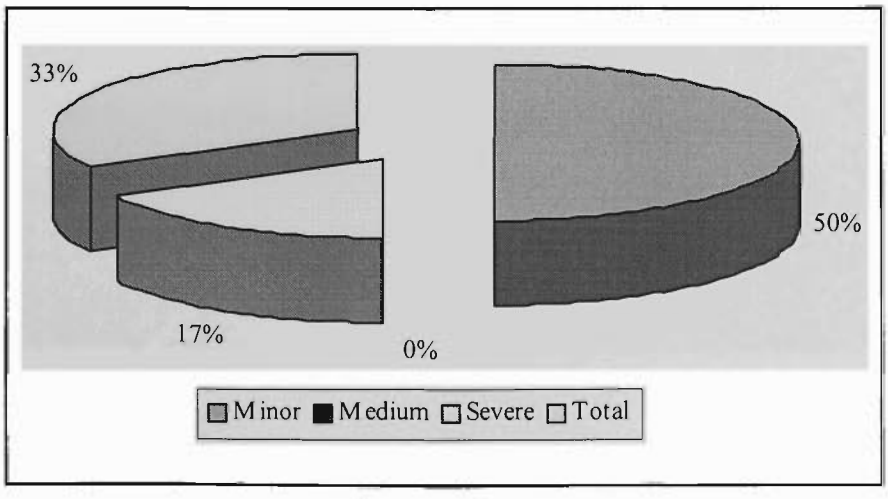


Figure 5.6
Level of Damage

The majority of the crises were caused by a fire and resulted in a major impact rangeing from severe to total damage, which means the closure of the business or the loss of control of the business by existing owners. Even a contamination, which had a very small impact on the productive assets of the business ended up causing a long closure of the business and the end of its operations in Australia. This shows that even minor damage can result in severe consequential losses unless it is controlled in one way or another. For sure in such circumstances the best strategy lies in preventing the event.

Nine out of twelve businesses were temporarily closed for a period of 1 to 9 months and their operations were disrupted for a significant period of time. In one case the business had not returned to normal operations after some 24 months. Further information is provided in Appendix 5.6. Also Figures 5.5 to 5.8 highlight some important characteristics of the nature of the disruptions occurred.

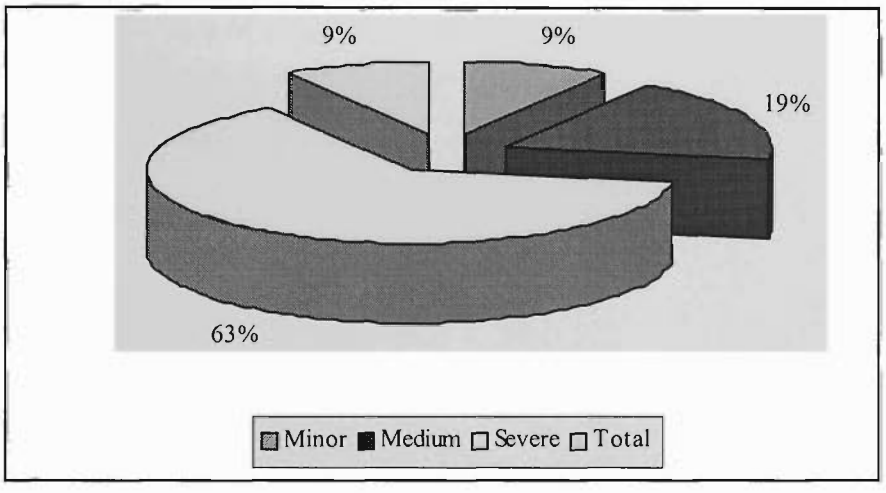


Figure 5.7
Level of Impact

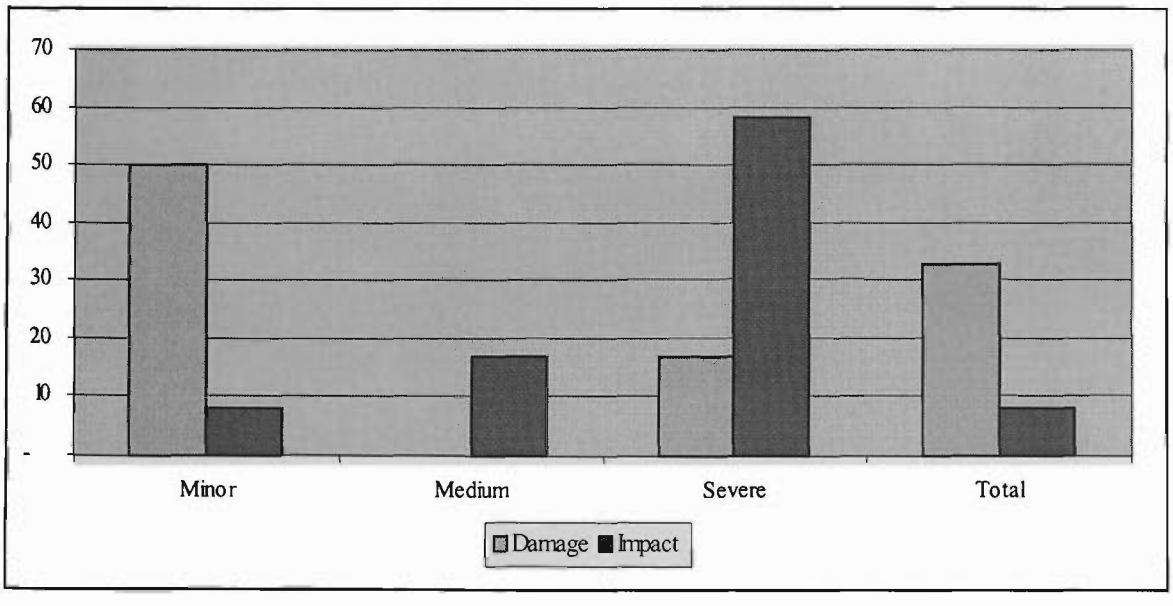


Figure 5.8
Damage vs Impact (%)

5.3.6 Financial and Other Crises

The crises encountered by the surveyed companies are measured here in terms of dollar losses of the materials damaged, consequential losses suffered and other losses such as loss of contract, loss of customers temporarily and permanently, product withdrawal, market withdrawal, supplier withdrawal and employee resignation. The table in Appendix 5.7 provides detailed information.

The overall loss suffered by the 12 businesses surveyed was estimated at $8.78 million in terms of physical assets destroyed or damaged and $8.80 million in consequential losses for the 12-month period following the incident. The consequential loss over a longer period of time will be much higher than this figure as in one case the whole value of the business was gone in 14 months after the fire.

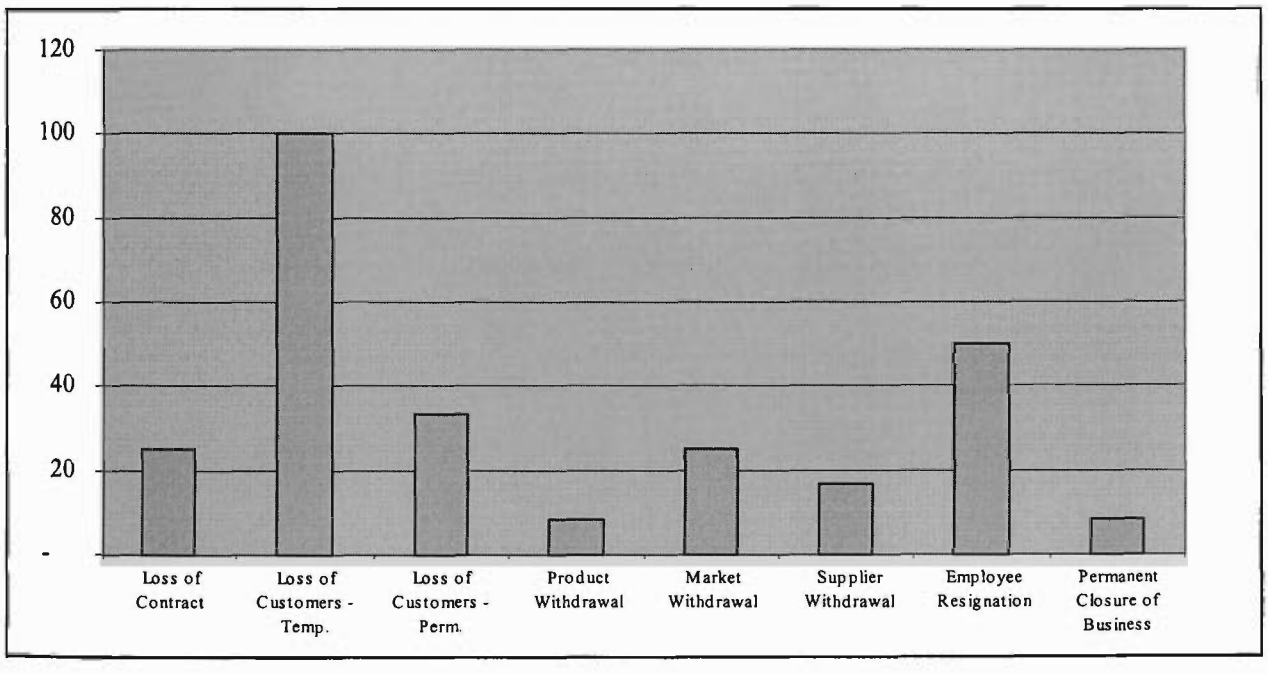


Figure 5.9
Impact of Crises (%)

The survey also shows that all the business organisations suffered from a loss of customers temporarily because they could not either serve them well or the customers did not like their products or services. It is also evident from Figure 5.9 that 25% of them lost contracts, 33.3% lost customers permanently, 8% had to withdraw some products, 25% withdrew from certain markets, 17% experienced supplier withdrawal and 50% lost key employees. One business had to move offshore and the other fell into the hands of an administrator/liquidator.

5.3.7 Crisis Management Practices

Here crisis management involves the actions taken in an attempt to mitigate losses that result from some sort of crisis. These actions include temporary business relocations, permanent relocation, machine hire, outsourcing, use of advertising or promotion, use of a public relation exercise, application of accounting/financial modeling, engagement of specialists (Appendix 5.8).

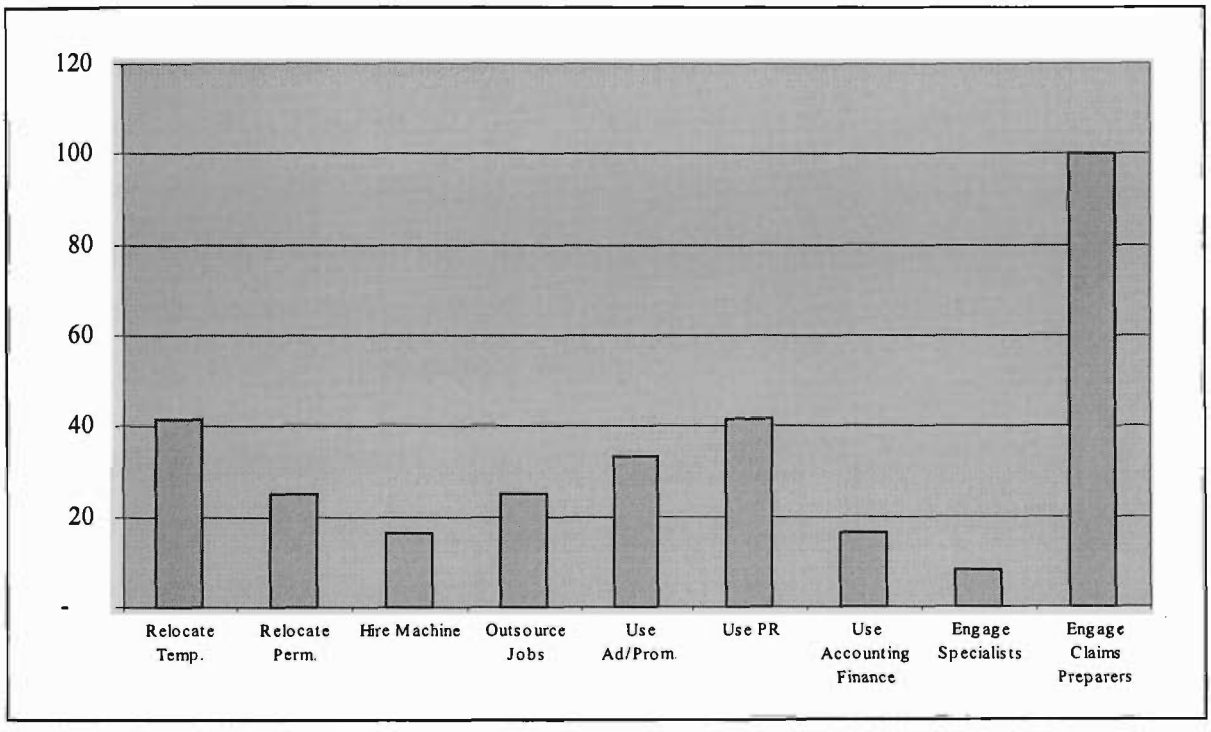


Figure 5.10
Crisis Management Strategies (%)

Apart from hiring claims preparers, the most common strategies adopted by the businesses surveyed were temporary relocation of business operations and use of advertising and promotion. The temporary relocations occurred in the case of fire damage and it is normal in such circumstances to move a business to suitable premises. Outsourcing is used where the businesses felt that the work could be done externally and the damage was also an isolated case. That is where the impact of the damage is limited to part of the production process.

Only 2 companies applied accounting or finance based techniques to help them with crisis management. Only one medium business approached a production specialist to fast track the production system and reinstate custom made tools and jigs. Further information is given in Figure 5.10 above.

5.4 Conclusion

The case studies in this chapter dealt with 12 small and medium sized business organisations that experienced financial and some other crises due to damage to their productive assets. The damage occurred between June 2001 and January 2003, but some of the SMEs are still in crises as at the time of writing this thesis (December 2004) due to the consequences of the damage that occurred more than 2 years ago.

All SMEs included in this survey chose insurance as a primary means of risk management control, but without adequate cover both in terms of material damage and business interruption loss. Only 4 out of the 12 SMEs had adequate cover for both material and consequential loss. Two other SMEs had full cover for material damage and another two had covered their gross profit adequately. This shows that there is a major gap between the desire of SMEs to use insurance as a risk management tool and their implementation of this important strategy.

Various businesses take different actions in managing crises, including temporary relocation, permanent relocation, hiring machines, outsourcing jobs, using stepped up advertising and marketing activities, applying a public relations exercise, use of accounting or financial modeling, and engagement of specialists. One common strategy adopted by all these businesses was the use of claims preparers in the event of insured losses, to help them with the preparation of their claim and recovery processes.

However, the case studies generally show that the SMEs involved in this survey operated under very difficult circumstances for varying degrees of time and with limited success. Except for a couple of SMEs, the rest suffered badly due to inadequate preparation for crisis and/or lack of effective and efficient approach to financial crisis management. As a result, the following three chapters will be dedicated to the development application of the instruments and strategies of the new approach.

Chapter 6
OPTIMISATION OF CASH FLOWS

6.1 Introduction

Following a loss of productive assets, SMEs need to manage their cash flows with maximum skills, due to the limited resources at their disposal and greater dependence on a single or few productive assets as shown in Chapter 5.

In the event of partial losses, it is quite common for SMEs (refer case studies) to continue to operate with limited products and services but with full costs. As a result, the marginal benefit of any savings in cash achieved through better management of cash flows is quite great and should be pursued with all means available to SMEs. The cash optimisation model is one of the major elements of the new crisis management approach developed in Chapters 2 and 3, and should be viewed as an instrument of crisis management planning intended to maintain a healthy cash balance (a target) during all phases of a crisis.

This chapter introduces cash optimisation and management techniques that can be used by SMEs during all phases of an abrupt financial crisis management period and probably beyond. Without the application of such tools, the impact of any financial crisis can be exacerbated and lead to the demise of the SMEs experiencing crisis. First, a general theory of optimisation will be presented, followed by a cash optimisation model and its application to the case studies presented in the previous chapter.

6.2 Optimisation Theory

In an optimisation problem, the decision maker tries to minimise or maximise important characteristics of a process within a problem such as revenue, cost or elapsed time, by an appropriate choice of decisions, which influence this process. For example, optimisation models are applied to problems such as budget allocations, manpower deployed, or quantities to be manufactured (Kallarth and Wilson 1997). Figure 6.1 shows the process of optimisation in a diagrammatic form.

From Figure 6.1, it is evident that optimisation models attempt to offer the best solution, which is here described as an optimal solution. Traditionally the test for optimality had not been always straightforward due to lack of computational capabilities. With the advent of desktop computing and various software, the calculation of an optimal solution and the test for optimality is now easier and affordable. It is important to note the significance and contribution of optimisation techniques such as linear programming in all sectors of Australian economy before the proliferation of information technology.

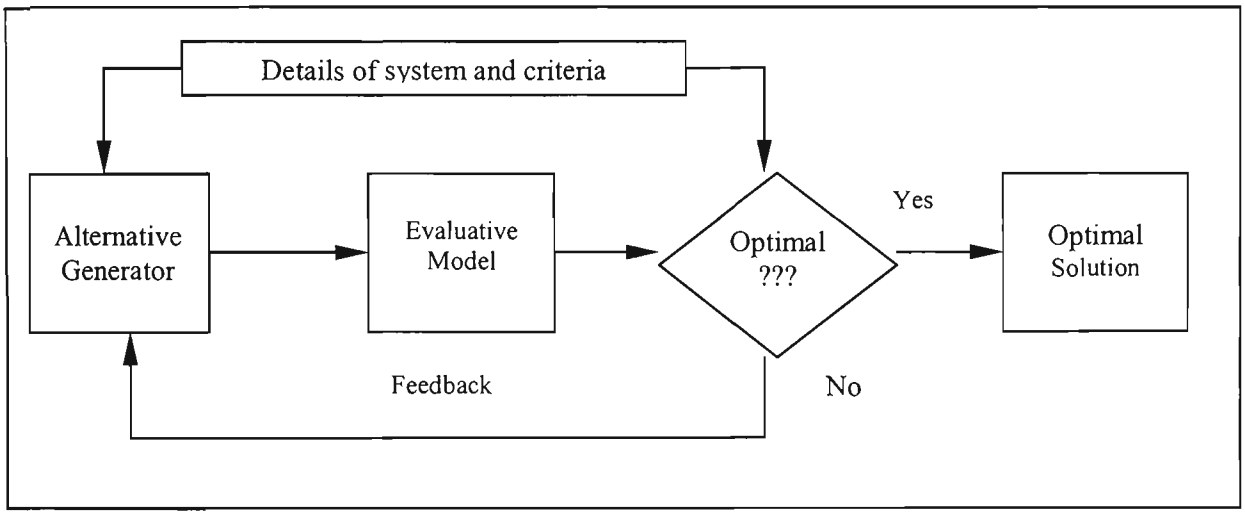


Figure 6.1
Optimisation Model

Financial optimisation as a field of management science is based on the theory of finance, which is basically the microeconomic theory that describes the pricing of both primary and derivative financial assets (Kallarth and Wilson 1997, Ragsdale 2001). Although the theory of finance is not as such intended to support non-average decision-making, financial modelling or optimisation techniques provide a straightforward framework for individual decisions.

The financial modelling framework, according to Spronk and Hallerbach (1997) involves: (i) listing of decision alternatives, which are assumed to be given and fixed; (ii) expressing each of these alternatives in terms of its associated cash flows and contingent claims in terms of well-defined probability distributions and/or stochastic processes; (iii) using the micro-economic valuation theories to find a (market) price tag for every alternative; and (iv) choosing the alternative with the highest market value.

The same authors also argue that the above framework implies that the roles of financial modelling are:

1) To get a better idea of the set of alternative decision strategies, ie. to get insight into the feasibility of different strategies and possibly also to generate new alternatives.

2) To clarify the relations between decision alternatives and the (potential) results of these alternatives. This may vary from the assessment of probabilities through simulation and econometric techniques to the identification of sources of risk and estimating response parameters.

3) To help find a (set of) suitable stream(s) of decision alternatives. Depending on the problem characteristics this may vary from searching feasible solutions to constructing a partial ordering of the set of alternatives to the construction of a complete ordering of the alternatives.

The above discussion of the framework and roles of financial modelling shows that it involves mathematics, econometrics, accounting, simulation and heuristics, and decision support techniques. Financial optimisation techniques are prescriptive in nature (normatively orientated) as they concentrate on building instruments that dictate decision-making behaviour unlike positive theories such as microeconomic theory that tends to describe the consequences of alternative courses of actions.

It is obvious that decision makers that cannot understand or do not know the consequences of various alternatives are not expected to make a decision that leads to the fulfilment of their objectives. As financial modelling benefits from positive theories in building valid and effective optimisation models, positive theories also benefit from the process and experience of mathematical modelling.

All mathematical models are not normative in nature as they are generally classified into three categories of modelling techniques: prescriptive models, predictive models and descriptive models (Render et al 2003).

Prescriptive models tell the decision maker that a certain course of action is superior to the rest of the alternative courses of actions and should be chosen. In other words such models follow normative financial economic theories and attempt to make value judgements.

Predictive models do not tell the decision maker which alternative course of action is desirable but indicate what outcome will be achieved if certain action is taken. More specifically, the objective of such models is to predict the value of the dependent variable, say Y for certain independent variables $x_1, x_2, x_3, \ldots x_n$. These models are based on positive theories.

Descriptive models attempt to describe the outcome of a given set of independent variables based on an uncertain decision environment. In other words, the independent variables can take different values under different circumstances and the models attempt to furnish the decision maker with different pictures that can come about as a result of unknown or changing independent variables. Like the previous category of mathematical models, descriptive models are based on positive theories.

Ragsdale (2001) states that mathematical programming is a filed of management science that finds the optimal, or most efficient, way of using limited resources to achieve the objectives of an individual or a business. For this reason, mathematical programming is often referred to as an optimisation. Cash flow optimisation models should be viewed in this context and applied to problems SMEs encounter during an abrupt financial crisis.

6.3 Optimisation of Cash Flows

On the basis of the previous discussion of optimisation theory and practice, it is now easier to understand the role of optimisation models in relation to the management of cash flows. The following sections of this chapter are devoted to the estimation and optimisation of cash flows during an abrupt financial crisis.

6.3.1 The Essence of Cash Flow Management

All business entities receive inflows of cash and need to make cash payments. Because the inflows and outflows will not automatically be matched in time and amount, the company's cash position must be forecast, monitored and managed. If this is not done, the following situations are likely to arise.

1) If the outflows exceed the inflows, then the company will need to borrow money to make payments, or else postpone payment. If it borrows money, it

will need to pay interest and probably fees. Alternatively, if payment is postponed, the likely result is disruption to its business and/or damage to its financial reputation.

2) If the inflows exceed the outflows, resulting in a large cash balance, then the company is failing to make the best use of its resources. The net funds obtained could be invested to earn interest or used to reduce the company's debt.

In short, the essence of cash management is to ensure that the company has adequate liquid resources to make cash payments as the need arises, without holding such a high level of liquid assets that the company's resources are used inefficiently. This balance is achieved by first forecasting the likely patterns of cash inflows and outflows and then adopting an appropriate mix of cash, liquid assets and short-term borrowing (Macks 1997).

Shapiro and Balbirer (2000) provide the objectives of cash management as: (i) bringing the company's cash resources within control as quickly and efficiently as possible; and (ii) achieving the optimum conservation and utilisation of these funds. They further argue that apart from cash planning and budgeting, cash management should focus on four key areas: (i) collecting funds; (ii) disbursing funds; (iii) setting an optimal level of cash balance; and (iv) investing excess funds.

It is also essential to note that economic entities have different motives for holding cash or liquid assets. The conventional classification of motives, often attributed to Keynes, divides the motives into three groups: transaction motives, precautionary motives and speculative motives.

For most companies, transaction-based motives are the dominant influences and are therefore the focus of this research. It should also be noted that in this thesis cash and liquid assets are interchangeably used and liquid assets generally comprise cash and assets which can be converted into cash in a very short time and whose value can be predicted with a high degree of certainty (Van Horne et al. 1990).

A recent study by Briggs and Singh (2000) provides a different perspective of cash management in that it states that in a world with no transaction costs, there is no incentive for a firm to hold cash or other liquid assets because cash deficiencies could be handled through derivative contracts, etc. However, if there is a cost to lack of liquidity, then the

firm has to balance the marginal cost of being liquidity-deficient to the marginal cost of holding cash. The optimal cash model in such an event is an interplay of three factors: (i) the cost of holding cash, balanced against; (ii) the benefit of reducing leverage; or (iii) the ability to meet liquidity needs through other means, such as derivative use.

From a SME's point of view, the activities of cash management as identified by Shapiro and Balbirer (2000) and other authors (Hughes and Storey 1994; Gaujers, Harper and Browne 1999) are not only valid but they are also very important in the event of an abrupt financial crisis as cash becomes scarcer and more unpredictable in terms of pattern and level. The following subsection will present a typical cash flow problem encountered by SMEs in crisis mode.

6.3.2 Cash Flow Problem and Impact of Abrupt Crisis

The following problem is drawn from the case studies presented in Chapter 5 and provides an insight into cash flow problems experienced by SMEs in the event of an abrupt financial crisis and the impact of such unfortunate incidents. It also sets the scene for the necessary financial optimisation models and tools to be developed in the next section of this chapter.

6.3.2.1 ***The Cash Flow Problem (Hypothetical Case)***

Blackberry Pty Ltd is a small family business owned and managed by Mr. Joe Bloggs. The company is involved in the production and sale of packaging products for local consumptions in Australia. On 1st March 2004 around 7 p.m., a fire started in the control unit of the main printing machine and caused significant damage before staff members who were on duty during the afternoon shift were able to put it out. Normally, this machine produces 60% of the total output.

Mr. Bloggs immediately appointed a firm of forensic engineers to investigate and report the cause of accident. The forensic report was expected to take about two weeks and cost $12,500. Another electrical and mechanical engineering firm was also appointed to assess the extent of the damage and to make a recommendation whether the machine should be repaired or replaced. The cost of this service was quoted at $15,000. Blackberry had already received a tax invoice for $3,500 for the disconnection of all electrical wires from the damaged machine and safety checkup of all other machines, electrical instruments and connections. All costs are quoted net of GST.

At the time of the fire, the company's bank balance was $50,000 in credit. The company's cash inflow from cash sales and accounts receivable is on average $80,000 per week. The accounts receivable rarely move. Blackberry spends on average $25,000 on direct material and factory supplies, and $20,000 on operating expenses including factory overheads. The cost of payroll is $15,000 per week for all staff. Depreciation is estimated at $10,000 per week. The company adopts a 50-week operating period per annum.

Mr. Bloggs, with the help of his accountant assessed the impact of the damage and expected a reduction in the cash flow of the business by up to 70%. The impact on the cash flow was assessed to be higher than the reduction of 60% of the output from this machine due to the relative value and complimentary products disrupted by the fire. The loss of sales was expected to increase unless the company is able to adopt some loss mitigation strategies within a short period of time. The accountant also advised Mr. Bloggs that the disruption would result in savings of $5,000 per week in overheads. The savings were a result of semi-variability of some operating expenses that are generally classified as fixed. Cost of depreciation would drop by 50%.

Blackberry had a commercial insurance policy in place at the time of the fire covering material damage and consequential loss for a period of 12 months. The Insurer appointed a loss adjuster and promised to make a global payment of $50,000 upon acceptance of a liability arising out of the insured peril, the fire that occurred on 1st March 2004.

Following an investigation of the fire and a review of the book of accounts, the Insurer accepted a liability and paid the promised sum amount of money at the end of the fourth week and agreed to make further payments of $50,000 per month at the end of May and June provided that the risk was adequately covered. In case the level of the cover was below 100%, the Insurer stated that it was entitled to reduce the payment proportionately.

The company had previous arrangement with its bank to invest surplus cash with four different options: (i) 24 hour at call account at 3.5% p.a.; (ii) 30-day cash management account at 4.5% p.a.; (iii) 60-day cash management account at 5% p.a.; and (iv) 90-day cash management account at 5.25% p.a. The company's main business cheque account is linked to Mr. Blogg's personal mortgage account with a redraw facility up to $200,000. This facility attracts a 6.75% standard variable rate.

Mr. Bloggs asked his Finance Manager to develop: (i) detailed weekly cash flow statements for the next three months from the date of the fire; and (ii) a cash management model that could be used to ensure the optimum utilisation of the company's cash flows.

Before making any attempt to develop the appropriate cash flow projection and optimal solution for the above problem, it is imperative to identify the key variables, estimate the free cash flow (FCF) before and after the fire incident, and assess the impact of the crisis. Benniga (2000) describes FCF as the cash produced by a business without taking into account the way the business is financed.

Table 6.1 provides the necessary information in relation to the key variables that help in measuring FCF and the crisis impact. The FCF can be measured in different ways and in this research the following approach is adopted.

Table 6.1 Crisis Impact Analysis ($ per week)

Key Variables	*Pre-Incident*	*Post-Incident*
Sales	80,000	24,000
Less - Cost of Sales	25,000	7,500
Gross Margin	55,000	16,500
Rate of Gross Margin	68.75%	68.75%
Less Expenses		
Payroll	15,000	15,000
Operating Expenses	20,000	15,000
Depreciation	10,000	5,000
Total Expenses	45,000	35,000
EBIT	10,000	-18,500
Add Depreciation	10,000	5,000
Net Cash Flows	20,000	-13,500

In addition to the above table, it is also essential to construct a table for the purpose of identifying and summarising the direct costs of the crisis. These costs are generally one-off in nature and include all expenses incurred as a direct result of the incident. The cost of the productive asset(s) damaged or destroyed is also treated as part of the direct cost of a crisis but will not be considered here, as detailed analysis is provided in the following chapter. For the purpose of developing cash flow projections, the direct costs of crisis are summarised in Table 6.2.

Table 6.2 The Direct Costs of Crisis

Details	*Cost ($)*
Electrical Work	3,500
Forensic Engineering	12,500
Electrical/Mechanical Engineering	15,000
Total	31,000

The direct of the cost of crisis is based on the cash flow problem and will help in the development of a detailed cash flow projection as requested by Mr. Joe Bloggs of Blackberry Pty Ltd.

The cash flow projections presented in Table 6.3 covers the first three months of the crisis period and is designed on the basis of traditional cash flow statements. It also includes an additional section (as shown from rows 9 to 15) to facilitate the capturing of the direct costs of the crisis. This format is quite helpful in identifying and costing activities that are directly related to the crisis and help the overall financial management of SMEs during the crisis. The blank lines (8, 12-15) are provided to show that a modeler can add additional items depending on the size and complexity of the cash flow problem to be projected and/or optimised.

The cash flow problem and the tables extracted from the information provided, show the following major points:

1) The immediate impact of the damage is a reduction of 70% in sales but 167.5% in terms of cash flows. In other words, operating expenses reduce at a much higher rate given the fixed nature of various business expenses and resulting in negative cash inflows starting from the beginning of the crisis. In the case of the above problem, the business used to produce a positive cash flow of $20,000 per week prior to the crisis and this has reduced to negative $13,500 after the crisis.

2) The cash flow projection spreadsheet reflects the practices of the majority of the SMEs covered by the case studies in that the available cash can only cover about two weeks of operations with limited trading opportunities.

Table 6.3 Cash Flow Projections for the 13 Weeks Ending 01/07/04 ($)

Item	*Details*	*08/04/04 Week 1*	*15/04/04 Week 2*	*22/04/04 Week 3*	*29/04/04 Week 4*	*06/05/04 Week 5*	*13/05/04 Week 6*	*20/05/04 Week 7*	*27/05/04 Week 8*	*03/06/04 Week 9*	*10/06/04 Week 10*	*17/06/04 Week 11*	*24/06/04 Week 12*	*01/07/04 Week 13*
1	Opening Balance	50,000	33,000	7,000	- 21,500	15,000	1,500	- 12,000	- 25,500	11,000	- 2,500	- 16,000	- 29,500	7,000
	Add Cash Inflows													
2	Cash from sales	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
3	Cash from insurance				50,000				50,000				50,000	
4	Cash from other sources													
	Total Cash Inflows	24,000	24,000	24,000	74,000	24,000	24,000	24,000	74,000	24,000	24,000	24,000	74,000	24,000
	Less Cash Outflows													
	Cost of Sales and Expenses:													
5	Cost of Sales	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
6	Operating Expenses	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
7	Payroll	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
8														
		37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500
	Direct Cost of Crisis													
9	Electrical work	3,500												
10	Forensic Engineering		12,500											
11	Electrical/Mechanical Engineering			15,000										
12														
13														
14														
15														
		3,500	12,500	15,000	-	-	-	-	-	-	-	-	-	-
	Total Cash Outflows	41,000	50,000	52,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500	37,500
	Net Cash Inflows/-Outflows	- 17,000	- 26,000	- 28,500	36,500	- 13,500	- 13,500	- 13,500	36,500	- 13,500	- 13,500	- 13,500	36,500	- 13,500
	Closing Balance	33,000	7,000	- 21,500	15,000	1,500	- 12,000	- 25,500	11,000	- 2,500	- 16,000	- 29,500	7,000	- 6,500

1) Without some drastic measures such as retrenchment and or capital injection by the owners, any SMEs in such a cash flow situation cannot continue to trade beyond the first two to three weeks as it is no longer financially viable and legally permissible due to the obligations imposed on directors by the Corporation Law to refrain from trading when debts can no longer be met.

2) It is also interesting to see that insurance proceeds can help the business keep afloat provided that there is adequate business interruption insurance (also know as consequential loss) in place. Further discussion on this aspect of crisis management strategy will be provided in Chapter 8.

3) The cash flow projection spreadsheet is **a diagnostic tool** only in that the financial manager needs other tools and strategies to overcome the cash flow problem as identified by the diagnostic tool. In these circumstances, the goal of the financial manager is to maximise the inflows or to minimise the outflows in order to achieve a better result than what is shown at the end of the three-month period, that is a balance of negative $6,500.

It is also essential to design the above spreadsheet in such a way that **a sensitivity analysis** can be made without too much trouble. In Subsection 6.3.5.3, this technique will be applied in order to be able to monitor cash flows under different scenarios that might arise as a result of risk and uncertainties inherent in any business operations.

The following section deals with the development of the appropriate cash optimisation model and its application to the cash flow problem as identified by the cash flow projection spreadsheet and discussed so far in this chapter.

6.3.3 Cash Flow Optimisation Modelling

As was discussed in the previous chapters of this thesis, one of the objectives of this research is to identify and develop a cash optimisation model that can be applied in the event of an abrupt financial crisis encountered by SMEs.

To this end, first a single period financial optimisation model will be introduced, followed by multi-period or dynamic programming model. In both cases, linearity is assumed in order to minimise complications in the presentation and analysis of cash flow problems of SMEs in an abrupt financial crisis.

With minor modification to Mulvey (2001) and taking into account the comments by Kono and Yamazaki (1991), a simple optimisation model for a single investment period (it should be noted that this model is applicable both to cash management problem and other investment decisions) with a fixed horizon date can be re-expressed as follows (see Equation 4.1):

$$\text{maximise} \quad f(x) = (1-\eta)Z_1 - \eta Z_2 \tag{6.1}$$

$$\text{subject to}: \quad Z_1 = \sum_s p_s v^s \qquad \text{(expected wealth)}$$

$$Z_2 = \sum_s p_s \mid v^s - Z_1 \mid \qquad \text{(variance of wealth)}$$

$$\sum_j x_j = w_1$$

where: w_1 = wealth at the beginning of time period 1;

η = tradeoff parameters for return and risk objectives; and

v^s = $\Sigma\, r^s_j x_j$ wealth under senario s, end period 1.

While the above model can be successfully applied to finding an optimal solution to cash flow problems, it is not suitable in this case as it is concerned with a single period instead of multi-period cash flow problem that SMEs encounter in crisis mode.

For a multi-period cash flow problem, the model developed by Thompson and Thore (1996) provides a better solution to the cash flow problem discussed in the previous section, as it focuses on the optimum utilisation of cash involving more than one period. In this model, the financial manager attempts to maximise the cash holding at the end of the planning horizon for a portfolio of a number of short-term claims and short-term debts. In other words, the model attempts to address the optimal maturity structure of a portfolio under a condition of certainty by investing surplus cash and borrowing when there is no sufficient fund to meet obligations. Borrowings can take place when there is even sufficient fund in order to take advantage of interest differentials.

Thomson and Thore (1996) express their model as follows:

maximise: $P - L$ (6.2)

subject to:

$$\sum_{s=1}^{t-1}(1+r_{st})x_{st} + \sum_{s=t+1}^{n}(1-r_{st})x_{st} - \sum_{s=1}^{t-1}x_{ts} - \sum_{s=t+1}^{n}x_{ts} = -a_t + b_t$$

$$t = 1, \ldots\ldots\ldots, n\text{-}1$$

$$\sum_{s=1}^{n-1}(1+r_{sn})x_{sn} + \sum_{s=1}^{n-1}x_{sn} - P - L = -a_n + b_n$$

$$x_{st} > 0,\ s,\ t = 1, \ldots\ldots\ldots, n$$

$$P,\ L > 0$$

where:

$s,t = 1, \ldots, n$	Indices of time periods, n is the last period (the planning horizon)
x_{st} *with* $s < t$	Purchases of claim (lending) in time period s, maturing in time period, t
r_{st} *with* $s < t$	Rate of interest obtained from investment x_{st}, $s < t$ (calculated over t-s time periods)
x_{st} *with* $s > t$	Issue of debt (borrowing) in time period t falling due in period s
r_{st} *with* $s > t$	Rate of interest charged on debt issued in period t and falling due in period s (calculated over s-t periods)
a_t	Cash receipts in period t
b_t	Cash outlays in period t
P, L	P is the total build-up of cash available in period n *(P=Profit)*, and a negative accumulation of cash is denoted L *(L=Loss)*.

The above models include four key elements:

1) Objective function: identifies some function of the decision variables that the decision maker wants to either **maximise** or **minimise**. Objective functions are always shown in the form of *Max* or *Min:* $f(x_1,x_2,x_3,\ldots x_n)$. In case of the cash flow problem presented in the previous section, the objective function is to maximise the closing cash balance at the end of the three-month period.

2) Variables: represent the degree freedom or the decision to be made with the help of the model. For example, the amount of money that should be invested in various securities, the number of man-hours needed for different products,

etc. In optimisation models, a variable can take different numerical values (continuous, semi-continuous, binary or integer). Variables are mostly expressed in the form of $x_1, x_2, x_3 \ldots x_n$ but can also be represented by any other alphabetical characters. The cash flow problem to be optimised using this model involves two main variables the investment and borrowing vehicles that can be manipulated to allow the optimum utilisation of cash.

3) Data or parameters represent costs or demands, fixed operating conditions of a reactor, capacities of plants and so on. The cash flow projection spreadsheet provides various data needed to build the model including receipts and payments to be made during various weeks.

4) Constraints define the mathematical relationships represented by the optimisation model and are generally expressed in three different ways: (i) less than or equal to constraints (≤); (ii) greater than or equal to constraints (≥); and (iii) equal to constraints (=). The main constraints in the cash flow problem are the minimum commitments to be met on a weekly basis as shown in the cash flow projection spreadsheet.

From Table 6.3, the various receipts and payments that are required to build the cash optimisation model can be extracted including the borrowing and lending rates provided in the cash flow problem of Blackberry Pty Ltd. The lending rates are summarised in Table 6.4 below for ease of reference. It should be noted that a 30-day period is converted approximately into a 4-week period. So is the 60-day and 90-day period.

Table 6.4 Lending (Investment) Rates

Investment Options	*Days*	*Rate p.a. (%)*	*Weeks*	*Adjusted Rate (%)*
A	7 (7 x 24 Hour)	3.50	1	0.067
B	30	4.50	4	0.346
C	60	5.00	8	0.769
D	90	5.25	13	1.312

The borrowing rate for this purpose is provided as 6.75% p.a. and can be adjusted to reflect the above time period to simplify the construction of the cash optimisation model. The derivatives of the borrowing rates are given in Table 6.5. The conversion of days in to weeks is done on the same basis as above.

Table 6.5 Borrowing Rates

Borrowing Option	*Days*	*Weeks*	*Adjusted Rate (%)*
W	7	1	0.130
X	30	4	0.519
Y	60	8	1.038
Z	90	13	1.688

The above interest rates provide the various alternatives that the finance manager can choose from for the purpose of investing receipts and borrowing funds at the beginning of each period in order to ensure the optimum utilisation of cash during the planning horizon. Optimisation of cash is defined here as the maximisation of the cash balance at the end of the planning horizon.

As was stated in Chapter 4, the optimisation program to be used here is a standard version of Solver, which is part of the Microsoft Excel spreadsheet program. To methodically solve the above problem and establish the basis for further cash flow analysis related to the case studies, the following steps will be discussed here in detail but will not be repeated later in this chapter to avoid repetition. These steps are: (i) defining the objective function; (ii) defining the decision variables; (iii) defining the constraints, (iv) implementing the model; (v) solving the model; and (vi) analysing the solution. These steps follow the approach adopted by Ragsdale (2001).

*6.3.3.1 **Defining the Objective Function***

The objective function of the cash flow problem is to maximise the cash on hand at the end of the planning horizon by investing receipts in the investment vehicle(s) that yield the maximum return and borrowing at the rate that minimises the total interest payouts. Even though the rate is constant in this case, the principle for general and future applications must be established. In short, the objective is to maximise the difference between the sum of all net weekly receipts (represented by *A, B, C* and *D*) and the sum of all net weekly payments (represented by *W, X, Y* and *Z*) at the end of the three months. Mathematically, the objective function is:

maximise $A+B+C+D - W-X-Y-Z$

6.3.3.2 *Defining the Decision Variables*

The Finance Manager of Blackberry Pty Ltd needs to decide how much cash to invest in each investment vehicle during each time period, when the investment opportunities are available, and how much to borrow for how long whenever it is necessary to do so. To this end, each investment and borrowing for each different time period must be represented by different variables. This can be achieved as shown in Table 6.6.

Table 6.6 Decision Variables for Investments (Lending)

Variables	*Description of Variables*
$A_1, A_2, A_3, \ldots, A_{12}$	The amount of cash placed in investment *'A'* at the beginning of weeks 1, 2, 3, ..., 12, respectively.
$B_1, B_2, B_3, \ldots, B_9$	The amount of cash placed in investment 'B' at the beginning of weeks 1,2,3,..., 9, respectively. Since the maturity takes 4 weeks it is not possible to place any cash in investment *'B'* after Week 9.
C_1, C_2, C_3, C_4 *and* C_5	The amount of cash placed in investment *'C'* at the beginning of weeks 1, 2, 3, 4 and 5, respectively. No investment can be placed after Week 5.
D_1	The amount of cash placed in investment *'D'* at the beginning of Week 1.

In the following Table 6.7, decision variables with respect to borrowing are provided as part of Step 2.

Table 6.7 Decision Variables for Borrowing

Variables	*Description of Variables*
$W_1, W_2, W_3, \ldots, W_{12}$	The amount of cash that can be borrowed using loan vehicle *'W'* at the beginning of weeks 1, 2, 3, ..., 12, respectively.
$X_1, X_2, X_3, \ldots, X_9$	The amount of cash that can be borrowed using loan vehicle *'X'* at the beginning of weeks 1, 2, 3, ..., 9, respectively. Since this loan matures in 4 weeks it is not possible to borrow using this term after Week 9.
Y_1, Y_2, Y_3, Y_4 *and* Y_5	The amount of cash that can be borrowed using loan vehicle *'Y'* at the beginning of weeks 1, 2, 3, 4 and 5, respectively. No borrowing can be made on this term after Week 5.
Z_1	The amount of cash that can be borrowed using loan vehicle *'Z'* at the beginning of Week 1.

6.3.3.3 Defining the Constraints

To formulate the cash flow constraints for this problem it is important to clearly identify: (i) when the different investments or borrowings can be made; (ii) when the different investments or borrowing will mature; (iii) how much money will be available when each investment matures; and (iv) how much money should be borrowed when there is no sufficient cash to meet obligations or when it is financially sensible to do so. Table 6.8 is constructed to provide this information.

From this table, it is imperative to note that the negative values represented by –1 indicate when funds flow out of the system to be invested in the investment vehicle available during that time period. The positive values show the funds that flow into the system because money that was already invested has matured or borrowing has taken place in order to meet obligations. For example, the very first line indicates that the finance manager can invest in A at time 1 based on the expectation that this investment will mature at time 2. The value of this investment at time 2 is expected to be 1.00067.

The very first line that starts with 'W' represents a borrowing that can be made at time 1 but matures at time 2. The figure 0.99870 shows that the finance manager needs more than $1 in order to meet an obligation worth $1 due to interest factor. All the other fields represented by '0' (zero) indicate that there are neither investments nor borrowings. They simply mean that money is locked out somewhere outside the system.

The last row in Table 6.8 also shows the final constraints that can be imposed upon the mathematical programming model from week to week. For example, at the end of Week 1, which is also the beginning of Week 2, there is a surplus amount of $33,000 (including opening balance). If there are no other restrictions, the finance manager has the choice to invest the whole or part of this money in one or more of the investment vehicles available during the week. On the other hand, if the company policy imposes that a certain amount of money should always be maintained in the bank account, then this additional constraint needs to be imposed.

At the end of Week 2, the cash flow shows that the company is in deficit by $26,000. Once again the finance manager needs to borrow in full in order to meet the company's obligations unless there is a policy that prevents him borrowing at all or more than a certain amount or on certain terms.

Table 6.8 Cash Inflow and Outflow Constraints ($ '000)

			Investment/Borrowing Period Ended Week:												
Variable	*Start Week*	*Mature Week*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
A	1	2	-1	1.00067	0	0	0	0	0	0	0	0	0	0	0
B	1	5	-1	0	0	0	1.00346	0	0	0	0	0	0	0	0
C	1	9	-1	0	0	0	0	0	0	0	1.00769	0	0	0	0
D	1	13	-1	0	0	0	0	0	0	0	0	0	0	0	1.01312
A	2	3	0	-1	1.00067	0	0	0	0	0	0	0	0	0	0
B	2	6	0	-1	0	0	0	1.00346	0	0	0	0	0	0	0
C	2	10	0	-1	0	0	0	0	0	0	0	1.00769	0	0	0
A	3	4	0	0	-1	1.00067	0	0	0	0	0	0	0	0	0
B	3	7	0	0	-1	0	0	0	1.00346	0	0	0	0	0	0
C	3	11	0	0	-1	0	0	0	0	0	0	0	1.00769	0	0
A	4	5	0	0	0	-1	1.00067	0	0	0	0	0	0	0	0
B	4	8	0	0	0	-1	0	0	0	1.00346	0	0	0	0	0
C	4	12	0	0	0	-1	0	0	0	0	0	0	0	1.00769	0
A	5	6	0	0	0	0	-1	1.00067	0	0	0	0	0	0	0
B	5	9	0	0	0	0	-1	0	0	0	1.00346	0	0	0	0
C	5	13	0	0	0	0	-1	0	0	0	0	0	0	0	1.00769
A	6	7	0	0	0	0	0	-1	1.00067	0	0	0	0	0	0
B	6	10	0	0	0	0	0	-1	0	0	0	1.00346	0	0	0
A	7	8	0	0	0	0	0	0	-1	1.00067	0	0	0	0	0
B	7	11	0	0	0	0	0	0	-1	0	0	0	1.00346	0	0
A	8	9	0	0	0	0	0	0	0	-1	1.00067	0	0	0	0
B	8	12	0	0	0	0	0	0	0	-1	0	0	0	1.00346	0
A	9	10	0	0	0	0	0	0	0	0	-1	1.00067	0	0	0
B	9	13	0	0	0	0	0	0	0	0	-1	0	0	0	1.00346
A	10	11	0	0	0	0	0	0	0	0	0	-1	1.00067	0	0
A	11	12	0	0	0	0	0	0	0	0	0	0	-1	1.00067	0
A	12	13	0	0	0	0	0	0	0	0	0	0	0	-1	1.00067
W	1	2	0.99870	-1	0	0	0	0	0	0	0	0	0	0	0
X	1	5	0.99481	0	0	0	-1	0	0	0	0	0	0	0	0
Y	1	9	0.98962	0	0	0	0	0	0	0	-1	0	0	0	0
Z	1	13	0.98312	0	0	0	0	0	0	0	0	0	0	0	-1
W	2	3	0	0.99870	-1	0	0	0	0	0	0	0	0	0	0
X	2	6	0	0.99481	0	0	0	-1	0	0	0	0	0	0	0
Y	2	10	0	0.98962	0	0	0	0	0	0	0	-1	0	0	0
W	3	4	0	0	0.99870	-1	0	0	0	0	0	0	0	0	0
X	3	7	0	0	0.99481	0	0	0	-1	0	0	0	0	0	0
Y	3	11	0	0	0.98962	0	0	0	0	0	0	0	-1	0	0
W	4	5	0	0	0	0.99870	-1	0	0	0	0	0	0	0	0
X	4	8	0	0	0	0.99481	0	0	0	-1	0	0	0	0	0
Y	4	12	0	0	0	0.98962	0	0	0	0	0	0	0	-1	0
W	5	6	0	0	0	0	0.99870	-1	0	0	0	0	0	0	0
X	5	9	0	0	0	0	0.99481	0	0	0	-1	0	0	0	0
Y	5	13	0	0	0	0	0.98962	0	0	0	0	0	0	0	-1
W	6	7	0	0	0	0	0	0.99870	-1	0	0	0	0	0	0
X	6	10	0	0	0	0	0	0.99481	0	0	0	-1	0	0	0
W	7	8	0	0	0	0	0	0	0.99870	-1	0	0	0	0	0
X	7	11	0	0	0	0	0	0	0.99481	0	0	0	-1	0	0
W	8	9	0	0	0	0	0	0	0	0.99870	-1	0	0	0	0
X	8	12	0	0	0	0	0	0	0	0.99481	0	0	0	-1	0
W	9	10	0	0	0	0	0	0	0	0	0.99870	-1	0	0	0
X	9	13	0	0	0	0	0	0	0	0	0.99481	0	0	0	-1
W	10	11	0	0	0	0	0	0	0	0	0	0.99870	-1	0	0
W	11	12	0	0	0	0	0	0	0	0	0	0	0.99870	-1	0
W	12	13	0	0	0	0	0	0	0	0	0	0	0	0.99870	-1
Net Recipts/Payments			33	-26	-28.5	36.5	-13.5	-13.5	-13.5	36.5	-13.5	-13.5	-13.5	36.5	-13.5

For the purpose of this exercise, there are no external constraints that limit the implementation of the optimisation model other than those shown in Table 6.8. Further constraints and restrictions will be discussed in Section 6.3.5. Using Table 6.8, all the constraints to be applied for the 13 weeks are expressed as follows:

$-1A_1-1B_1-1C_1-1D_1+0.99870W_1+0.99481X_1+0.98962Y_1+0.98312Z_1 = -33$ Week 1
$1.00067A_1-1A_2-1B_2-1C_2-1W_1+0.9987W_2+0.99481X_2+0.98962Y_2 = 26$ Week 2
$1.00067A_2-1A_3-1B_3-1C_3-1W_2+0.9987W_3+0.99481X_3+0.98962Y_3 = 28.5$ Week 3
$1.00067A_3-1A_4-1B_4-1C_4-1W_3+0.9987W_4+0.99481X_4+0.98962Y_4 = -36.5$ Week 4
$1.00346B_1+1.00067A_4-1A_5-1B_5-1C_5-1X_1-1W_4+0.9987W_5+0.99481X_5+0.98962Y_5 = 13.5$ Week 5
$1.00346B_2+1.00067A_5-1A_6-1B_6-1X_2-1W_5+0.9987W_6+0.99481X_6 = 13.5$ Week 6
$1.00346B_3+1.00067A_6-1A_7-1B_7-1X_3-1W_6+0.9987W_7+0.99481X_7 = 13.5$ Week 7
$1.00346B_4+1.00067A_7-1A_8-1B_8-1X_4-1W_7+0.9987W_8+0.99481X_8 = -36.5$ Week 8
$1.00769C_1+1.00346B_5+1.00067A_8-1A_9-1B_9-1Y_1-1X_5-1W_8+0.9987W_9+0.99481X_9 = 13.5$ Week 9
$1.00769C_2+1.00346B_6+1.00067A_9-1A_{10}-1Y_2-1X_6-1W_9+0.9987W_{10} = 13.5$ Week 10
$1.00769C_3+1.00346B_7+1.00067A_{10}-1A_{11}-1Y_3-1X_7-1W_{10}+0.9987W_{11} = 13.5$ Week 11
$1.00769C_4+1.00346B_8+1.00067A_{11}-1A_{12}-1Y_4-1X_8-1W_{11}+0.9987W_{12} = -36.5$ Week 12
$1.01312D_1+1.00769C_5+1.00346B_9+1.00067C_{12}-1Z_1-1Y_5-1X_9-1W_{12} = 13.5$ Week 13

The above constraints look different from the compact form of constraints given under Section 6.3.3 in that the current constraints utilise different alphabetical representations and detailed information for each cash flow period. However, the meaning and mathematical values are all the same in both cases.

6.3.3.4 ***Implementing the Model***

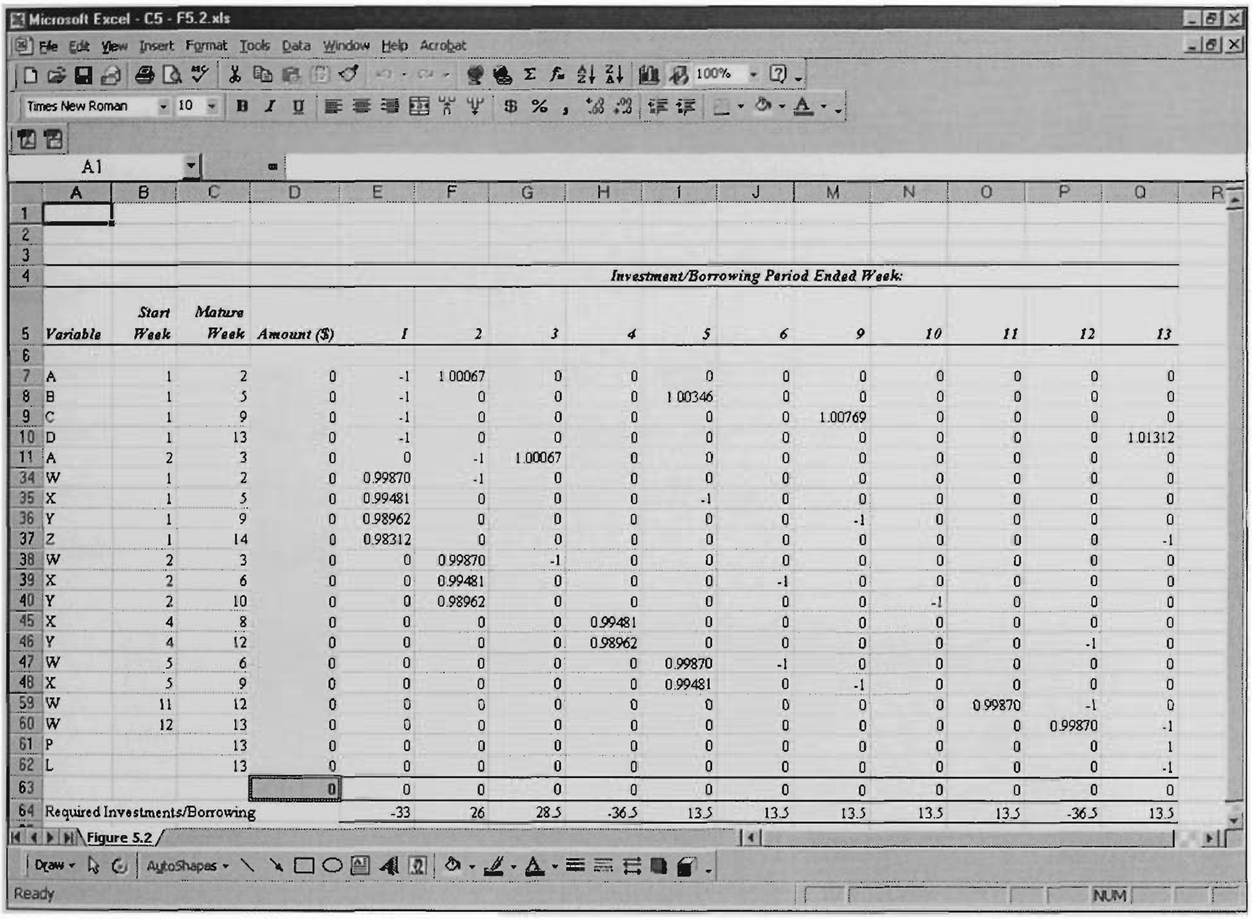
The cash optimisation model for Blackberry Pty Ltd for the crisis period that covers 13 weeks can be summarised as follows:

maximise: $A_i+B_i+C_i+D_i-W_i-X_i-Y_i-Z_i$

subject to:

$-1A_1-1B_1-1C_1-1D_1+0.99870W_1+0.99481X_1+0.98962Y_1+0.98312Z_1$ =-33.0
$1.00067A_1-1A_2-1B_2-1C_2-1W_1+0.9987W_2+0.99481X_2+0.98962Y_2$ = 26.0
$1.00067A_2-1A_3-1B_3-1C_3-1W_2+0.9987W_3+0.99481X_3+0.98962Y_3$ = 28.5
$1.00067A_3-1A_4-1B_4-1C_4-1W_3+0.9987W_4+0.99481X_4+0.98962Y_4$ =-36.5
$1.00346B_1+1.00067A_4-1A_5-1B_5-1C_5-1X_1-1W_4+0.9987W_5+0.99481X_5+0.98962Y_5$ = 13.5
$1.00346B_2+1.00067A_5-1A_6-1B_6-1X_2-1W_5+0.9987W_6+0.99481X_6$ = 13.5
$1.00346B_3+1.00067A_6-1A_7-1B_7-1X_3-1W_6+0.9987W_7+0.99481X_7$ = 13.5
$1.00346B_4+1.00067A_7-1A_8-1B_8-1X_4-1W_7+0.9987W_8+0.99481X_8$ =-36.5
$1.00769C_1+1.00346B_5+1.00067A_8-1A_9-1B_9-1Y_1-1X_5-1W_8+0.9987W_9+0.99481X_9$ = 13.5
$1.00769C_2+1.00346B_6+1.00067A_9-1A_{10}-1Y_2-1X_6-1W_9+0.9987W_{10}$ = 13.5
$1.00769C_3+1.00346B_7+1.00067A_{10}-1A_{11}-1Y_3-1X_7-1W_{10}+0.9987W_{11}$ = 13.5
$1.00769C_4+1.00346B_8+1.00067A_{11}-1A_{12}-1Y_4-1X_8-1W_{11}+0.9987W_{12}$ =-36.5
$1.01312D_1+1.00769C_5+1.00346B_9+1.00067C_{12}-1Z_1-1Y_5-1X_9-1W_{12}$ = 13.5
$A_i,B_i,C_i,D_i,W_i,X_i,Y_i,Z$ >= 0

The implementation of the model requires the preparation of the data shown in Table 6.8 in the form suitable to use Solver for optimising cash build up during the crisis period that covers 13 weeks. In Figure 6.2, a screen printout of the spreadsheet designed to run Solver is shown. This spreadsheet covers part of the whole spreadsheet enclosed in Appendix 6.1 for further information



	Variable	Start Week	Mature Week	Amount ($)	1	2	3	4	5	6	9	10	11	12	13
4									Investment/Borrowing Period Ended Week:						
7	A	1	2	0	-1	1.00067	0	0	0	0	0	0	0	0	0
8	B	1	5	0	-1	0	0	0	1.00346	0	0	0	0	0	0
9	C	1	9	0	-1	0	0	0	0	0	1.00769	0	0	0	0
10	D	1	13	0	-1	0	0	0	0	0	0	0	0	0	1.01312
11	A	2	3	0	0	-1	1.00067	0	0	0	0	0	0	0	0
34	W	1	2	0	0.99870	-1	0	0	0	0	0	0	0	0	0
35	X	1	5	0	0.99481	0	0	0	-1	0	0	0	0	0	0
36	Y	1	9	0	0.98962	0	0	0	0	0	-1	0	0	0	0
37	Z	1	14	0	0.98312	0	0	0	0	0	0	0	0	0	-1
38	W	2	3	0	0	0.99870	-1	0	0	0	0	0	0	0	0
39	X	2	6	0	0	0.99481	0	0	0	-1	0	0	0	0	0
40	Y	2	10	0	0	0.98962	0	0	0	0	0	-1	0	0	0
45	X	4	8	0	0	0	0	0.99481	0	0	0	0	0	0	0
46	Y	4	12	0	0	0	0	0.98962	0	0	0	0	0	-1	0
47	W	5	6	0	0	0	0	0	0.99870	-1	0	0	0	0	0
48	X	5	9	0	0	0	0	0	0.99481	0	-1	0	0	0	0
59	W	11	12	0	0	0	0	0	0	0	0	0	0.99870	-1	0
60	W	12	13	0	0	0	0	0	0	0	0	0	0	0.99870	-1
61	P		13	0	0	0	0	0	0	0	0	0	0	0	1
62	L		13	0	0	0	0	0	0	0	0	0	0	0	-1
63				0	0	0	0	0	0	0	0	0	0	0	0
64	Required Investments/Borrowing				-33	26	28.5	-36.5	13.5	13.5	13.5	13.5	13.5	-36.5	13.5

Figure 6.2
An Extract for the Implementation of Cash Flow Optimisation Model

It is important to note some essential elements of the spreadsheet including the following cells:

1) Cell **D63** represents the objective function, which is also known as the Set Cell in Solver Parameters. D63 is given as the difference between D61 and D62. D61 is the sum of all the receipts invested plus returns on those investments. D62 is the sum of all borrowings including interest paid.

2) Cells **D7:D62** are decision variable cells that are expected to be populated by Solver once the program is run. These cells show the amount and timing of investments and borrowings.

3) Cells **E63:Q63** represent the constraints defined and established above. Each cell is formulated as the sum of the products of decision variable cells and the yield factors shown above each cell. For example, E63 equals SUMPRODUCT($D$7:$D$62,E7:E62).

4) Cells E64:Q64 represent the right hand sides of the constraints. It should be noted that investments are shown as negative and borrowings as positive.

Once the data preparation is over, it is the right time to activate Solver from the Tools menu of Microsoft Excel, as will be discussed in the following section.

6.3.3.5 Solving the Model

To solve the model, it is necessary to activate Solver and set all the necessary parameters as shown in the Solver Parameters window in Figure 6.3. The constraints sub-window also shows the non-negativity conditions that have not been included in the discussion of Figure 6.2 above.

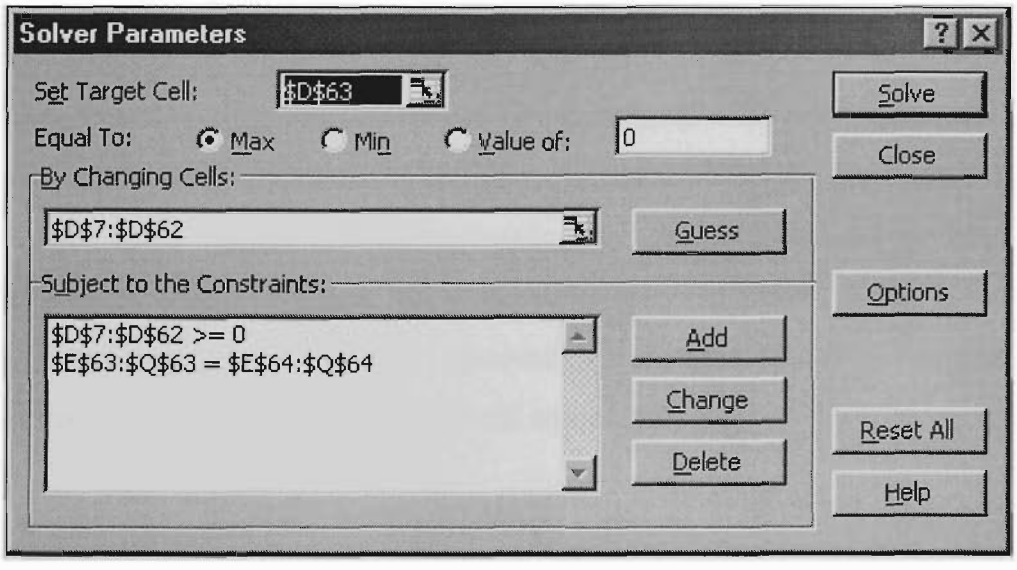


Figure 6.3
Solver Parameters Window

After running Solver for the above parameters, Cell D63 shows that the optimal solution for the model is a total borrowing of $6,589.35 including interest at the end of the planning horizon. By changing the formula for Cell D63 that is by changing the signs for the two cells (D61 and D62), it is possible to run the model as a minimisation function instead of maximisation.

Detailed calculation reports including the original spreadsheet and ancillary reports produced by Microsoft Excel *viz.* Answer Report, Sensitivity Report and Limits Reports are provided in Appendix 6.1 (Tables A6.1/2 to 5).

6.3.3.6 ***Analysing the Solution***

The reports provided in Appendix 6.1 indicate that by investing and borrowing optimally, Blackberry will be able to meet all of its obligations at an additional cost of $89.35. The process of investment and borrowing involves a number of transactions over the 13 weeks period but this can be made easy by reducing the shortest time period for investment or borrowings to a month instead of a week.

A close look at the activities for Week 1 shows that the surplus amount of $33,000 should be invested in A, B and D as there are no restrictions on amount to be invested in any investment vehicles. The investment in A matures after one week at the end of Week 2 and its balance after paying for that week's expenses (ie. $26.73293 x 1.00067 less $26 = $0.750845) should be invested in B. This process continues until the end of the planning horizon and can be depicted with the help of network flow.

It is evident that the company can avoid the additional cost of interest and activities involved in investing and borrowing by deferring some of the payments to its suppliers. But this option has been ignored here assuming that the company meets its obligations to its employees and suppliers, as and when they fall due. This assumption is particularly important in case of SMEs in some sort of crisis, as a minor default can lead to a major confidence crisis among suppliers and customers.

The initial cash flow projection spreadsheet provided in Table 6.3 results in an overall cash deficit of $6,500. Assuming that Blackberry did not incur $15,000 of the direct cost of the crisis for electrical/mechanical engineering service, the closing balance at the end of 13 weeks would be $8,500. By running the cash optimisation model on the basis of these cash flows instead of the original values, the result will be $8,582.70, as reported in Appendix 6.2. This exercise highlights that the optimisation model works in different situations and can make a significant contribution in the management of cash flows in general, and in a high interest rates environment, in particular.

6.3.4 Cash Flow Analysis – Case Studies

The analysis of cash flows regarding the SMEs covered by the case studies provided in this chapter is based on a series of spreadsheets and financial models identified below:

1) Sales Analysis
2) Gross Margin Analysis
3) Calculation of Cash Outflows – Other Expenses
4) Projection of Free Cash Flows
5) Optimisation of Cash Flow Model
6) Estimation of Free Cash Inflows – Uncertainty

All of the above financial models are prepared in each and every case and attached in the relevant appendices. To understand the significance and application of the financial models, each model will be discussed in relation to Company A and the rest will be provided in a summary form in Section 6.3.5.

*6.3.4.1 **Sales Analysis***

Table 6.9 provides a sales analysis report including a graphical representation of the same information for Company A in Figure 6.4. The sales data covers 24 months including 12 months of operations immediately preceding the crisis (denoted as 'S_p') and 12 months of operations following the crisis (denoted as 'S_c'). It also shows management's expectation of sales during the crisis period, which is denoted as 'S_e'. The 'Growth' column shows the increase or decrease in sales during the crisis period compared to the performance of the business during the previous year. In Appendix 6.3, sales analysis reports for all SMEs included in the case studies are given.

Assuming management's expectation of sales is a realistic one, the difference between S_e and S_c provides a measure for the impact of the crisis in the form of loss of sales. The other major use of sales figures in this section is to provide a basis for planning cash flows during the crisis period. Conventionally, sales figures have to be estimated to prepare cash flows for future operations.

Table 6.9 Company A Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales, S_e ($)*
Jun-00	S_p	244,919		
Jul-00	S_p	298,625		
Aug-00	S_p	194,390		
Sep-00	S_p	200,749		
Oct-00	S_p	140,126		
Nov-00	S_p	205,243		
Dec-00	S_p	151,460		
Jan-01	S_p	121,592		
Feb-01	S_p	278,954		
Mar-01	S_p	138,671		
Apr-01	S_p	144,009		
May-01	S_p	277,939		
Jun-01	S_c	86,307	-64.76	280,367
Jul-01	S_c	123,538	-58.63	291,067
Aug-01	S_c	169,475	-12.82	286,567
Sep-01	S_c	215,422	7.31	343,867
Oct-01	S_c	203,003	44.87	337,267
Nov-01	S_c	154,267	-24.84	391,789
Dec-01	S_c	166,029	9.62	383,811
Jan-02	S_c	142,626	17.30	430,633
Feb-02	S_c	207,620	-25.57	479,155
Mar-02	S_c	167,970	21.13	556,278
Apr-02	S_c	237,451	64.89	541,300
May-02	S_c	282,152	1.52	577,222

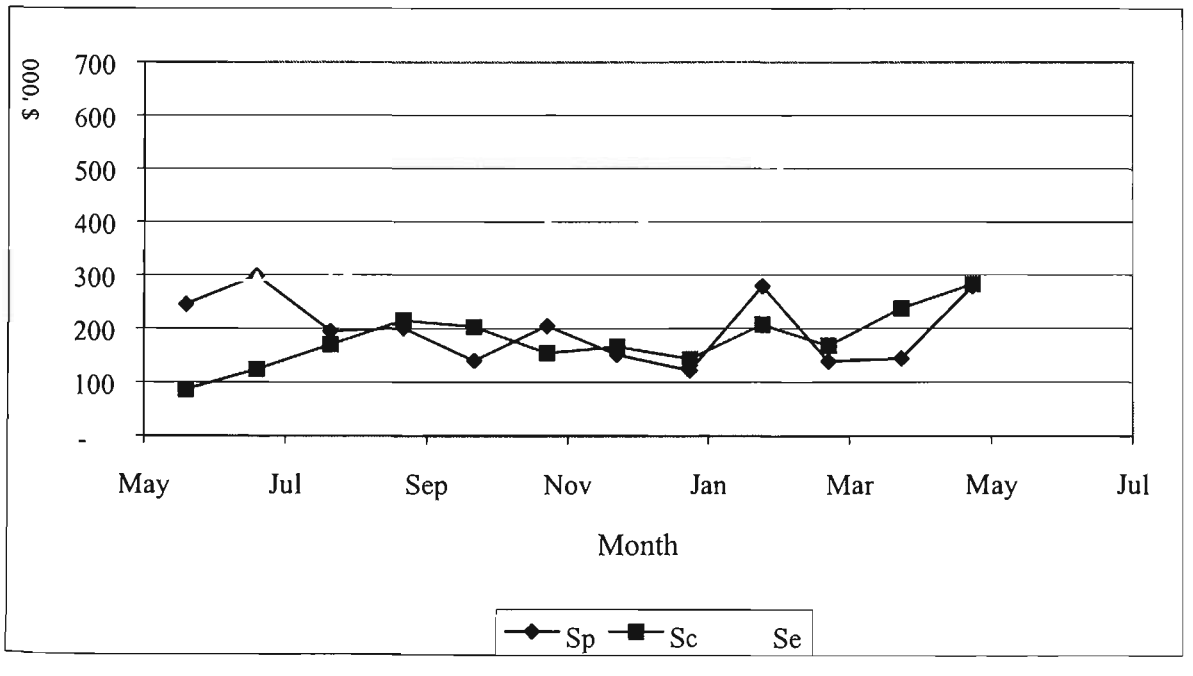


Figure 6.4
Company A Sales Graph ($'000)

In this exercise historical data for the crisis period will be used to form the basis for preparing cash flow projections and optimisation. In Section 6.3.4.6, a method for estimating future sales will be discussed, as this is necessary when cash flow projections are prepared in advance.

Once sales figures are made available, it is necessary to calculate the gross margin to estimate the cost of sales. This process is discussed in the following section.

6.3.4.2 Gross Margin Analysis

As Table 6.10 shows, gross margin is based on sales less variable expenses. Rate of gross margin provides the net cash inflow from sales after paying for the cost of sales. In other words, one minus rate of gross margin is used to calculate the rate of cost of sales. In case of Company A, the rate of gross margin for the year preceding the fire is calculated at 65.89% and the rate of cost of sales is 34.11%.

Table 6.10 Company A: Calculation of Gross Margin

Details	*Year 2001 ($)*
Revenue	
Sales	2,238,068
Total Revenue	2,238,068
Less Variable Expenses	
Opening Stock	1,236,417
Purchases	897,537
Factory and Store Supplies	54,178
Commission Paid	3,924
Freight and Cartage	63,138
	2,255,194
Less Closing Stock	1,491,831
	763,363
Gross Margin	1,474,705
Rate of Gross Margin	65.89%
Rate of Cost of Sales	34.11%

The above parameters for all SMEs are derived from financial statements for the year preceding the incidents. In one case, management accounts were used due to unavailability of information. In the preparation of the cash flow projection, these rates have been used without any modification to avoid complications, though it has been reported by some SMEs that these rates have been subject to deterioration under some severe disruptive trading circumstances. Gross margin analysis for all SMEs in this study are provided in Appendix 6.4.

6.3.4.3 Estimation of Cash Outflows – Other Expenses

The main purpose of this estimation process is to quantify free cash outflows that form part of the free cash flow analysis to be covered in the next section. However, interest expenses are also identified where applicable in order to account for the burden on the overall cash utilisation of the SMEs covered in this study. All free cash outflows are classified into two categories, operating expenses and payroll. Payroll has been identified separately due to its significance and role in running SMEs and managing cash flows in the event of crisis.

In Table 6.11, a report extracted from financial statements for the year preceding the incident for Company A is given. In this report it is assumed that SMEs face cash outflows evenly through out the year though this might not be the case in some circumstances.

Table 6.11 Company A: Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	694,316	57,860
Payroll	1,180,662	98,389
Interest	3,529	294

Notes:
1) Operating expenses include all expense other than variable expenses, payroll, depreciation and interest
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.

Source: 2000/01 Financial Statements

Similar reports for all other SMEs are provided in Appendix 6.5.

6.3.4.4 *Projection of Free Cash Flows*

The previous three tables will be used as an input in the preparation of this essential financial model to inform the owners and managers of SMEs in making important decisions regarding their business operations during a period of crisis. The free cash flow projection is based on the format provided in Table 6.3 but no attempt is made to quantify the direct cost of the crisis as the purpose of this report is to enable owners and managers to estimate their free cash flows and then budget for other costs as may be necessary.

However some fields for direct cost of crisis have been left intentionally blank to emphasise the necessity for converting the free cash flow projections into complete cash flow projections that cover the direct cost of crisis, interest expense and replacement costs. For the purpose of this exercise, the free cash flow projection is limited to the first 4 months of operations and a report prepared in relation to Company A is shown in Table 6.12. Appendix 6.6 contains similar reports for all other SMEs.

6.3.4.5 *Cash Flow Optimisation Model*

The cash optimisation model for Company A for the first four months of the crisis period is based on the cash flow information provided in Table 6.12. This optimisation model is intended to ensue the optimum utilisation of cash within the established framework and constraints defined in the cash flow projection discussed above. Crisis constraints such as upper bound on payments and lower bound on receipts can be established during the preparation of a cash flow projection and applied to this model. Net positive receipts can also be applied within this framework by prioritising expenses provided that management wishes to do so.

The model assumes that the owners can invest cash and borrow money to meet obligations provided it is financially advantageous to their business. In reality this is a well-established practice and will not cause any academic or practical difficulties in managing cash.

Table 6.12 Company A: Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Mont 3*	*Month 4*	*Total*
1	Opening Balance	1,110,812	1,011,432	936,582	892,001	1,110,812
	Add Cash Inflows					
2	Cash from sales	86,307	123,538	169,475	215,422	594,742
3	Cash from insurance					-
4	Cash from other sources					-
	Total Cash Inflows	86,307	123,538	169,475	215,422	594,742
	Less Cash Outflows					
5	Cost of Sales	29,439	42,139	57,808	73,480	202,866
6	Operating Expenses	57,860	57,860	57,860	57,860	231,439
7	Payroll	98,389	98,389	98,389	98,389	393,554
8						-
		185,687	198,387	214,056	229,729	827,859
	Direct Cost of Crisis					
9	Electrical work					-
10	Forensic Engineering					-
11	Electrical/Mechanical Engineering					-
12						-
13						-
14						-
15						-
		-	-	-	-	-
	Total Cash Outflows	185,687	198,387	214,056	229,729	827,859
	Net Cash Inflows/-Outflows	- 99,380	- 74,849	- 44,581	- 14,307	- 233,117
	Closing Balance	1,011,432	936,582	892,001	877,695	877,695

Table 6.13 shows that Company A can maximise its cash build-up by investing $74.6 thousand in Month 1 in order to meet the payments due at the end of Month 2 and by investing the balance $936.8 thousand for three months to mature at the end of Month 4. The obligation for Month 3 should be met by borrowing and the payment for Month 4 is to be financed from the proceed of the investment maturing at the end of Month 4.

Table 6.13 Company A: Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	75	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	937	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	0	0	0	-1	1.00346
X	1	2	0	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	0	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	45	0	0	0.99481	-1
P		4	0	0	0	0	1
L		4	890	0	0	0	-1
			890	-1011	75	45	14
Required Investments/Borrowing				-1011	75	45	14

The cash build up at the end of the planning horizon, $890,000, is higher than the closing balance of $877,700 provided by the free cash flow projection in Table 6.12. Cash flow optimisation models for all SMEs are provided in Appendix 6.7. It is imperative once again to note that the model satisfies the constraints established to meet obligations at the end of each and every period.

6.3.4.6 *Estimation of Free Cash Inflows*

As was discussed in Section 6.3.4.1, cash flow projections are prepared for future operations. It is always hard to predict the future due to uncertainty involved in the internal and external business environment. In the event of a crisis, the level of uncertainty increases and owners or managers of SMEs may be forced to use simulation techniques to estimate cash from sales and then determine all the other elements of cash flows on the basis of this important aspect of cash flow management.

Palisade Corporation has developed Decision Tools Software that can be used in conjunction with Microsoft Excel to undertake simulations using @RISK functions. Information regarding this company and its products can be found on www.palisade.com. Winston (1998) also provides extensive discussion of simulation techniques using Palisade's Decision Tools Software.

Table 6.14 is constructed to simulate sales so that free cash inflows can be estimated to serve as a basis for planning recurrent and other expenditure. Appendix 6.8 contains estimation of free cash inflow reports for all SMEs.

Table 6.14 Company A: Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	244,919	298,625	194,390	200,749
2	Sales scenario (random no.)	0.88	0.20	0.44	0.06
3	Sales decline (%)	35.00	50.00	15.00	15.00
4	Excepted sales (S_e, $)	159,197	149,313	165,232	170,637
5	Gross margin (%)	65.89	65.89	65.89	65.89
6	Expected cash from sales ($)	104,895	98,382	108,871	112,432

Notes:
Decline in sales is based on the following assumptions.
1) 70% chance that sales will decline by 40% to 60% during the first two months.
2) 30% chance that sales will decline by 30% to 40% during the first two months.
3) 70% chance that sales will decline by 10% to 20% during Months 3 and 4.
4) 30% chance that sales will decline by 0% to 10% during Months 3 and 4.

The first item on the above table is sales figures extracted from the previous year (see Table 6.9) to serve as a basis to estimate sales during the crisis period. It is assumed that management thinks that there is a 70% chance that sales will decline by 40% to 60% during the first two months of the crisis period and a 30% chance that the reduction in sales will be between 30% and 40%. The chances for months 3 and 4 are shown in the table above. But the management of Company A is not sure which sales scenarios will apply to each month.

Item 2 sales scenarios are generated using Microsoft Excel's statistical function *=Randbetween(bottom,top)*. In this case, the bottom is zero (0) and the top is one (1) and Microsoft Excel has produced the scenarios as shown in the above table. The decline in sales (Item 3) are then determined using Palisade's *=RiskUniform(bottom,top)* function. This function is based on equally likely scenarios between two random variables (Winston 1998) and can be invoked using Microsoft Excel's 'f_x' command once it is installed.

In the event of uncertain situations, management can apply the above techniques to estimate sales, then cash from sales in order to come up with cash management

strategies. This technique can also be applied to other elements of cash flow modelling such as gross margin, change in working capital requirements, operating expenses, etc. But management has better control over the expense side of cash flow management and can estimate cash outflows with a greater degree of certainty and accuracy.

6.3.5 Results and Implications of Cash Flow Analysis

From the tables provided in the previous section and information contained in Appendices 6.6 to 6.7, it is possible to summarise the major results of the cash flow analysis in Table 6.15.

Table 6.15 Major Results ($)

Company	*Opening Cash Balance*	*Closing Cash Balance No Optimisation*	*Closing Cash Balance With Optimisation*	*Monthly Interest Payment*
A	1,110,812	877,695	890,000	294
B	19,113	-234,720	-236,500	141
C	-240,858	-47,230	-49,100	4,240
D	-48,765	-61,804	-62,800	1,466
E	8,768	18,324	-18,700	20,625
F	-217,415	-283,123	-286,700	2,824
G	2,361,858	4,037,465	4,079,900	Nil
H	Nil	52,048	52,400	5,051
I	8,029	5,720	5,800	Nil
J	360	-713	-700	899
K	Nil	-249,044	-252,200	17,000
L	Nil	-147,055	-148,400	2,000

The implication of the results can be discussed on the basis of the reports from which they are drawn, ie. projection of free cash flows and the cash flow optimisation model. Also further cash management strategies will be discussed under a separate heading.

6.3.5.1 The Implications of Projection of Free Cash Flows

From the results of the above reports, owners and managers of SMEs will be able to assess the implication of the results as follows:

1) Optimal cash flows: the projection of cash flows shows the receipts and payments during the crisis period and serves as basis for taking corrective

actions to balance the cash requirements of the business. Such actions will help in minimising the impact of the crisis.

2) Interest expense: the level of net free cash flow position and the impact of interest on its final position. From the results reported above, it is interesting to see that, except in two cases, all of the SMEs involved in this study rely on borrowed money to conduct their business affairs and this signifies that interest payments should be carefully considered in cash flow management.

3) The impact of payroll: the priorities that may have to be put in place in terms of recurrent expenses and a strategy for recovery including staff retention must be considered well in advance given the impact of payroll on cash. From the case studies it is evident that payroll cost is a significant portion of free cash outflows and a timely decision to stand down or retrench staff will ultimately impact on the total cost of the crisis and the time it takes to recover.

4) Insurance claims: to establish the quantum and timing for insurance claims provided that there is a business interruption policy in place to cover the incident that caused the crisis.

5) Loan: to canvas the possibility for approaching potential investors or banks and other lending institutions for a loan.

6) Legal responsibilities: to determine the legal responsibilities of directors in relation to the Corporation Law. For example, the Corporation Law imposes an obligation on the directors of all types of companies including incorporated SMEs to stop trading if there is a reasonable ground to believe, that the business entity they are responsible for, is not in a position to pay its liabilities as and when they fall due.

6.3.5.2 The Implications of the Cash Flow Optimisations

As was stated earlier in this chapter, cash flow optimisation models are not the panacea of cash management problems in that their usefulness as a management tool is limited in certain circumstances. From Table 6.15, the value of the optimisation model is quite clear when the SMEs enjoy positive cash flows. In case of negative cash flows, the benefit is not so apparent because the cost of interest is not included in the closing

balance extracted from the cash flows projections. However, this does not mean that the model does not add value to the process by minimising the cost of interest.

Where the net cash flows are negative from the start of the planning period up to the end as in the case of Companies K and L, there is no magic that the cash flow optimisation model can do as interest expense will naturally be minimised by borrowing as the payments fall due. Three SMEs (G, H and I) consistently returned net positive cash flows and the application of optimisation models over the short planning horizon is still remarkable except in the case of Company H.

However, the usefulness of the optimisation model used in this study is greatly enhanced where the position of the net cash flow varies from month to month and there is also a sizable interest rate differential over different periods, say between the 30-day rate and 60-day rate, etc. This is applicable for both lending and borrowing.

It is also essential to remember that various transaction costs such as draw down fees do have an impact on the results of the optimisation models and should not be ignored where applicable. Finally, different constraints affect the operations of optimisation models and the users of such tools need to be aware if there are any company policies to be adopted. For example, if there is a requirement to maintain a minimum balance, the above model needs to be modified to account for such policies.

6.3.5.3 Uncertainty and Sensitivity Analysis of Cash Flows

As was stated in the previous sections of this chapter, the timing and pattern of the cash flows and interest rates have a major impact on the results of the cash flow optimisation model. By altering the lending and borrowing rates as provided in Table 6.16 (as opposed to the rates given in Tables 6.4 and 6.5), the optimal cash balance can significantly change. These results are provided in Table 6.17.

Table 6.16 Lending and Borrowing Rates (%)

Days	*Month*	*Lending Rate*	*Borrowing Rate*
30-day	1	2.0	3.5
60-day	2	5.0	7.5
90-day	3	8.0	11.0

The results in Table 6.17 shows that the owners/managers of SMEs need to pay a very close attention in the environment of high interest rates as the cost of cash deficit can be quite severe and lead to bankruptcy. Likewise the benefit could also be great when the SME in crisis has surplus cash. In other words, due to uncertainty of future events, it is essential to develop various scenarios and compare results before making decisions.

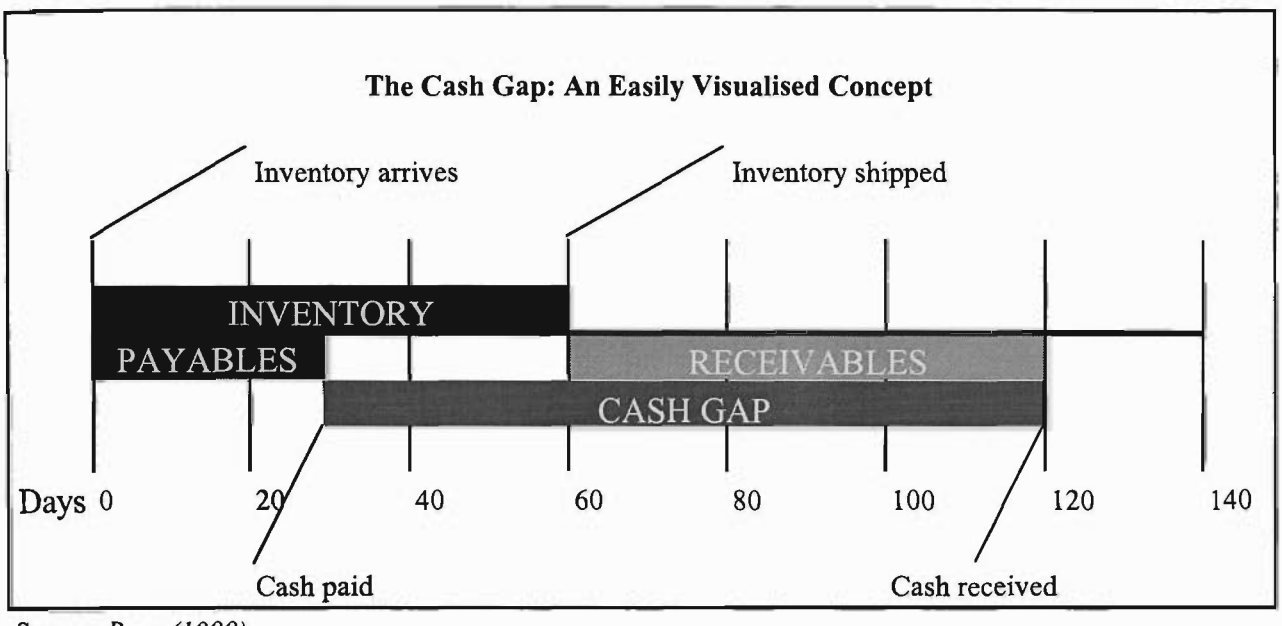
Table 6.17 Sensitivity Analysis of Closing Cash Balance ($)

Company	*Old Results*	*New Results*	*Difference*
A	890,000	952,900	62,900
B	-236,500	-247,100	-10,600
C	-49,100	-60,500	-11,400
D	-62,800	-68,700	-5,900
E	-18,700	-21,300	-2,600
F	-286,700	-308,800	-22,100
G	4,079,900	4,296,900	217,000
H	52,400	54,400	2,000
I	5,800	6,100	300
J	-700	-760	-60
K	-252,200	-271,000	-18,800
L	-148,400	-156,400	-8,000

6.3.5.4 *Other Cash Flow Management Strategies*

There are a number of other cash flow management strategies developed to assist business organisations in normal or abnormal trading environments. Shapiro and Balbirer (2000) refer to a collection float as the time that receivables spend in the process of being collected and suggest that by accelerating collection of funds it is possible to increase cash inflows. This implies that SMEs in crisis need to revise their practices in relation to invoicing, accounts receivable and banking in order to improve their cash position.

Boer (1999) argues that the cash gap is a simple but important concept that should be understood as the number of days between a business's payment of cash for goods and services bought and the receipt of cash from its customers for goods and services sold. In other words, inventory days on hand plus receivables collection period less accounts payable period equals the cash gap. This can be easily shown with a help of a diagram as provided in Figure 6.5.



Source: Boer (1999)

Figure 6.5
The Cash Gap

Boer (1999) also suggests that there are three ways to reduce the cash gap: increase the payable periods; decrease the collection period; or increase inventory turnover. SMEs can easily reduce their cash gap by reviewing their business practices in relation to the above three operational areas in the event of a crisis.

Authors such as Payne (2002), Sullivan (2003) and Wallis (2002) concentrate on the mistakes that should be avoided in the management of cash and working capital. More specifically, Payne (2002) identifies 10 common mistakes including engaging in artificial efforts – such as delaying payments to suppliers without considering its consequences. This shows that increasing the payable period as suggested by Boer (1999) could be dangerous without proper planning and consideration or in isolation to other managerial and operational policies.

Finally, the cash management model propounded by Miller and Orr (1966) some 40 years ago and modified by Wright (1980) later on has still got some application in shaping ideas on how to set the upper and lower limit for common business bank accounts. If such limits are in place, be it consciously or unconsciously, it is important that the owners or managers of SMEs review such practices in the event of crisis.

6.4 Conclusion

As the popular saying goes: *cash is king*. Cash pays bills, wages, interest, dividends, and so on. Optimal cash management is, therefore, an important challenge for all business organisations in general and SMEs in particular, given their capacity to generate and maintain a steady flow of cash. In crisis mode, this capacity can be severely damaged and puts SMEs in a very tight cash position, as evidenced by various cash flow projections produced in Appendix 6.6.

In the event of an abrupt financial crisis, an SMEs capabilities to deal with such incidents will be greatly enhanced if owners/managers undertake detailed analysis and planning of cash flows, including the direct costs of a crisis, asset replacement cost and insurance proceeds on top of normal elements of cash flows. The traditional cash flow statements need to be modified to account for new phenomena and, in some circumstances, simulation techniques need to be applied to deal with various scenarios that might ensue following a crisis.

The application of a cash optimisation model can also help SMEs in improving their cash position when they face a different pattern of net cash flow positions from month to month, and different borrowing and lending terms are available to them. In applying cash optimisation models, SMEs need to consider various constraints such as a minimum cash balance, and implement them as an integral part of their model. A good starting point for identifying inputs and constraints for a successful cash optimisation model is an accurate and complete cash flow projections report. As mentioned at the beginning of this chapter and preceding chapters, the cash optimisation model developed in this thesis serves as an effective instrument to maintain cash flows and reduce the chance of bankruptcy following an abrupt financial crisis.

In addition to the above financial modelling strategies, SMEs also need to review their inventory, billing, cash collection, accounts payable and accounts receivable strategies to reduce what is known as 'The Cash Gap' and to improve the inflow of cash and reduce interest expense.

Chapter 7
OPTIMAL POST-LOSS INVESTMENT DECISIONS

7.1 Introduction

From the case studies discussed in this thesis so far, it is obvious that the major cause of financial crisis of the SMEs surveyed is the result of a partial or full destruction of their productive assets. The reinstatement of these assets is a very important step in the recovery process and the restoration of the overall financial health of the business organisation due to a disastrous situation. It is also clear from the Financial Crisis Management Model discussed in Chapter 2 and the Crisis Phases shown in Figure 2.8 that the reconstruction of physical assets is one of the major targets of the crisis management planning process and the fourth step in the recovery process. Figure 7.1 shows this phase of the financial crisis management model.

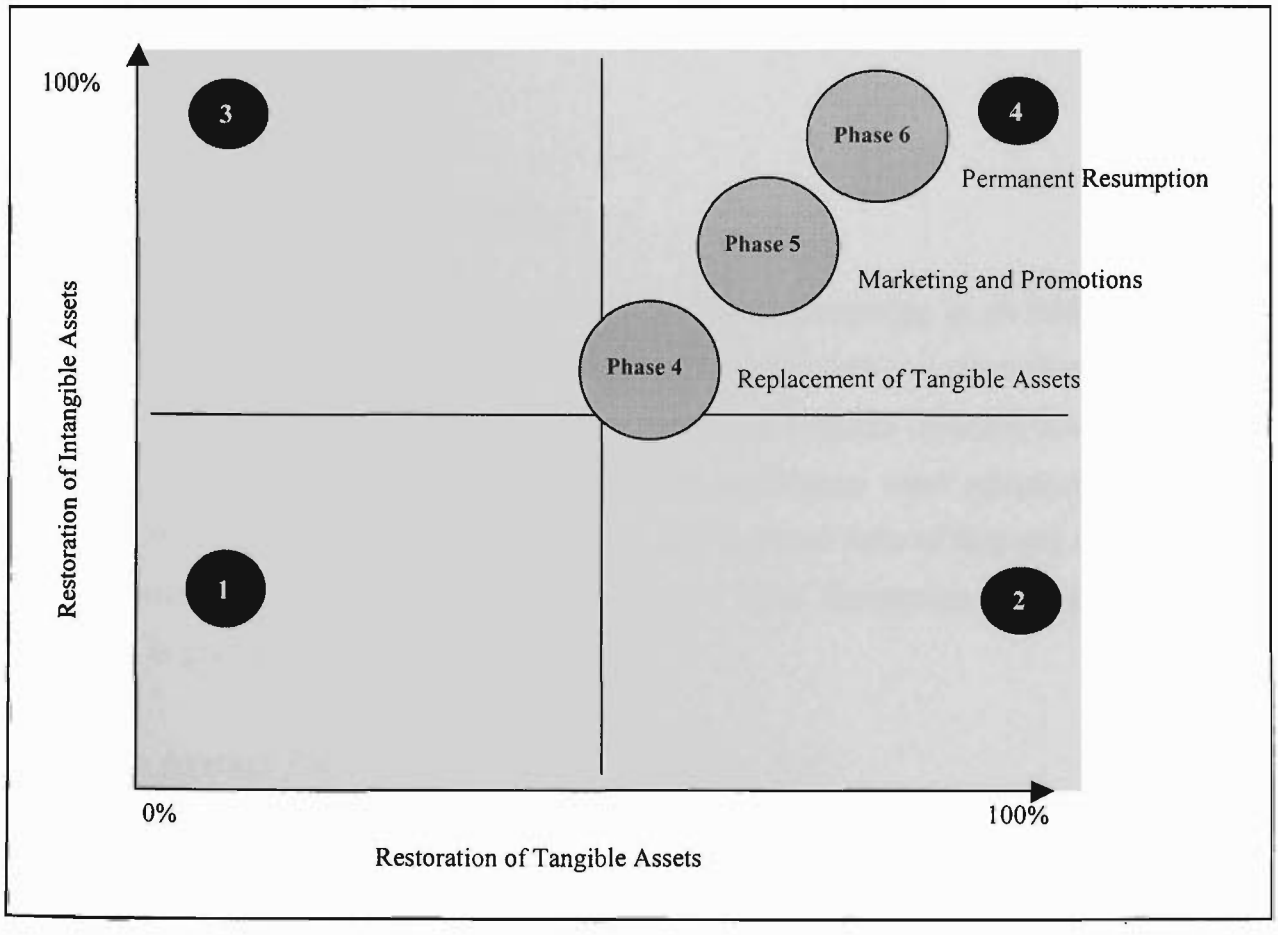


Figure 7.1
The Fourth Phase of the Financial Crisis Management Process

Without the reinstatement of damaged assets, the business will continue to operate at limited or no capacity, with very little to offer to its customers in the form of products or services. However, a decision to invest in the replacement of assets should not be arbitrary and assumed to be automatic. Doherty (2000) comments that firms should make an optimal decision as to whether to replace assets destroyed in the loss, and make decisions for new investment that are value-maximising in the post-loss environment.

As investment decisions are essentially capital budgeting decisions, this chapter will first introduce the techniques used in capital budgeting, followed by analysis and discussions of the optimal post-loss investment model, abandonment, salvage value and disposal cost. In addition, the application of 'Tobin's q' to risk management and crisis, as well as the issue of financing, will be dealt with later in this chapter. Once again, it must be noted that all these models serve as instruments of the crisis management process intended to reinstate the assets damaged (target) in a disastrous situation.

As discussed in Chapters 2 and 3, capital budgeting is one of the elements of the new approach to crisis management, and its application to replacement problems greatly enhances the chance of survival, growth and profitability of SMEs involved in an abrupt financial crisis.

7.2 Capital Budgeting Techniques

Further to the discussions in Chapters 2 and 3, capital budgeting is an integral part of capital expenditure management, which involves the planning and expenditures that are incurred in the expectation of deriving future economic benefits (Peirson et al. 2002). In Chapter 2, four most commonly used budgeting techniques were introduced: (i) The Average Rate of Return; (ii) Payback Method; (iii) Internal Rate of Return; and (iv) Net Present Value (NPV) Method. In this section a brief discussion of each of these techniques is given.

7.2.1 The Average Rate of Return

The average rate of return (ARR) is an accounting method and represents the ratio of the average annual profits to the initial investment in the project. The main principle of the average rate of return is its simplicity: it makes use of readily available accounting information. The principal shortcoming of the method is that it fails to take account of timing of cash inflows and outflows.

In mathematical terms, the average rate of return can be expressed as follows:

ARR = average earnings / initial investment in a project x 100%, or

ARR = average earnings / average investment in a project x 100% (7.1)

7.2.2 Payback Method

The payback period of an investment project tells us the number of years required to recover our initial cash investment. To calculate the payback period, the initial investment is divided by the annual cash inflows.

If the payback period calculated is less than some maximum acceptable payback period, the proposal is accepted; if not, it is rejected. The major shortcoming of the payback is that it fails to consider cash flows after the payback period; consequently, it cannot be regarded as a measure of profitability.

7.2.3 Internal Rate of Return

The discounted cash flow (DCF) methods provide a more objective basis for evaluating and selecting investment projects given the shortcomings of the previous two methods (Van Horne et al. 1995). The DCF takes account of both the magnitude and the timing of expected cash flows in each period of a project's life. The two DCF methods are the internal rate of return (IRR) and NPV methods.

IRR is the rate of return that equates the present value of the net cash inflows generated by an investment with its initial cash outlay. The IRR can be calculated by solving the following equation for 'k'. This equation is similar to the firm valuation model given in 2.1 and highlights the relationships as follows:

$$K_o = \sum_{i=1}^{no} \frac{K_o r_o}{(1 + k)^i} \qquad (7.2)$$

The acceptance criterion is to compare the IRR with a required rate of return, known also as the hurdle rate or cost of capital. If the IRR is greater than the required rate, the project is accepted; if not, it is rejected.

7.2.4 Net Present Value

Net present value (NPV) is the difference between the present value of the net cash inflows generated by the investment and the initial expenditure. Like the IRR, the NPV is a discounted cash flow approach to capital budgeting. The NPV of an investment proposal can be expressed as follows, using the firm valuation model given in Equation 2.1:

$$NPV = -K_o \sum_{i=1}^{no} \frac{K_o r_o}{(1+k)^t} \qquad (7.3)$$

The acceptance criteria depend on the value of NPV. If NPV is equal to or greater than zero the investment proposal will be accepted, otherwise it will be rejected.

From the discussions in Chapters 2 and 3, NPV is the preferred method of evaluating investment projects and this method will continue to be considered for such purposes in this thesis.

7.3 Post-Loss Investment Decisions

To understand the nature of post-loss investment decisions, first a post-loss investment problem drawn from the case studies in Chapter 4 will be introduced to form the basis for the discussion of the model to be applied and the analysis of the replacement of assets for SMEs covered by this research.

7.3.1 Post-Loss Investment Problem

The following post-loss investment problem is derived from various cases presented in Chapter 5 and shows the various elements to be considered in the light of the crises facing SMEs. The problem also provides the basis for the development of the appropriate optimal post-loss investment model that can be applied in relation to the replacement of the assets destroyed as a direct result of the incident as well as new investments to be made in the post-loss environment.

7.3.1.1 ***The Post-Loss Investment Problem***

Following the fire at Blackberry on 1st March 2004, the electrical and mechanical

engineering firm that was appointed by Mr. Joe Bloggs produced its report at the end of the month. With the help of this report and information from manufacturer's agent regarding the availability and cost of new printing press, the owner, Mr. Joe Bloggs prepared the following summary for his accountant to develop replacement and new investment strategies.

1) Blackberry started operations approximately two years ago by investing $5 million in two printing machines with effective economic life of 10 years. The machines are expected to return 19.2% or $80,000 per month.

2) The damaged machine can be repaired for $1.5 million and it takes 4 months to complete as parts and engineers have to fly in from Germany, where the manufacturers of the machine are based. Upon successful commissioning the machine is expected to last for another 8 years. There is an upfront financing cost of $30,000 but the cost of interest is expected to be offset by efficiency to be gained from the revamped machine, etc.

   Without this machine, the company can continue to generate $24,000 worth of sales per month by running the unaffected printing press, which is valued at $1.6 million.

3) The damaged machine can be traded in for the latest printing press at a cost of $3 million and a financing cost of $60,000. This machine is currently available in the manufacturer's warehouse in Germany and roughly takes the same period to bring it over, install and commission. This proposal increases the earning rate by 4% to 23.2% after interest for the next 10 years due to savings in the cost of running the machine.

4) Prior to the fire, Mr. Joe Bloggs was considering a capital expenditure worth $5 million in the machine mentioned above by borrowing the whole amount by paying an upfront financing cost of $100,000 plus ongoing interest, which is to be offset by improvement in efficiency and work practices. This investment is expected to earn revenue at the same rate as the original investment 2 years ago but it will have surplus capacity that can be used in the event of expansion or some other adverse incident such as the present one. In that sense it improves the risk management practice of the company considerably. This investment cannot be implemented if the damaged machine is to be traded in for a new one instead of being repaired.

Mr. Bloggs requested his accountant once again to identify the optimal investment alternative(s) based on the company's 12.5% cost of capital. The company's liquid asset is worth $50,000 as indicated in the previous chapter.

From the above problem, it is now easier to summarise the consequences of abrupt financial crisis resulted from the partial or full destruction of physical assets as outlined below. Doherty (2000) provides a detailed analysis including the consequences of other forms of crisis and can be referred to for further information.

1) The depletion of the value of the existing assets. This is the direct effect, which means the loss of K_o. In case of the above problem, this is represented by the repair cost of $1.5 million.

2) The fall in K_o can affect the earning rate, r_o. There are several factors that can lead to a fall in the earning rate including:

   a) The loss of output as a direct result of the destruction of the assets. In relation to Blackberry this refers to the loss of output for 4 months that will lapse till the damaged machine is fixed or a replacement one is put in place. The impact of the loss beyond this period is unknown or not reported but it is not uncommon for earnings to continue to suffer.

   b) The fall of demand in other products or services unaffected by the damage due to customers' perception of the quality of these products or services after the destruction,

   c) The loss of sales in other products unaffected by the damage but that cannot be produced or sold due to vertical integration in the production process or the complimentary nature of the products affected by the damage. The fall in earning rate can sometimes be partially offset due to increased demand for the remaining products of the business organisation or concentration on the most profitable customers.

3) The fall in cash flows due to the above reasons can also lead to abandonment of future investment opportunities in K_I that are marginal or cannot be financed externally.

In case of Blackberry this implies that the company will abandon its envisaged plan to invest in a new machine worth $5 million and it will also lose the net cash inflow of $150,000 per month over the life of the machine.

4) The fall in K_t will lead to a fall in earnings from such investments as explained in relation to K_o in Point 2 above.

Having analysed the nature and impact of the destruction of physical assets, it is time to see the application of the model developed in Chapter 2.

7.3.2 Optimal Post-Loss Investment Model

From the analysis and discussions provided in Chapter 2, the optimal post-loss investment model can be reproduced as follows:

$$NPV = -C + \left[\sum_{t=1}^{no} \frac{K'_o r'_o}{(1+k)^{t'}} \right] - \left[\sum_{t=1}^{no} \frac{K'_t - V'_t(K'_t; r'_t)}{(1+k_t)^{t'}} \right] + L - D - T' \qquad (7.4)$$

In order to develop investment strategies as requested in the previous section, it is imperative to approach the solution on the basis of the trading circumstances existing prior and after the loss as set out below.

7.3.2.1 ***Pre-Loss Investments***

The parameters required to calculate the value of Blackberry Pty Ltd on the basis of its trading circumstance before the fire on 1st March 2004 are summarised in Table 7.1.

By using the above parameters and the optimal post-loss investment model provided earlier, it is possible to calculate the NPV of the business just before the fire in relation to the existing assets and the new investment under consideration. Microsoft Excel can handle the calculation of NPV with the help of its financial function =NPV(rate,value1,value2, ...) as long as the appropriate table is constructed containing all the necessary information. It is also possible to use various functions and formulas within Microsoft Excel to perform the same calculations.

Table 7.1 Pre-Loss Parameters ($ million)

	Parameters	
Variables	*Existing*	*Proposed*
K_o	5.000	
K'_o		
K_t		5.000
K'_t		
r_o	19.20%	
r'_o		
r_t		19.20%
r'_t		
k	12.50%	12.50%
C		
T		0.100
L	0.050	
Earnings	0.960	0.960

For the purpose of this exercise, Table 7.2 is prepared using a Microsoft Excel spreadsheet and individual discounted cash flows (PVs) in order to present all the elements of the model clearly and accurately.

Table 7.2 Pre-Loss NPVs of Existing and Potential Assets ($ million)

Year	*Variables*	*Existing Assets PV Cash Flow*	*Proposed Investment PV Cash Flow*	*Total PV Cash Flow*
0	C			0.000
0	T		(0.100)	(0.100)
0	L	0.050		0.050
0	K_t		(5.000)	(5.000)
1	*Earnings*	0.853	0.853	1.707
2	*Earnings*	0.759	0.759	1.517
3	*Earnings*	0.674	0.674	1.348
4	*Earnings*	0.599	0.599	1.199
5	*Earnings*	0.533	0.533	1.065
6	*Earnings*	0.474	0.474	0.947
7	*Earnings*	0.421	0.421	0.842
8	*Earnings*	0.374	0.374	0.748
9	*Earnings*		0.333	0.333
10	*Earnings*		0.296	0.296
11	*Earnings*			
12	*Earnings*			
	NPV	4.737	0.215	4.952

The above table shows that the NPV of the business at the time of the fire was $4.737 million excluding the investment under consideration. Had the fire not occurred, the company would have gone ahead with its investment in the new machine given its

positive NPV. After the new investment, the company's NPV would have increased from $4.737 million to $4.952 million.

To satisfy inquisitive mind and avoid any confusion, the Table 7.3 is constructed to show that the original investment undertaken by the company was a viable one and satisfied the criteria set by the model.

Table 7.3 NPV of Original Investment ($ million)

Year	*Variables*	*PV Cash Flow*
0	K_o	(5.000)
0	T	
0	L	
1	*Earnings*	0.853
2	*Earnings*	0.759
3	*Earnings*	0.674
4	*Earnings*	0.599
5	*Earnings*	0.533
6	*Earnings*	0.474
7	*Earnings*	0.421
8	*Earnings*	0.374
9	*Earnings*	0.333
10	*Earnings*	0.296
11	*Earnings*	
12	*Earnings*	
	NPV	0.315

Having established the previous NPVs of the business under different scenarios, the impact of the crisis will now be investigated as follows.

7.3.2.2 Optimal Post-Loss Investment Alternatives

It is important once again, before presenting the table that contains the NPVs of various investments and alternatives to show the new parameters that are in operations now due to trading circumstances that changed as a result of the crisis.

Table 7.4 shows that there are four sets of parameters to be used in relation to four different investment projects: P1, P2, P3, and P4. P1 refers to the parameters that reflect the variables relevant to the remaining asset of the business and a decision not to repair or replace the assets damaged in the fire. Hence the business will continue to trade with the remaining productive assets. P2 contains the necessary parameters for a decision

alternative to repair the damaged assets and P3 refers to the parameters applicable to trading circumstances of a replacement (as opposed to repair) decision made in relation to the assets damaged. P4 stands for a brand new investment and these notations (P, P2, P3 and P4) will be used consistently throughout this chapter.

Table 7.4 Post-Loss Parameters ($ million)

Variables	*No Action* *P1*	*Repair* *P2*	*Replace* *P3*	*New* *P4*
K_o				
K'_o	1.600	5.000	5.000	
K_t				
K'_t				5.000
r_o				
r'_o	18.00%	19.20%	23.20%	19.20%
r_t				
r'_t				
k	12.50%	12.50%	12.50%	12.50%
C		1.500	3.000	
T		0.030	0.060	0.100
L	0.050	0.050	0.050	
Earnings	0.288	0.960	1.160	0.960

Using the above parameters, the NPVs shown in Table 7.5 are calculated in relation to five alternative investment decisions. It should be clear that the owner of Blackberry Pty Ltd would be furnished with five different investment alternatives based on the information and constraints given in Section 7.3.1:

- Alternative 1: No repair and continue trading as is (same as P1).
- Alternative 2: Repair the asset damaged to continue trading (same as P2).
- Alternative 3: Replace the asset damaged with new machine (same as P3).
- Alternative 4: Use remaining asset and buy new machine (P1 plus P4).
- Alternative 5: Repair the asset damaged and buy new machine (P2 plus P4).

Table 7.5 Post-Loss Alternative Investment Decisions ($ million)

Year	Variables	*No Action* *Alternative 1* *P1* *PV Cash Flow*	*Repair* *Alternative 2* *P2* *PV Cash Flow*	*Replace* *Alternative 3* *P3* *PV Cash Flow*	*New* *N/A* *P4* *PV Cash Flow*	*Alternative 4* *P1+P4* *PV Cash Flow*	*Alternative 5* *P2+P4* *PV Cash Flow*
0	*C*		(1.500)	(3.000)		0.000	(1.500)
0	*T*		(0.030)	(0.060)	(0.100)	(0.100)	(0.130)
0	*L*	0.050	0.050	0.050		0.050	0.050
0	K'_t				(5.000)	(5.000)	(5.000)
1	*Earnings*	0.256	0.853	1.031	0.853	1.109	1.707
2	*Earnings*	0.228	0.759	0.917	0.759	0.986	1.517
3	*Earnings*	0.202	0.674	0.815	0.674	0.877	1.348
4	*Earnings*	0.180	0.599	0.724	0.599	0.779	1.199
5	*Earnings*	0.160	0.533	0.644	0.533	0.693	1.065
6	*Earnings*	0.142	0.474	0.572	0.474	0.616	0.947
7	*Earnings*	0.126	0.421	0.509	0.421	0.547	0.842
8	*Earnings*	0.112	0.374	0.452	0.374	0.486	0.748
9	*Earnings*			0.402	0.333	0.333	0.333
10	*Earnings*			0.357	0.296	0.296	0.296
11	*Earnings*						
12	*Earnings*						

Following the principle of NPV and the various figures provided above, Alternative 5 represents the optimal post-loss investment decision for the simple reason that Blackberry will be able to maximise its value by repairing the machine that was damaged in the fire and by investing in the new machine indicated as 'P4'. The NPV in case of Alternative 5 is $3.422 million and represents the highest among the available investment alternatives. However, this is marginally higher compared to Alternative 3 and other factors must also be considered before making the final decision.

7.3.2.3 ***Underinvestment Problem***

Blackberry Pty Ltd would have been able to increase its value further by replacing the machine damaged in the fire and investing in new machine. By taking this alternative, Blackberry's NPV would have been $3.627 million (P3+P4) instead of $3.422 million but it cannot implement this alternative due to limited funds or borrowing capacity as indicated in Section 7.3.1. This point highlights the Underinvestment Problem in the event of loss and the need for corporate insurance as propounded by Mayers and Smith (1987) and raised by Geczy, Minton and Schrand (1997). A similar point was also discussed by Doherty (2000) as the 'Crowding Out Hypothesis'.

In short the point to be noted is that in the absence of a proper risk management strategy in place, business organisations in abrupt financial crisis might forgo investment

opportunities with a positive NPV because they are unable to secure external financing or it is too expensive to secure. But if sufficient insurance cover is in place to finance a loss of asset due to the occurrence of risky events, then the business will be able to replace the loss and invest in new projects without too much trouble. Going back to the example developed in this paper, Blackberry would not have had to put a financing constraint in place regarding new investments had it expected its loss to be financed by means of insurance proceeds and it would have been able to enjoy the investment opportunities that might arise in any circumstances. In other words, the lack of insurance cover forced Blackberry to take the second best alternative.

7.3.3 Post-Loss Reinvestment Analysis – Case Studies

In Chapter 5 and Appendix 5.6 it was shown that all of the SMEs except one (Company B) had suffered loss of physical assets estimated at a total of $8.78 million. This loss was reported as 'Material Loss' to suit the terminology used by insurance policies issued in Australia and to compare the assets owned or controlled (VAR or value at risk) by the SMEs with the level of insurance covers sought to protect these assets.

Under Section 1 of their policy document, the majority of insurance companies in Australia divide the materials (assets) for which they provide cover, into three main categories: stock, contents and buildings. For the purpose of this research, there will be four categories of assets: stock, contents, plant and machinery, and buildings. To avoid confusion, each category of assets will assume the following meaning:

- **Stock:** Part of current assets including raw materials, work-in-progress and finished goods manufactured or purchased by a business organisation for the purpose of selling to customers to generate sales and profit.
- **Plant and Machinery:** Refer to non-current assets of a business organisation used directly in the manufacturing of goods for sale or in the process of selling products or services to customers. Fixtures and fittings can be treated as plant and machinery in case of retail and other similar businesses.
- **Contents:** Refer to all non-current assets held by a business organisation in the course of doing business but exclude any assets that might be classified as

plant and machinery. It is should be noted that what is classified as contents for one business can be treated as plant and machinery for other.

- **Buildings:** Refer to the premises that provide shelter to all elements and activities of a business organisation.

The classification of the assets into different categories is quite essential here as different disruption management and optimisation techniques are applied. For example, plant and machinery require the application of an optimal post-loss investment model that has been discussed in the previous sections of this chapter. The replacement of stock, on the other hand, follows the Economic Production Quantity Model (Yu and Qi 2004), the Economic Order Quantity Model, or the inventory control system such as JIT. Based on the classification provided above and the information given in Chapter 5 and Appendix 5.6, Table 7.6 is constructed to show the loss of assets suffered by the SMEs and to form the basis for optimal replacement of the respective class of assets.

Table 7.6 Major Categories of Assets Destroyed/Damaged ($'000)

No.	*Company*	*Month of Incident*	*Stock*	*Contents*	*Plant and Machinery*	*Buildings*	*Total*
1	Company A	Jun-01	1,200	500	3,000	800	5,500
2	Company B *	Aug-01	0	0	0	0	0
3	Company C	Nov-01	63	15	52	0	130
4	Company D	Oct-01	93	55	115	336	599
5	Company E	Jan-02	0	0	15	0	15
6	Company F	Nov-01	237	40	150	0	427
7	Company G	Aug-02	0	0	599	0	599
8	Company H	Mar-01	0	0	40	0	40
9	Company I	Aug-01	19	9	123	0	151
10	Company J	Aug-01	44	79	49	142	314
11	Company K	Jan-03	15	5	580	0	600
12	Company L	May-02	160	40	200	0	400
	Total		1,831	743	4,923	1,278	8,775

*Note: * The incident related to contamination of building as a result of plumbing work on asbestos roof, instructed by the landlord.*

Table 7.6 shows that the 12 SMEs included in this study lost stock worth $1.831 million, contents worth $902,000, plant and machinery valued at $4.923 million and buildings cost at $1.278 million. It is obvious from the above table that one company suffered more than 50% of the total loss. However for the purpose of analysing

replacement processes and techniques, this has no bearing and can be ignored for all practical purposes.

The lower number of building incidents can also look a bit odd given the type and nature of incidents discussed in Chapter 5. However, the reason behind this low frequency of reportable building incidents lies in the nature of the ownership status of the occupying SMEs. Seven out of the 12 entities covered by this research were tenants at the time of the incidents and this resulted in the exclusion of the consideration of the building loss in this thesis. Also incidents such as machine breakdown and small machine fire would not normally involve any damage to the buildings.

In the following subsections, the replacement process for each category will be introduced followed by further discussion of the results, implications and sensitivity analysis in Section 7.3.4.

7.3.3.1 ***Replacement of Stock***

Optimisation techniques for ordering stock or determining production run are well-established area of management science (Yu and Qi 2004; Ragsdale 2001; Render et al. 2003; Greis 1994; Badinetti 1986; Noori and Keller 1986). Traditionally the Economic Order Quantity model (EOQ) is used to determine the optimal quantity per order by taking into account ordering costs and carrying costs. In this model it is important to determine the annual demand for the inventory item, as we can see from the following formula developed to calculate the EOQ:

$$Q^* = \sqrt{\frac{2DC_o}{C_h}} \tag{7.5}$$

where: Q^* = optimal number of pieces per order

D = annual demand in units for the inventory item

C_o = ordering cost of each order

C_h = carrying cost per unit per year

In the case of a manufacturing business, the above model needs to be adjusted in order to reflect a production process. In a manufacturing environment, there will be a setup cost instead of an ordering cost. This is the cost of setting up the production facility to manufacture the desired product. The Economic Production Quantity (EPQ) model is based on the following formula:

$$Q_P^* = \sqrt{\frac{2DC_s}{C_h\left(1-\frac{d}{p}\right)}} \tag{7.6}$$

where: Q^*_P = optimal quantity produced in one batch

D = annual demand in units

C_s = setup cost per setup

C_h = carrying cost per unit per year

p = daily production rate

d = daily demand rate

t = length of the production run in days = Q/p

In the event of a crisis, it is necessary to revise the elements of the above models in such a way that the annual demand reflects the new reality instead of the trading circumstances prior to the crisis. From the data collected regarding the SMEs involved in this study, it is hard to calculate the EOQ or EPQ but it is not difficult to apply the concept once the information is made available.

In Chapter 5, it was discussed that Company A was engaged in rebuilding its stock based on the relative value of the stock to its bottom line and the value of the customers to be served. Knowingly or unknowingly, the management of this business was involved in ABC Analysis, the purpose of which is to divide all of a company's inventory items into three groups, the A group, the B Group and the C group. ABC Analysis simply recognizes that some inventory items are more important than others.

According to ABC Analysis, the inventory items in the A group are critical to the functioning and operations of the business in that they account for more than 70% of the total business in dollar terms but represent 10% of all inventory items (Render and Stair 2000). This technique is somewhat similar to the 80/20 rule or what is also known as the Pareto principle but more elaborate and specific in its application.

The above technique is quite useful in the crisis mode as it enables SMEs to mobilise the limited resources available to their business on the most important products and customers that eventually determine their recovery. Hence, ABC Analysis should be used in conjunction with EOQ or EPQ for best results in replacing and maintaining stock in the event of a crisis.

*7.3.3.2 **Replacement of Plant and Machinery***

The replacement of plant and machinery is one of the most important phases of the recovery process and lies in the heart of the restoration of tangible assets that form part of the financial crisis management model. As was previously discussed, SMEs should replace productive assets in a value-maximising way and this can be achieved with the application of the model developed and applied to Blackberry Pty Ltd in Section 7.3.2.

On the basis of Table 7.6, the application of the optimal post-loss investment model will be discussed company by company. The cost of capital used throughout the following exercise is determined at 15% for ease of analysis but it should be noted that this is not the case in practice.

1) Company A

Company A lost virtually all of its plant and machinery including custom made tools and jigs. The total value of these assets was estimated at $3 million. From the information provided in Chapter 5, this business was fully covered by the insurance policy in place at the time of the fire. However, only $800,000 was advanced to the owner due to the level of proof required to substantiate the total loss. The owner believes that only the basic plant and machinery has been replaced and it will take several months or perhaps years before all equipment is restored to pre-fire condition.

Table 7.7 shows the impact of insurance cover and replacement cost on optimality under two different alternatives. Having paid $800,000 by the insurance company, if the owner decided to keep the liquid fund (assuming the policy allows to abandon repair/replacement of assets) his NPV would remain the same at $800,000. If he went ahead and partly replaced (as he did) the plant and machinery damaged by the fire, his NPV would be $903,378 and it is optimal to do so. If the company was not insured and the owner still went ahead with the replacement, the decision would still be optimal as

the second alternative is greater than the first alternative as shown in Table 7.7. This analysis is based on the parameters provided in the same table and the decision to replace can change depending on the cash flows and the level of cost of capital applied.

Table 7.7 The Impact of Replacement Cost and Insurance Cover on Optimality ($'000)

Decision Parameters	*Variables*	*P1*	*P2*	*P1*	*P2*
	k	15.00%	15.00%	15.00%	15.00%
	C		800.000		800.000
	T				
	L (Insurance)	800.000	800.000		
	Earnings	0.000	180.000	0.000	180.000

		Post-Loss Alternative Investments			
		Scenario 1 (Full Insurance Cover)		*Scenario 2 (No Insurance Cover)*	
		P1	*P2*	*P1*	*P2*
Year	*Variables*	*PV Cash Flow*	*PV Cash Flow*	*PV Cash Flow*	*PV Cash Flow*
0	*C*		(800.000)	0.000	(800.000)
0	*T*				
0	*L (Insurance)*	800.000	800.000		
0	K'_t				
1	*Earnings*	0.000	156.522	0.000	156.522
2	*Earnings*	0.000	136.106	0.000	136.106
3	*Earnings*	0.000	118.353	0.000	118.353
4	*Earnings*	0.000	102.916	0.000	102.916
5	*Earnings*	0.000	89.492	0.000	89.492
6	*Earnings*	0.000	77.819	0.000	77.819
7	*Earnings*	0.000	67.669	0.000	67.669
8	*Earnings*	0.000	58.842	0.000	58.842
9	*Earnings*	0.000	51.167	0.000	51.167
10	*Earnings*	0.000	44.493	0.000	44.493
	NPV	800.000	903.378	0.000	103.378

From the above table it is clear that P2, ie. the decision to partly replace the assets damaged in the fire yields the best outcome.

2) Company B

This company did not suffer a loss of physical assets as a result of the contamination that occurred and no analysis of post-loss investment decisions has been required.

3) Company C

This company also accepted insurance money and repaired its printing machine. The cost of repair was only $52,000 compared to $60,000 cost of outsourcing that the company incurred during the 5-month period when this machine was not available. It should be noted that the repair period was less than 5 months but the premises took that long to be completed and made the used of the machine impossible for the whole for 5 months.

In this case, the benefits of repairing the machine outweigh the costs of repair (even if insurance cover was not available) and it does not require detailed analysis or the application of the optimal post-loss investment model. However, the company would have needed to apply the model had it been a complete destruction of the machine and no insurance cover was available to replace the asset.

Company C would still be in front in the event of any replacement cost incurred up to $602,000 by conservatively estimating the total cost of outsourcing at $120,000 per year and the cost of capital at 15%. This calculation also assumes 10 years of effective life for the productive asset to be procured.

4) Company D

Company D is a retail business whose success and cash flow is based among other things on the shelf space available to display goods. Therefore, the main assets utilised in running this business were the shelves, fittings and fixtures in the store. As was reported in Chapter 5, the business was relocated to another premise and resumed business on a much lower scale. The owner cannot rebuild the premises due to limited funds and significant underinsurance cover.

The company's sales analysis report contained in Table A6.3/4 (Appendix 6.3) is reproduced here with some modification in Table 7.8 to show the deterioration in cash flows that followed the fire incident in October 2001 and the impact of trading from less suitable premises.

Company D is losing on average $44,000 a year and if this continues to be the case over the next 10-year period and its cost of capital is 15%, there would be no reason why

Company D should not be replacing its plant and machinery by spending up to $220,000. However, this could not be done due to a number of complicating factors including a lack of suitable premises within the regional town and rental expenses.

Table 7.8 Company D Estimated Loss of Earnings ($)

Month	*Expected Sales*	*Actual Sales*	*Shortfall in Sales*
Oct-01	16,747	2,500	14,247
Nov-01	15,559	550	15,009
Dec-01	27,751	18,373	9,378
Jan-02	36,342	22,498	13,844
Feb-02	27,003	9,508	17,495
Mar-02	11,707	9,670	2,037
Apr-02	17,480	11,029	6,451
May-02	14,806	10,839	3,967
Jun-02	12,486	5,636	6,850
Jul-02	10,496	6,450	4,046
Aug-02	8,450	5,816	2,634
Sep-02	7,848	7,565	283
Total	206,675	110,434	96,241
Gross Margin/Earnings at 45.65%			43,934
PV of Future Earnings at 15% over 10-year period			220,494

5) Company E

The water damage to a small but important part of the production system did cost the company $15,000 to repair. The consequence of the damage was severe in terms of cash flows as the company lost more than $150,000 in earnings during the 12-month period following the damage. Hence, it does not require detailed analysis to prove that the decision to repair the machine was economical and justifiable.

6) Company F

This is a jeweller's shop whose main assets include display materials such as cabinets and units. Also properly secured and presentable premises are important part of the overall assets due to the nature of the business.

Given the estimated loss of earnings as presented in Table 7.9, the decision to replace

the assets that cost $1.5 million is unquestionable based on the parameters provided. But the complicating factors include finding the appropriate premises within the existing shopping strip, the cost of securing such premises and ongoing rent. In such circumstances, the cost of plant and machinery must be increased by the initial cost payable to secure the premises and any other cost incurred to improve the premises. Also a review of future earnings becomes important once the business is to be relocated because the chance of regaining and maintaining the same level of customer will not be known for sometime.

Table 7.9 Company F Estimated Loss of Earnings ($)

Month	*Expected Sales*	*Actual Sales*	*Shortfall in Sales*
Nov-01	95,628	0	95,628
Dec-01	211,573	0	211,573
Jan-02	123,123	0	123,123
Feb-02	91,541	0	91,541
Mar-02	108,918	0	108,918
Apr-02	71,528	0	71,528
May-02	82,590	0	82,590
Jun-02	51,467	0	51,467
Jul-02	175,252	0	175,252
Aug-02	150,061	0	150,061
Sep-02	125,995	0	125,995
Oct-02	135,111	0	135,111
Total	1,422,786	0	1,422,786
Earnings at 21.22%			301,915
PV of Future Earnings at 15% over 10-year period			1,515,243

As per the case study, Company F relocated to another premises in the same street by paying $70,000 to the shop occupier and spending $317,000 on the premises, contents and plant and machinery. While the company's insurer had met the majority of these costs, it would have still made sense to spend the whole lot of $387,000 to restore the major tangible assets of the business to resume operations. Assuming a 15% cost of capital, it would only require net earnings of $77,000 over ten years to meet the above cost.

7) Company G

The company's business activities were affected for more than five months due to the accidental damage that stopped the main printing press. The machine was rectified by spending $599,000. During this period the company also incurred nearly $600,000 in additional expenses for the purpose of sourcing alternative printing facilities. This figure equates to $1.2 million per year and should be treated as an opportunity cost of this machine. However, it is unreasonable to think that the company would consider any decision not to repair the machine given the availability of insurance money to foot the repair bill.

Table 7.10 Company G Post-Loss Alternative Investments ($ million)

Decision Parameters	*Variables*	*No Action P1*	*Repair P2*	*Replace P3*	*Proposed P4*
	L (Insurance)		0.600		
	K'_t				7.000
	k		15.00%	15.00%	15.00%
	C		0.600	7.000	
	Earnings		3.220	4.000	1.000
	Growth p.a.				12.50%

Year	*Variables*	*Repair Alternative 1 P2 PV Cash Flow*	*Replace Alternative 2 P3 PV Cash Flow*	*New N/A P4 PV Cash Flow*	*Alternative 3 P2+P4 PV Cash Flow*	*Alternative 4 P3+P4 PV Cash Flow*
0	*L (Insurance)*	0.600	0.600		0.600	0.600
0	*C*	(0.600)	(7.000)		(0.600)	(7.000)
0	K'_t			(7.000)	(7.000)	(7.000)
1	*Earnings*	2.800	3.478		2.800	3.478
2	*Earnings*	2.435	3.025	0.851	3.285	3.875
3	*Earnings*	2.117	2.630	0.832	2.949	3.462
4	*Earnings*	1.841	2.287	0.814	2.655	3.101
5	*Earnings*	1.601	1.989	0.796	2.397	2.785
6	*Earnings*	1.392	1.729	0.779	2.171	2.508
7	*Earnings*	1.211	1.504	0.762	1.973	2.266
8	*Earnings*	1.053	1.308	0.746	1.798	2.053
9	*Earnings*	0.915	1.137	0.729	1.645	1.866
10	*Earnings*	0.796	0.989	0.714	1.509	1.702
11	*Earnings*			0.698	0.698	0.698
12	*Earnings*					
	NPV	16.160	13.675	0.721	16.881	14.396

The information in Table 7.10 shows that the company was confronted with four different alternative investment decisions (note that P1, no action is not an alternative here):

- Alternative 1: Repair (P2);
- Alternative 2: Replace (P3);
- Alternative 3: Repair and invest in new machine (P2 plus P4); and
- Alternative 4: Replace and invest in new machine (P3 plus P4).

According to the calculations provided in Table 7.10, the optimal post-loss investment choice should be Alternative 1 for the simple reason that the highest NPV is achieved by repairing the machine but rejecting the proposed investment in the second machine earmarked for expansion in the export market.

From the case study presented in Chapter 5, it is clear that the company went ahead with the decision to repair as well as invest in the proposed machine, ie. Alternative 3. While this alternative is financially less desirable to Alternative 1 (because the NPV of $14.050 million for Alternative 3 is less than the NPV of $14.471 million for Alternative 1), the company must have had other reasons to take this course. The discussion with the management revealed that having a second reliable machine was a major consideration in deciding to make the investment rather than any other financial considerations. This is clearly a measure of good risk management practice given what happened to the company due to the accidental damage.

8) Company H

The water damage to computers and showroom created havoc and disrupted operations for more than 10 days. Simply, the company could not serve customers well because it had no reliable records of inventory levels and customers details to contact and push sales during this important Easter trading season. It could also not display some of the merchandise to wholesale customers.

The cost of reinstatement of $40,000 was modest compared to the consequential loss of more than $300,000 during the first six months of the disruption period. The company

did not have any other viable choice but to repair/replace the machines affected. Unfortunately it did so after the damage was done. If management acted quickly and hired machines to operate in secured areas of the warehouse, much of the consequences of the loss would have been contained. This is a clear case of a minor hiccup turning into a crisis due to management's failure to assess the impact properly including various scenarios that might eventuate in the event of delayed repairs.

On the basis of the costs involved in reinstating the assets damaged and the value at risk as a result of the damage, the appropriate decision will be to take an action to repair or replace irrespective of the level of insurance cover in place.

9) Company I

The café that lost all of its assets in the fire was lucky to have the second premises that it was using for making bread because the lease on the property was still current at the time of the fire. The cost of replacement for the plant and machinery was estimated at $123,000 and the earnings for this business were approximately $50,000 per year.

Table 7.11 Post-Loss Value of Company I ($ '000)

Decision Parameters	*Variables*	*P1*	*P2*
	k	15.00%	15.00%
	C		123.000
	T		
	L		
	Earnings		49.861

Year	*Variables*	*No Action P1 PV Cash Flow*	*Repair P2 PV Cash Flow*
0	*C*	0.000	(123.000)
0	*T*		
0	*L*		
1	*Earnings*	0.000	43.358
2	*Earnings*	0.000	37.702
3	*Earnings*	0.000	32.785
4	*Earnings*	0.000	28.508
5	*Earnings*	0.000	24.790
6	*Earnings*	0.000	21.556
7	*Earnings*	0.000	18.745
8	*Earnings*	0.000	16.300
9	*Earnings*	0.000	14.174
10	*Earnings*	0.000	12.325
	NPV	0.000	127.243

Once again using 15% of cost of capital, which is assumed to be reasonable in these circumstances, the owners did the right thing by replacing most of the assets and resuming business in the alternative premises. The value of the company after the loss is $127,243 based on the parameters provided in Table 7.11 and it was an optimal decision to resume operations by spending the above amount given the NPV of the other alternative (no action no earnings) was zero. The insurance payout was negligible in this case and was ignored for the purpose of performing the above calculation.

10) Company J

The circumstances of Company J (the newsagent) were similar to the above case in that the company had to relocate to alternative premises, which happened to be the owner's residential property. The owner was happy to run his business temporarily from his house by making some modifications. As an agent of Australia Post, the owner did not have much choice except resuming the business of providing postal services to the local population as per the contractual obligations imposed on him.

Table 7.12 Post-Loss Value of Company J ($ '000)

Decision Parameters	*Variables*	*P1*	*P2*
	k		15.00%
	C		153.000
	T		
	L		
	Earnings		42.000

Year	*Variables*	*No Action P1 PV Cash Flow*	*Repair P2 PV Cash Flow*
0	*C*	0	(153.000)
0	*T*		
0	*L*		
1	*Earnings*	0	36.522
2	*Earnings*	0	31.758
3	*Earnings*	0	27.616
4	*Earnings*	0	24.014
5	*Earnings*	0	20.881
6	*Earnings*	0	18.158
7	*Earnings*	0	15.789
8	*Earnings*	0	13.730
9	*Earnings*	0	11.939
10	*Earnings*	0	10.382
	NPV	0.000	57.788

Financially the resumption of the business was also economical in that the newsagent was expected to earn more than $42,000 per annum based on the financial statements for the year preceding the loss. The investment of $153,000 in the reinstatement of the assets was therefore optimal, based on the criteria used in the previous case and the result shown in Table 7.12.

11) Company K

The replacement of Company K's (the hotelier) main income generating assets was not a matter of choice for the owner/manager given the interest of a third party in these properties. From the case study in Chapter 5, it is reasonably clear that the company replaced most of its assets but was unable to attract sufficient customers to trade out of the doldrums caused by the bushfire.

Given the status of the business 13 months after the fire, the replacement of the assets was not worthwhile purely on the basis of the short-term financial results and it can be concluded that the process was not carried out in a value-maximising way. However, this decision could have resulted in a better outcome had the owner followed a number of crisis management strategies identified in this thesis and discussed in Chapter 8.

12) Company L

The video shop like the café (Company I) and the newsagency (Company J) had to temporarily relocate by spending additional funds for the purpose of setting up temporary premises, which its insurer covered only in part due to an underinsurance problem.

The assumption and calculation of the value of the business in a post-loss environment follow the same principle that has been utilised so far and shows a positive NPV of $30,582 (Table 7.13) and passes the test for optimality.

Table 7.13 Post-Loss Value of Company L ($ '000)

Decision Parameters	*Variables*	*P1*	*P2*
	k		15.00%
	C		125.000
	T		
	L		
	Earnings		31.000

Year	*Variables*	*No Action P1 PV Cash Flow*	*Repair P2 PV Cash Flow*
		0.000	
0	*C*		(125.000)
0	*T*		
0	*L*	0.000	
1	*Earnings*	0.000	26.957
2	*Earnings*	0.000	23.440
3	*Earnings*	0.000	20.383
4	*Earnings*	0.000	17.724
5	*Earnings*	0.000	15.412
6	*Earnings*	0.000	13.402
7	*Earnings*	0.000	11.654
8	*Earnings*	0.000	10.134
9	*Earnings*	0.000	8.812
10	*Earnings*		7.663
	NPV	0.000	30.582

7.3.3.3 Replacement of Contents

From the description provided earlier in this chapter, contents form part of the assets of business organisations that are needed to run the day-to-day operations. Contents may not be among the core assets of the business required to generate income producing goods and services but remain essential in assisting the production system and maintaining a conducive working environment.

In the event of total loss, it is reasonable to take the sum of the replacement costs of contents as well as plant and machinery to determine the optimality of the decision to do so. For example, in case of three SMEs above (Company I, Company J and Company L) this approach was adopted to see whether their reinvestment decisions were done in value-maximising ways.

Generally the replacement of contents in isolation from plant and machinery will be hard to be assessed on the basis of the model used so far in this paper, as it is difficult to associate cash flows with the acquisition and utilisation of them. However, SMEs need to prioritise replacements in the light of their cash flows during the recovery process.

7.3.3.4 *Replacement of Buildings*

The ownership and maintenance of real estate properties follow, in most cases, a different motive from owning and running SMEs involved in the provision of goods or services. From the case studies presented in this thesis, five out of twelve SMEs ran their business from their own premises but no information was collected from them to establish the reason behind their investment.

As most commercial properties are insured, their reinstatement is generally dictated by insurance policies in place. Two (Company A and Company J) of the three SMEs that suffered property damage, reinstated their buildings using the insurance payout and the third one (Company D) did not do anything due to limited funds.

For the purpose of this research, it is safe to assume that SMEs will follow their original motives and reasoning instead of the immediate property related cash flows generated or saved in making a decision to reinstate real estate properties damaged in some sort of incidents. Establishing criteria or an investment model for this type of decision is beyond the scope of this thesis and no further discussion is warranted.

7.3.4 Uncertainty and Sensitivity Analysis of Investment Decisions

The main results achieved from the manipulation of the model developed for the purpose of assessing the optimal values of the SMEs surveyed in this thesis and whether optimal decisions were made in respect of the post-loss replacements decisions are summarised in Table 7.14.

Table 7.14 NPVs of SMEs Based on 15% Cost of Capital ($)

Company	*Cash Flows*	*NPV*	*Purpose of Calculation*
A	180,000	903,378	Optimal replacement decision
C	120,000	602,000	Maximum replacement cost
D	43,934	220,494	Maximum replacement cost
F	301,915	1,515,243	Loss of earnings
G	3,220,000	16,881,000	Optimal replacement decision
I	49,861	127,243	Optimal replacement decision
J	42,000	57,788	Optimal replacement decision
L	31,000	30,582	Optimal replacement decision

The above results were used for different purposes as discussed in Subsection 7.3.3.2. Their implications were also discussed under each SME and they do not need repetition here. However, it should be noted that the model used to produce the above results is based on a deterministic approach and it is important to carry out sensitivity analysis by altering the cost of capital and individual cash flows that fluctuate depending on the degree of the recovery and general market forces.

Table 7.15 is based on 18% cost of capital instead of 15% previously used and shows the difference between the old and new NPVs. It is interesting to see that the increase in cost of capital has different impact on different SMEs. For example, the optimal alternative in the case of Company G will change from Alternative 3 to Alternative 1. Also the impact of the 20% increase in cost of capital (ie. from 15% to 20%) has reduced the NPVs by an average of 13.83% across all SMEs but with the maximum impact of 53.18% on Company L due to the initial cost required to reinstate the assets.

Table 7.15 NPVs of SMEs Based on 15% Vs 18% Cost of Capital ($,%)

Company	*NPV at 15%*	*NPV at 18%*	*Difference in NPV*	*Deterioration in NPV*
A	903,378	808,936	94,442	10.45
C	602,000	539,290	62,710	10.42
D	220,494	197,442	23,052	10.45
F	1,515,243	1,356,833	158,410	10.45
G	16,881,000	14,471,000	2,410,000	14.28
I	127,243	101,082	26,161	20.56
J	57,788	35,752	22,036	38.13
L	30,582	14,317	16,265	53.18

In short the cost of capital can significantly impact on NPVs calculated for different purposes and can affect the decisions to be made in relation to the selection of alternative investments, the maximum amount available for investments in the reinstatement of assets damaged and whether to reinstate or abandon the business.

Table 7.16 is constructed by keeping the cost of capital at 15% but by reducing the individual cash flows by 15% in all cases.

Table 7.16 NPVs of SMEs Based on Reduced Cash Flows ($,%)

Company	*NPV at 15%*	*NPV Reduced Cash Flows*	*Difference in NPV*	*Deterioration in NPV*
A	903,378	767,872	135,506	15.00
C	602,000	511,910	90,090	15.00
D	220,494	187,420	33,074	15.00
F	1,515,243	1,287,956	227,287	15.00
G	16,881,000	13,736,000	3,145,000	18.63
I	127,243	89,707	37,536	29.50
J	57,788	26,170	31,618	54.71
L	30,582	7,245	23,337	76.31

The reduction in cash flows will have the same impact on NPVs if there is no cost involved at the beginning of the period. This is clear from the first four NPVs calculated for various purposes. However, where there is an initial cost, the fluctuations in cash flows can have a substantial impact on NPVs and the decisions to be made. Once again the best alternative in the case of Company G will be Alternative 1 instead of Alternative 3 due to changes in cash flows. As a result it is quite important for SME owners to develop the calculation of NPVs under different scenarios to see the impact of different cost of capital and different cash flows due to uncertain business environment under which all SMEs operate.

7.4 Abandonment, Salvage and Disposal Cost

In Chapter 3 the concepts of abandonment, salvage and disposal cost were discussed in relation to investment decisions that face business organisations in the event of destruction of existing physical assets. In the following subsections a brief discussion of these concepts will be undertaken in relation to the case studies covered by this research.

7.4.1 Abandonment

Abandonment refers to the decision to discontinue some activity, be it the firm itself or some project provided that it is no longer economical in the light of the information that comes to hand. In this sense, abandonment is a form of real option.

The concept and application of the abandonment technique is a relevant investment management tool in a post-loss environment as it provides SMEs with additional ammunition in making sensible decisions during the recovery process. Benninga (2000) gives two examples that can be applied to post-loss situations:

a) The option to wait (or option to expand): this option can be applied to a post-loss situation where SMEs have lost several productive assets but do not have to replace all in one hit. Thus the SME in such circumstances can replace one machine and then wait and monitor its performance to replace the rest of them. If the result is unsatisfactory the whole project will be abandoned. This is basically a call option.

b) The option to contract scale: this option involves the ability to abandon a business because the SME resumed the business after an incident without firm knowledge of its cash flows, but found the performance to be unsatisfactory after a while. This is treated as a put option.

In certain cases, an abandonment option can be exercised from the outset (immediately after the loss) for a number of reasons as outlined by Doherty (2000).

1) **Appreciation of Abandonment Value:** In the event that the resources consumed by the pre-loss project can acquire higher value in alternative uses, a similar project does not have to be reinstated. This situation has not arisen regarding the case studies covered in Chapter 5, but is common in incidents involving real estate.

2) **Revision of Cash Flow Estimates:** After an incident and temporary closure of a business, the demand for the SME's products and services can dramatically alter and the reinstatements of the assets to resume the business will be become unviable.

3) **Revision of the Cost of Capital:** Lower demand for the company's goods and services and or increase in interest rates can push up the cost of capital. This in turn reduces the discounted cash flows over the life of the project and makes it uneconomical to resume the business after a disastrous incident.

4) **Phasing Out of Old Projects:** In some cases older technologies with positive cash flows can be very expensive to reinstate and lead to the abandonment of the project. This is also common where SMEs use old technology that is expensive to replace or sometimes impossible to do so.

While the basic concepts of abandonment have been covered in the foregoing paragraphs of this section, detailed information on the valuation of real options can be found in Trigeorgis (1996).

7.4.2 Salvage

In contemporary financial accounting, salvage or scrap value is interpreted as a refund of part of the asset's original cost, which reduces the cost of the services provided by the asset (Henderson and Peirson 2004). In other words, any non-current asset acquired by a business organisation needs to be reduced by this amount for the purpose of estimating the depreciable amount and depreciation expense per period during the life of the asset.

In a financial crisis management sense and post-loss environment, salvage refers to the amount that can be recovered from the realisation of the asset that is partly damaged. Doherty (2000) describes salvage as any left over scrap from an incident that caused damage to existing assets and that can result in either a financial benefit or cost. For the purpose of this paper, salvage refers to a scrap with a financial benefit in line with insurance industry and business practice in Australia.

In replacement analysis, it is important to consider the salvage value of the asset damaged so as to arrive at an optimal post-loss investment decision. The salvage value can sometimes reduce the cost of replacement by reducing the price of the new machine or can be sold independently and generate cash flows. In reference to the optimal post-loss investment model that has been discussed in this chapter, the impact of salvage can be summarised as follows:

1) Salvage can have a downward impact on 'C' by being used as a trade-in.

2) Salvage can generate cash inflows and increase the amount of liquid fund, 'L' on hand.

In relation to SMEs covered by this study, there has not been a good example where salvage has been a major issue and necessitated a change of decision. However, this does not mean that salvage should be ignored as an irrelevant decision variable in analysing post-loss replacements.

7.4.3 Disposal Cost

Salvage has been discussed as a decision variable with a positive impact on the value of a business in a post-loss environment. Disposal involves the activities undertaken to remove debris and or make the area of business safe after some sort of disastrous incident.

A number of SMEs surveyed in this research have an insurance policy that covers the removal of debris. This shows that disposal is a very important consideration in post-loss situation and appropriate insurance cover should be arranged to minimise its financial impact on SMEs involved in an abrupt financial crisis. In the event of damage to old buildings with asbestos roofs or walls, the removal of debris can have a huge financial impact as it can escalate the total cost beyond any reasonable expectation. The case study of Company B, for example, highlights the issue of handling asbestos related materials and its financial consequences.

In making a post-loss investment decision, the cost of disposal becomes an issue if it needs to be incurred in the process of reinstatements. If a cost of disposal is to be incurred regardless of the decision to repair or replace, then it will be irrelevant for the purpose of analysing alternative investment decisions and can be treated as a constant.

7.5 Tobin's q

Tobin's q (Tobin 1969) is described as the ratio of the market value of a firm over the replacement cost of its existing assets. Mathematically, this can be expressed as follows:

$$Tobin's\ q = \frac{market\ value\ of\ a\ firm}{replacement\ cost\ of\ assets} \qquad (7.7)$$

According to various authors (Doherty 2000; Chirinko 1993; Blanchard 1993; Barro 1990), Tobin's q can serve various purposes including as a measure of the management's control of a firm's resources and as a measure of the efficiency of alternative use of capital.

It is also interesting to see the similarity and differences between NPV and Tobin's q. They are similar in that both use the present value of future cash inflows and cost of the assets used to generate the same. However there are two major differences: the first one is the fact that NPV is applied at a project or individual asset level and Tobin's q is applied at a firm level. The second difference relates to the nature of asset in use, ie. NPV is about assets in future use while Tobin's q is concerned with the assets in current use. It should also be noted that Tobin's q uses the market value of a firm as a proxy for its future cash flows.

Doherty (2000) suggests that Tobin's q can be used, with all its limitations, as a risk management tool in the post-loss investment environment because it is well known and understood as a measure of investment efficiency. Using the formula provided above, it is easy to calculate Tobin's q and compare it with NPV as an additional tool for making a replacement decision. If Tobin's q is greater than unity, the NPV is positive and the criterion to make an investment is met.

So far the various techniques that can be used in making optimal post-loss investment decisions have been discussed in great detail. From some case studies, it has emerged that in the absence of adequate insurance cover, SMEs struggle to finance the replacement of assets damaged in disastrous situations and in some cases they have had to abandon part of their business. In the following section of this chapter, the issue of financing will be discussed to provide a complete picture of this important aspect of the abrupt financial crisis management phase.

7.6 Financing Replacement of Assets

In the event of uninsured loss of physical assets or inadequate insurance cover, SMEs have to raise funds in order to be able to finance the replacement of assets in a value maximising way and to meet the expenses of the day-to-day operations of the disrupted business until such a time that the business is able to sustain itself. This process involves important practical and theoretical issues mainly sources of finance and optimal capital structure.

7.6.1 Sources of Finance

It is quite obvious that there are two main sources of finance: internal and external sources. The internal source refers to funds generated within the business organisations. Internal funds can be new capital injections (equity capital) by the owners of the business or surpluses generated and retained by the company, which are the property of owners (retained earnings).

It should be noted that what is available to finance an optimal replacement of assets, depends on the amount of liquid fund and part of accounts receivable rather than the balance of retained earnings shown in the financial statements or the general ledger of the company's books of accounts. As was discussed and developed in Chapter 6, SMEs in abrupt financial crisis need to develop a detailed free cash flow projection, which includes all sources and obligations for the replacement of assets in order to determine their cash position and borrowing needs. A decision made on an ad hoc and incomplete information basis can be quite expensive during a crisis and can lead to the demise of the business organisation.

In the present financial market in Australia, SMEs have a wide range of options in choosing a suitable source of external finance. This choice has increased in number and complexity since the deregulation of the Australian financial system in the mid 1980s and the advent of internet in the mid 1990s. To lessen the impact of the complexity of the financial market and unscrupulous players in this industry on unsophisticated consumers of financial products (be it the household or SMEs), the Federal Government of Australia recently introduced the Financial Services Reform Act (FSRA).

Briefly, the FSRA was an act amending the Corporations Act 2001 and was done predominantly by the insertion of Chapter 7 into the Corporations Act 2001. The legislative change has also involved the passing of various amendments to the Corporations Act since that time. The amending Act was passed into law on the 10th March 2002. The Act provided for a two-year transition or phase-in period for most Sections of the Act until the 10th March 2004. The objective of the Act is to promote:

a) confident and informed decision making by consumers of financial products and services while facilitating efficiency, flexibility and innovation in the provision of those products and services; and

b) fairness, honesty and professionalism by those who provide financial services; and

c) fair, orderly and transparent markets for financial products; and

d) the reduction of systemic risk and the provision of fair and effective services by clearing and settlement facilities.

In any case, the main categories of external source of finance in Australia include: (i) trading banks; (ii) merchant banks; (iii) finance companies; (iv) life insurance companies; (v) non-life insurance companies; (vi) unit trusts and investment companies; (vii) superannuation plans; (viii) secondary mortgage market; and (ix) overseas sources. For detailed sources of finance in Australia, standard books on finance such as Peirson et al. (2002) can be consulted.

The above list is neither exhaustive nor are all of the players suitable to the financial needs of SMEs. Merchant banks for example deal with the top end of the market and concentrate on investment management functions and corporate financial advisory services. Hence, SMEs need to consult with their external accountants or loss consultants before approaching their bank for short or long-term loans.

7.6.2 Types of Finance

The other important consideration in sourcing finance is the decision to be made in relation to the type of finance (bank overdraft, commercial loans, operating lease, finance lease, HP, chattel mortgage, etc) to choose and its implications regarding the treatment of the GST and income tax. While it is beyond the objective and scope of this paper to provide a comprehensive analysis of GST and tax implications of various forms of financing, it is desirable to choose the type of loan that allows upfront Input Tax Credit (ITC) and a higher amount of income tax deduction. This type of choice helps the SME's cash flow when it is needed most and ensures that the business is able to manage the crisis well.

The overall cost of finance is also another factor that should be considered in seeking external finance to replace assets damaged and make new investments in the post-loss business environment. From the literature review in Chapter 2, SMEs cannot borrow unrestrictedly for theoretical and practical reasons. This last issue is discussed in the following section.

7.6.3 Optimal Capital Structure

In the practical world of finance, the capital structure of a business organisation is a relevant financial issue because there is a trade off between the opposing effects of the tax savings on debt finance and the cost of financial distress (Scott 1976; Miller 1977; Chen and Kim 1979; Myers 1984). Beyond some critical degree of leverage, the value of a business starts to fall as a result of increasing cost of capital (refer to Figure 3.1).

Peirson et al. (2002), Doherty (2000) and Van Horne et al. (1995), identify various key financial parameters that are affected by the choice of debt or equity financing and recommend that the impact of any choice on each and every one of them should be analysed before making the final financing decision. The relevant parameters in the case of SMEs are:

1) EBIT
2) Interest
3) Tax
4) Growth Rate
5) Value of Equity
6) Value of the Firm

Although all of the above factors are important, ultimately it is the value of the business that determines which type of financing should be sought provided there is a choice to do so. For the sake of clarity, it is important to return to the basic objective of the optimal post-loss investment model, which requires SMEs to respond to the replacement of assets in a value-maximising way. A choice of debt or equity financing is therefore determined on the basis of which choice contributes more to the value of the business.

7.7 Conclusion

The financial crisis management model developed in Chapter 2 suggests that abrupt financial crisis can be managed on a phase-by-phase basis until such a time that the business is fully recovered from the impact of the partial or full loss of productive assets. The fourth phase in the crisis management process involves the replacement of physical asset(s).

A decision to replace physical asset(s) requires a proper analysis and financial management tool that can assist SMEs to respond to this important task in a value-maximising way. One such important tool is an optimal post-loss investment model that is based with the NPV technique. As shown earlier in this chapter and Chapters 2 and 3, the optimal post-loss investment model is a very important instrument in crisis management planning, intended to achieve an optimal replacement of assets damaged in a disastrous situation. This model is also based on the principle of capital budgeting techniques that form one of the elements of the new approach to crisis management, designed to provide an effective and superior strategy to deal with an abrupt financial crisis.

The replacement of other forms of assets such as stock, contents (other than plant and machinery) and buildings utilise different techniques, given the nature of their use and consumption patterns in the day-to-day operation of business organisations. In all cases, the consideration of abandonment, salvage and disposal cost enhances the quality of the decision to be made and should be not be ignored.

From the analysis of the experience of asset replacement by the SMEs covered in this research, it was possible to see that the decisions taken were not based on proper analysis of various courses of actions. As a result, some of the decisions were sub-optimal and the SMEs' efforts in restoring their value would have been improved with the application of this model.

In the absence of insurance cover (or inadequate cover), SMEs have to choose between internal and external funding in order to finance the replacement of their damaged asset. External finances are generally used when SMEs are not able to raise funds internally or it is not optimal to do so. In the Australian financial market, there is a wide range of external sources of finances, and SMEs need to be careful in making a decision regarding the source and type of finance, and in maintaining an optimal capital structure at all times.

Irrespective of the source of finance used, it is essential to prepare a detailed free cash flow projection (as discussed in Chapter 6), which includes all direct costs of crisis and replacement of all forms of assets, so that SMEs can have a clear and complete picture of the cash flow requirements during the crisis period. A comprehensive free cash flow

projection is a starting point for initiating a decision to go external and in prioritising business activities that demand the utilisation of SMEs' most valuable asset: cash.

The following chapter will introduce a number of other risk and crisis management instruments and polices that compliment the financial optimisation models discussed in the previous two chapters and the financial crisis management model introduced in Chapter 2, in line with the aims of this research as set out in Chapter 1.

Chapter 8
STRATEGIC CRISIS MANAGEMENT ISSUES

8.1 Introduction

In the previous chapters of this thesis, the financial aspects of an abrupt financial crisis management were discussed in detail, including the optimisation of cash flow and optimal post-loss investment decisions. These vital managerial tools need to be supplemented with some skills and knowledge of basic management theories and functions, strategic crisis management principles, legal skills and knowledge with respect to corporate financial obligations, and other operational techniques and methods.

This chapter will therefore address the above topics in the following three sections: (i) crisis preparedness in Section 8.2; (ii) crisis management phases in Section 8.3; and (iii) strategies and policies in crisis management in Section 8.4. The first section deals mainly with strategic crisis management principles necessary to prepare for a crisis before it happens, and the skills required to deal with non-financial matters. The second section provides some of the issues that have not been covered so far in more detail. Section 8.4 is mainly about the strategies and policies to be followed in using the instruments of the financial crisis management model developed in this thesis.

8.2 Crisis Preparedness

From the case studies presented in Chapter 5, it is clear that the majority of the SMEs covered by the survey used insurance policies as a major tool of risk and crisis control mechanism. However, this proved to be insufficient based on their experience. As a result this section is intended to shed more light on other tools and techniques available to prepare SMEs for crises before they happen. To this end the following topics will be discussed: crisis control models, insurance schemes, business impact analysis, business continuity planning, and monitoring and early warning systems.

8.2.1 Crisis Control Models

As was stated in Chapter 2, modeling a crisis helps a business organisation to recognise and understand the numerous variables, characteristics, and events, which influence the

crisis situation. The crisis control models developed by various scholars and practitioners in this field are numerous but similar in nature and applications as per the discussion provided in Chapters 2 and 3. While the models discussed in Chapter 2 tend to cover all aspects of a crisis, in this section of the thesis, the emphasis should be given to their strategies developed to deal with the situation before a crisis.

The three models: (i) Best Practice Model for Crisis Management by Mitroff and Anagnos, (2001); (ii) Multifaceted Approach to Crisis Management by Hickman and Crandall (1997); and (iii) Crisis Process Continual Improvement by Campbell (2004), provided in Chapter 2 represent the concepts and principles of the majority of crisis control models and can be used as an effective tool in controlling crises before they happen. For example, the model developed by Campbell (2004) is similar to earlier discussions in Chapter 2 regarding the crisis phases that were attributed to Mitroff (1993) and this shows that most of the models are based on some common elements such as crisis identification, crisis planning and control and tend to cover the periods – pre, during and post crisis.

As was initially discussed in Chapters 1, 2 and 3, almost all of these models and techniques were also developed and presented from a large business organisation's point of view where larger resources could be made available and allocated to the development of crisis planning, control and procedures. From an SME's point of view, the most effective tool is a simple checklist such as the 13–point plan (Hickman and Crandall) instead of an elaborate multi-page document because of the scale of their resources and operations. This plan is provided in Appendix 3.1 (as discussed in Chapter 3) and a sample of a crisis/contingency plan based on Rike (2003) is given in Appendix 8.1 for comparative purposes.

From experience in the insurance industry, the writer has not come across any concerted effort by insurers or brokers in supplying SMEs with an information brochure on crisis planning and control techniques on a regular basis (say during policy renewal) other than concentrating on physical aspects and claims history of the organisation. In some cases, larger SMEs engage accountants or risk management consultants to review their insurance covers purely as part of insurance adequacy or cost cutting exercises instead of crisis planning and control processes.

Insurance plays a great role as one of the risk management and control tools in a modern economy like Australia and will be discussed briefly in the following section.

8.2.2 Insurance

In Chapter 3, the conceptual background of insurance as an instrument of hedging, its relation to portfolio theory (Meyer and Power 1983) and CAPM was discussed. Also insurance as one of the tools of risk management and control was reviewed based on shareholder value theories propounded by Gay and Nam (1998), Doherty (2000), Nance et al. (1993), Grillet (1992), Mayers and Smith (1987) amongst others.

It should be explained, once again, why risk is costly and why insurance adds value based on the four main shareholder value theories (Doherty 2000):

1) Risk transfer reduces expected taxes assuming that tax functions are convex. This will increase after-tax income and thereby increase the share value.

2) Risk transfer reduces expected bankruptcy costs. This will reduce the interest burden paid on debt. This will tend to increase share value.

3) Risk transfer reduces agency costs and thereby improves project selection (increasing operating income) and reduces the cost of debt. Both effects should increase share value.

4) Risk transfer will reduce the crowding out (underinvestment) and facilitate the financing, and therefore the value, of future investment opportunities. This will have a positive impact on share value.

Although the above benefits of risk transfer (insurance) are presented from a large corporations' viewpoint, they are also applicable to SMEs because they will transpire in a different form and affect the value of a business as a whole instead of through share prices. It should also be noted that insurance does not only protect business owners but also other stakeholders who have no direct claim against the assets of the company but can be affected by the operations of the business. In that sense having a proper insurance cover is part of good governance, which will have in turn a positive impact on the value of the business.

It should also be noted that some types of insurance covers are compulsory such as workcover and public liability, which are intended to cover employees and the general public, respectively. Other insurance covers such as professional indemnity insurance or product liability insurance are also required by law or professional bodies depending on the nature of the business or industry practice. In Appendix 8.2, different types of insurance covers are provided for further information.

In Chapter 5, it was pointed out that all of the SMEs covered by this study had two major types of insurance covers in place to deal with pure risk. The first one is intended to cover material damage (loss of property including building, plant and machinery, contents, stock, etc.). The second major cover is acquired to protect loss of gross profit, which is commonly known as business interruption insurance. In 50% of the cases (see Table A5.5/1 in Appendix 5.5), the SMEs were underinsured and their owners faced severe financial and personal problems. To avoid such problems, it is quite imperative for SMEs to accurately determine the value at risk by seeking professional help, if necessary.

Insurance brokers and loss management consultants generally help SMEs with setting sums insured in relation to material damage and business interruption. While the value at risk regarding various physical assets owned by a business organisation can be determined with the help of quantity surveyors, engineers and manufacturers (or agents and suppliers), detailed analysis and determination of gross profit at risk requires a business impact analysis (BIA), which will be presented in the following section of this chapter. Gross profit calculations for insurance purposes are usually different from accounting gross profit and a simple calculation sheet designed to estimate an adequate cover is given in Appendix 8.3. Zurich Financial Services provides a comprehensive instruction and calculation worksheet for the same purpose on their American website at www.zurichna.com.

8.2.3 Business Impact Analysis (BIA)

Business impact analysis is a procedure used to assess the effect that a breakdown would have on different functional areas of the business (Keehn 1993; Terry 1995). Hence, it identifies the financial and operational impacts that may result from a disruption of business operations. Various authors (Gebhardt 2000; Asbrand 1995;

Terry 1995; Wong, Monaco and Louise 1994; Coleman 1993; Keehn 1993) argue that BIA should examine each area of a business organisation to determine the critical business functions, the financial and non-financial consequences of a disaster and the cost involved in mitigating the loss from a disaster.

To conduct a BIA requires preparing a detailed plan, which involves a number of steps. Different risk management consultants follow different steps and procedures in conducting a BIA. Also different academics suggest different approaches (Mitroff et al. 1996; Campbell 2004; Coleman 1993; Myers 1999). In Appendix 8.4, a sample guide to the preparation of a BIA is attached for further information. There are also some computer softwares designed to help with the preparation of a BIA. For example, a company known as Strohl Systems has windows-based computer software, BIA Professional in the market exclusively developed for this purpose (www.strohl-systems.com).

A BIA based on all of the operational areas identified earlier in this section can be too much for SMEs given their limited resources. However, a shorter version of BIA is quite essential because business organisations that have such plans in advance are better placed to withstand a crisis (Mitroff et al. 1996; Campbell 2004; Myers 1999). It is also important to note that a BIA is generally prepared as part of business continuity planning (BCP) and is treated as a foundation of this process. The next section deals with the concept and process of BCP.

8.2.4 Business Continuity Planning (BCP)

Various authors and crisis management experts use different terminologies to describe BCP. For example, the terms business contingency planning, crisis management and recovery planning are also very commonly used. Some authors (Andrews 1990; Epich and Persson 1994) use disaster recovery planning (DRP) and business recovery planning (BRP) as synonymous with BCP. However, the majority of authors treat DRP as part of BCP that deals with emergency response to particular event (Morganti 2002). Then, what is BCP?

Business continuity planning (BCP) is the process of developing and maintaining an effective written plan of how organisations will continue to operate in the event of

interruptions of business functions (Andrews 1990). Tilley (1995) describes that BCP allows an organisation to continue to meet business objectives and customer obligations, and to maintain its market share. Morganti (2002) argues that BCP is strategic in its application in that it keeps facilities up and running after they have been 'damaged' in some way. Damage could be something as non-mechanical as lack of access to the business premises.

According to Campbell (2004), BCP offers an organisation a number of immediate benefits including:

- increased awareness of exposures to crises;
- understanding the full range of issues likely to be encountered;
- a plan specifically configured to each operation and business unit;
- improved crisis communication between management, employees, media, government, suppliers and customers;
- company employees better understand their roles and responsibilities, their strengths and weaknesses, and their part in the bigger picture; and
- enhanced corporate governance, management control and an improved reputation with external opinion makers such as government, bankers, financial analysts and industry peers.

Sapriel (2003) argues that the benefit of and the need for BCP have increased since the turn of the new millennium, particularly since the tragic event of September 11, 2001. The Lifelong Learning Marketing Report (2001) conducted a survey for the BCP market in November 2001 and discovered that the demand for training related to BCP and DRP was going to grow by 40% in 2002, driven by heightened concerns over workplace emergency preparedness in the wake of September 11.

Although there is a vast body of literature and reports that support the creation of BCP, there are also some concerns raised by academics and practitioners regarding the effectiveness of BCP in the event of a crisis. For example, Swartz (2003) reports that according to research conducted by the Meta Group, only 20% of Global 2000 organisations have BCP effective enough to ensure a strong likelihood that they will survive a disaster without long lasting adverse effects. The author did not provide

reasons for the ineffectiveness of BCP's in 80% of the cases but recommends that sound BCP should begin with senior management confronting and demanding honest answers to a vital question and allocating adequate funding to the creation, review, testing, and upgrading of BCP as an ongoing project.

The discussions provided so far indicate that BCPs are mainly in the realm of large organisations and require allocation of large sums of money in order to be effective. Therefore, the question is whether or not SMEs should be concerned with the preparation and maintenance of BCPs. Unfortunately, it is very hard to answer this question because there have not been major studies undertaken in Australia regarding SMEs' organisational preparedness.

A survey undertaken in New Zealand by Ewing-Jarive (2001) shows that New Zealand organisations (large and small) are poorly prepared for a crisis and this has also been exacerbated by the influence of Polynesian cultures. His findings regarding SMEs' responses to Preventative Management Action is provided in Appendix 8.5 and show that the majority of SMEs seem to be unconcerned. Thirty out of 41 SMEs solely depend on their insurance for an unfortunate event. But the author has not verified whether or not their insurance was adequate in the event of a disastrous event.

The SMEs covered by this study had no BCP or checklists for likely crises as was discussed in Chapter 4. Company A was forced to prepare BCP immediately after the incident because of existing and potential contracts with a large public company. The plan was prepared and shown to the customer. Even though the experience of 12 SMEs is not sufficiently representative it can be indicative of other similar SMEs that there is a need for attitudinal change regarding crisis preparedness.

The financial crisis management model developed in this thesis involves a crisis planning process during its 2nd phase of the crisis management process and helps to a certain extent in bridging this gap. However, SMEs need to be conscious of crises and prepare at least a checklist similar to what is provided in Appendix 3.1 and revisit the same from time to time in order to ensure its effectiveness.

8.2.5 Monitoring and Early Warning System

From the outset it is quite essential to note that a review of monitoring and early

warning systems is intended to strengthen the financial crisis management model developed in this thesis in such a way that the owner manager of an SME is able to assess the business existing prior to the crisis, identify any shortcomings or variables that indicate poor financial health and include remedial actions in the recovery plan, as necessary. Accordingly, the following discussions present the quantitative and qualitative warning systems available to business owners, managers, lenders and financial analysts.

8.2.5.1 ***Quantitative Approach to Early Warning System***

The corporate financial distress analysis and corporate failure prediction models in Chapter 2 show that it is possible to identify some 3 to 5 years in advance whether a company is in financial trouble and is domed to fail. The study in Australia by Castagna and Matolcsy (1981) indicates that the most commonly used statistical method, Zeta Model (also known as Z-Score model) is unreliable in relation to the Australian economy. But other studies regarding Australian public listed companies by the pioneer and most respected American scholar in this field, Professor Altman and his co-author, Izan in 1981 and Izan in 1984 found that the Z-Score is robust as far as the Australian economy is concerned, if applied appropriately.

The corporate failure prediction model is generally based on some of the financial ratios that were identified in Table 4.5 in Chapter 4. The original Zeta index developed by Altman (1968) and revised several times as recently as in Altman (2002), is based on five financial ratios shown in Table 8.1.

Table 8.1 Z-Scores

Variable	*Ratios*
X_1	Working capital/total assets
X_2	Retained earnings/total assets
X_3	EBIT/total assets
X_4	Market value of equity/book value of total liabilities
X_5	Sales/total assets

Source: Altman (2002)

In case of the Australian public companies, Altman (2002) argues that the ratios that have more relevance are different from the set of indices shown above and are presented in Table 8.2.

Table 8.2 Z-Scores for Australian Companies

Variable	*Ratios*
X_1	EBIT/total assets
X_2	EBIT/Interest
X_3	Current Assets/Current Liabilities
X_4	Funded Debt/Shareholders Funds
X_5	Market value of equity/Total Liabilities

Source: Altman (2002)

It is generally accepted that there is no universal Z-Score that can be applied to all economies and across all industries within the same economy (though the Australian Z-Score (Izan 1984) tends to suggest that its factors are applicable across all industries in the economy). Further its application is limited in that it is developed for the purpose of analysing public companies, instead of other forms of private companies in any economy. Contrary to this view, Altman (2002) advocates that Z-Scores can be re-estimated, not simply modified as some authors and practitioners attempted to do by substituting one variable for another (for example substituting the book values of equity for the market value in X_4) and applied successfully to private companies.

8.2.5.2 Qualitative Approach to Early Warning System

To overcome the shortcomings of Z-Scores and its various critics, McRoberts and Hoffman (1997) suggest that financial analysts should also look at what the banking industry calls CAMEL i.e. capitalisation (or gearing), assets, management, earnings and liquidity. The authors further point out that management is probably the most common cause of corporate failure and collapse. The analysis regarding management should cover factors such as a one-man rule, a weak and submissive board, poor financial information, loss of key personnel and overtrading which are all assumed to be the symptoms of the company that is on a trajectory to fail.

Further qualitative studies of early warning systems involve the theory and practice of trajectory of failure. McRoberts and Hoffman (1997) note that there are three main paths to failure or trajectories of failure. The failure trajectory is like a story line that tells a story about the birth, growth, sickness and death of a company. The three distinct and identifiable scenarios of failures are as follows:

- **Type 1 Trajectory:** A sickness, which attacks companies during their early years. According to the authors, more than 50% new companies survive for fewer than 5 years and as a broad rule, 70% of new businesses in Australia fail within their first 3 to 5 years of operations. In Appendix 8.6 (Figure A8.6/1), a graphical representation depicting a Type 1 Trajectory is attached.

- **Type 2 Trajectory:** An ailment usually associated with companies which have survived their formative years, but which strikes them as they begin to develop. The average age of a company, which follows a Type 2 trajectory, is perhaps 10 years. Appendix 8.6 (Figure A8.6/2) contains a diagram showing a Type 2 Trajectory.

- **Type 3 Trajectory:** Though this ailment can hit companies of all sizes (large, medium or small), but it commonly affects well-established and mature companies with profitable trading for years, possibly decades. The family-owned company is often in this category. Type 3 failures account for 20% to 30% of all failures. A diagram provided in Appendix 8.6 (Figure A8.6/3) shows Type 3 Trajectory.

McRoberts and Hoffman (1997) also discuss the trajectory of success, which is shown in Appendix 8.6 (Figure A8.6/4) to provide a complete picture of the expected life of all companies.

8.2.5.3 Financial Ratio Analysis – Case Studies

The question at this stage is whether the above techniques are applicable to SMEs and whether they can be used to strengthen the financial crisis management model developed in this thesis. Zeta is a tool for analysing public companies, unreliable according to some authors and generally unavailable (not developed as yet) in case of SMEs. However, single variable ratios as identified in Table 4.5 would still have some analytical values (with the necessary substitutions of variables) as common indictors of business performances and should be checked before designing any recovery plans during the 2nd Phase of the financial crisis management process.

In Appendix 8.7, financial ratios for the 12 SMEs are calculated using their financial statements (input data shown in Table A8.7/1), where available. SMEs generally

prepare *special purpose financial reports* and do not include a statement of cash flows in their accounts. As a result no ratios could be calculated in respect of funds flow (cash flows). The other 15 financial ratios shown in Tables A8.7/2 to A8.7/13 should be used with some care due to the lower quality of the annual accounts (lack of consistency and completeness) prepared by the SMEs and lack of regular (say monthly or quarterly) reporting for managerial or external purposes. For example, 5 of the 6 profitability ratios calculated in respect of Company A show improved business performances during the crisis year as opposed to the previous normal year. This is contrary to the overall cash flows, availability of stock for sale, production facilities in use and discussions held with the owner. It looks as though the preparation of the financial statements were driven by other considerations (such as tax) more than anything else.

However, the analysis of the financial ratios prior to the crisis year can help in the development of a recovery plan by highlighting the weaknesses existing prior to the loss. For example, Company A's profitability ratios were already low and these need to be investigated in designing new marketing strategies applicable during the crisis period.

8.2.5.4 ***Non-Financial Indicators – Case Studies***

Some non-financial variables were identified and are provided in Table 4.6. However, other than the age of the company, no other reliable data could be obtained from the SMEs surveyed due to the nature of record keeping. On the basis of the case studies in Chapter 5 and the trajectory of failure discussed above, the newer the business, the harder it gets to cope with crisis situation. Company K fits well in this category for a number of reasons. The owner manager started the business in March 2002, faced bushfire in December 2002 and appointed an administrator in February 2004 who eventually decided to liquidate the business. From observation, the business was ruled by one man (though there were two senior managers as well), suffered the loss of key personnel and produced poor or unreliable accounting information. The misplacement of priorities in terms of services to customers and financial sacrifices, and other characteristics tend to indicate that the company was on its way to collapse even without the fire.

Here, the lesson for an effective loss consultant and owner manager of an SME is to identify the managerial, operational and financial characteristics of the business in place, prior to the crisis and design the recovery plan in such a way that the business

will be able to take remedial actions regarding its pre-loss shortcomings that will otherwise exacerbate the crisis, and handle the impact of the crisis effectively. A financial crisis management model that is developed in such a way will not only avert the catastrophic consequences of a crisis but also that of any existing ailment. This is a classic example of killing two birds with one stone.

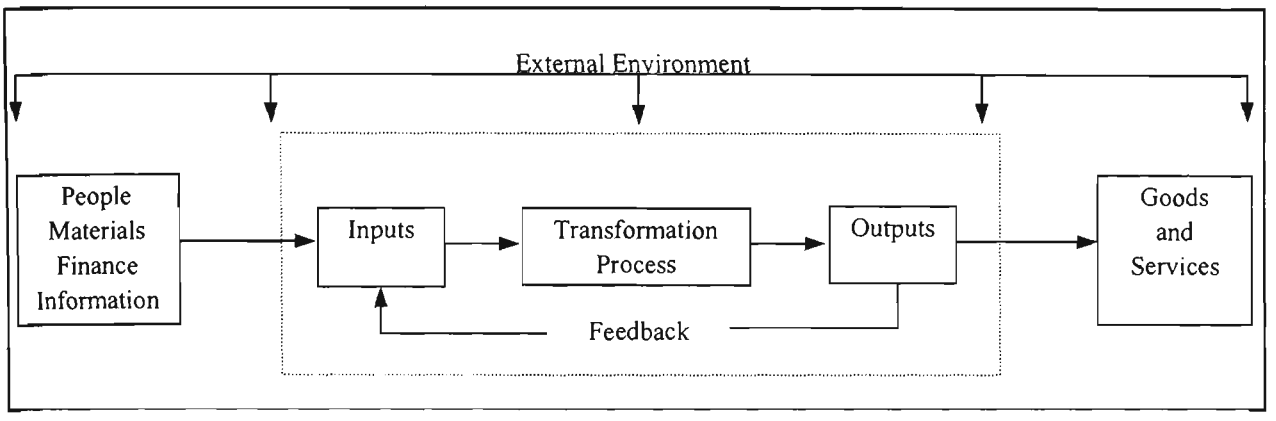
8.3 Crisis Management Phases

In operational terms, the phases of an abrupt financial crisis management is divided into 6 distinct phases based on the new approach to crisis management as discussed in Chapter 2 and the case studies presented in Chapter 5. These phases are similar to Motroff's (1996) classification in so far as the methodologies are concerned but different in terms of the period covered, the approach adopted, the entities targeted, the instruments used and the strategies followed.

The phases identified in this thesis are: (i) assessment of incident; (ii) crisis management planning; (iii) temporary resumption of operations; (iv) replacement and reconstruction of tangible assets; (v) marketing and promotion; and (vi) permanent resumption of operations. Figure 2.8 provided in Chapter 2 can be referred to refresh memory. Detailed discussion of these phases is given below.

8.3.1 Phase 1: Assessment of Incident

Following any disaster, it is necessary to identify the nature and extent of the damage including its impact on the products and services, key processes, management and staff, customers, suppliers, financiers, competitors and all other stakeholders. The assessment of incidents is a precursor in the preparation of all the necessary input for the crisis management planning that follows this phase. It is important to note that management does not have to wait for one phase to be officially or otherwise over to embark on the next one, as some phases can overlap and should legitimately be undertaken at the same time. In short the assessment of incident includes the incident itself and its impact on various organisation units and their resources.



Adopted from Bedian and Zammuto (1991)

Figure 8.1
Organisational System Based on Open System

The new approach to an abrupt financial crisis management developed in this thesis adopts a systems approach to an organisation. Based on Figure 8.1, it is easy to see the interaction between an organisation and the larger environment, and the interdependence that exists within an organisation among individuals that work together to achieve a common goal. This indicates that an organisation is an open system and as such it is composed of interacting units or elements that form an integrated whole intended to perform some function (Skyttner 2001).

Table 8.3 Functional Units (Subsystems) of SMEs Surveyed

SMEs	*Human Resources*	*Accounting/ Finance*	*Production/ Operations*	*Sales/ Marketing*	*IT*
Company A	No	Yes	Yes	Yes	Yes
Company B	No	Yes	Yes	Yes	No
Company C	No	Yes	Yes	Yes	Yes
Company D	No	No	No	No	No
Company E	No	Yes	Yes	Yes	No
Company F	No	No	No	Yes	No
Company G	No	Yes	Yes	Yes	Yes
Company H	No	Yes	Yes	Yes	Yes
Company I	No	No	Yes	No	No
Company J	No	No	No	No	No
Company K	No	Yes	Yes	Yes	No
Company L	No	Yes	Yes	No	No
Total	Nil	8	9	8	4

The interdependence shows the involvement of more than one person and multiplicity of functions within an organisation. Hence it is natural to assume that organisations are commonly structured on a functional basis for performing their tasks (Daft 2004; Pettinger 2002). A functionally structured organisation groups its activities into separate units or departments, each of which undertakes a distinctive function – marketing, production/operations, accounting/finance, IT, and so on (Bedian and Zammuto 1991).

In the light of the above information and the case studies presented in the previous chapters, the impact of a crisis on SMEs' functional units needs to be assessed individually and as interacting units from the outset. Table 8.3 shows the functional units used by the SMEs surveyed in this thesis and forms the basis for the discussion to follow.

The majority of the SMEs (9 out of 12) have a separate unit or a dedicated team responsible for production or operations. Maybe this is necessitated due to the importance of delivering quality products or services to customers (being a core activity), the nature of skills required to produce goods and services is different compared to other affairs of business organisations or customer service being the purpose of its existence (Hilmer 1990). Whatever the reason, this shows that a production unit is a major subsystem of SMEs that needs to be assessed in great detail for the purpose of developing a proper crisis management planning during the 2nd Phase.

The other subsystem that has a major influence on the crisis management planning is an accounting and finance unit. Traditionally, accounting can be described as the collection, classification and interpretation of information about financial transactions (Clift 1990). Perison et al. (2002) state that finance is concerned with a company's investment and financing decisions. Since both accounting and finance deal with the financial activities of a business organisation, they are generally grouped together and performed by a single unit or individual in case of the SMEs.

From the survey of the SMEs included in this thesis, accounting and finance play less sophisticated roles in that they are intended to capture basic financial transactions that take place within the organisations, record orders and issue tax invoices and provide a financial tool to monitor accounts receivable and accounts payable. It is also common among the SMEs surveyed to produce monthly profit and loss statements to monitor financial

performances and prepare quarterly Business Activity Statement (BAS) to be lodged with the Australian Taxation Office. Where the expertise lack, the accounting raw data is sent to their external accountant for the preparation and lodgment of BAS. Payroll is also another important activity performed as part of accounting and finance function within SMEs.

Accounting for business operations in a disruptive mode gets quite complicated by those transactions that are related to costs and expenses rather revenue because revenue items are limited while costs and expenses can be numerous and also different in nature during a crisis. On the other hand, keeping accurate and reliable accounting information during a crisis is quite essential in that a number of activities undertaken during the various phases of the financial crisis management process involve financial assessments and decisions. Table A8.8/1 in Appendix 8.8 provides a summary of such activities during various phases of an abrupt financial crisis management process.

In general, SMEs need to assess the impact of the incident on the accounting requirement of their business during this phase and modify their general ledger and other accounting system to account for crisis related transactions by creating a batch of accounts within the ledger to record, sort and analyse them until such a time that the disruption is over. Owner and managers of SMEs also need to assess the impact of their accounting system and see how it can help them in minimising the impact of the incident.

It is also essential to assess the impact of an incident on other subsystems of an organisation including IT and marketing, and the impact of these units on the recovery process. Marketing and promotion will be discussed in detail under Phase 5 but suffice to say that the application of IT as an information system is very useful during a crisis, as the assessment of potential and actual losses and the utilisation of cash flow optimisation and post-loss investment models require spreadsheet based solutions. Therefore assessing the impact of an incident on various subsystems within organisations and vice versa is quite important.

Simply the targets during this phase include the assessment of expected sales and cash flows based on new trading circumstances, direct costs of crisis, variable costs, increased costs of working, labour and payroll requirements, overhead expenses, and IT requirements in the post incident environment. SMEs can employ different tools and instruments to estimate these parameters as discussed in Chapters 6 and 7. Business

impact analysis (BIA) can also be used during Phase 1, though it is generally regarded as a strategic crisis management tool (Keehn 1993; Terry 1995) to be utilised in a pre-crisis mode. The business valuation model discussed in Chapter 2 (Equation 2.1) can be applied to assess the likely impact of the damage on the overall value of the business at this stage and throughout the rest of the financial crisis management phases.

8.3.2 Phase 2: Crisis Management Planning

Crisis management planning is a critical step in containing the damage of any crisis and in the recovery process because it sets out the actions to be taken from this point onward until all business assets (tangible and intangible) are restored or the system is back to normal. The criteria for the restorations of such assets or normalisation of the system should also be set at this stage based on management's expectation existing prior to the incident. From this research and experience, the general criteria to measure the normalisation of the system are:

1) The restoration of sales and sales growth. This criterion provides important information regarding the cash flows of the business and its market share (sales is used a proxy for market share in this case). While it is very difficult to determine the level of sales that would have been achieved but for the disruption, management can make reasonable assumptions to arrive at a 'normal level of sales'. It is also important to measure sales growth as well.

2) The restoration of profitability. This is also the other major criterion that should be used in assessing the normality of the system, as a business organisation in crisis mode might be able to generate the 'normal level of sales', but do so at a higher cost. Financial ratios such as return on investment (ROI), gross profit margin, etc can be applied for this purpose. Also, other efficiency ratios may be used to complement ROI and gross profit margin.

Generally, the objective of a financial crisis management plan is to develop a disruption management blueprint or to generate alternative scenarios and business plans based on the internal and external environment of the business following an incident that caused the system to significantly deviate from its original plan, and severely affects its performance (Yu and Qi 2004). Being a short-term business plan, a crisis management

plan should cover the basic organisational functions of SMEs, i.e. production (or operations), finance and marketing, during the disruption period.

On top of the above, this phase involves among other things the consideration of a cost-benefit analysis of a temporary resumption of business versus a postponement. In planning for the activities undertaken during the crisis period and in developing a blueprint for recovery, SMEs can make use of a managerial tool such as project management.

The two most common project management techniques that help managers plan, schedule, monitor and control projects are Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM). Both techniques are similar in nature and application but differ in the way activity times are estimated. PERT is a probabilistic technique in that it allows finding the probability that the entire projected will be completed by any given date. CPM, on the other hand, is a deterministic approach because it uses two time estimates, the normal time and the crash time, for each activity (Render et al. 1997). Nowadays, it is not uncommon for both methods to be blended together and used at the same time to increase their usefulness.

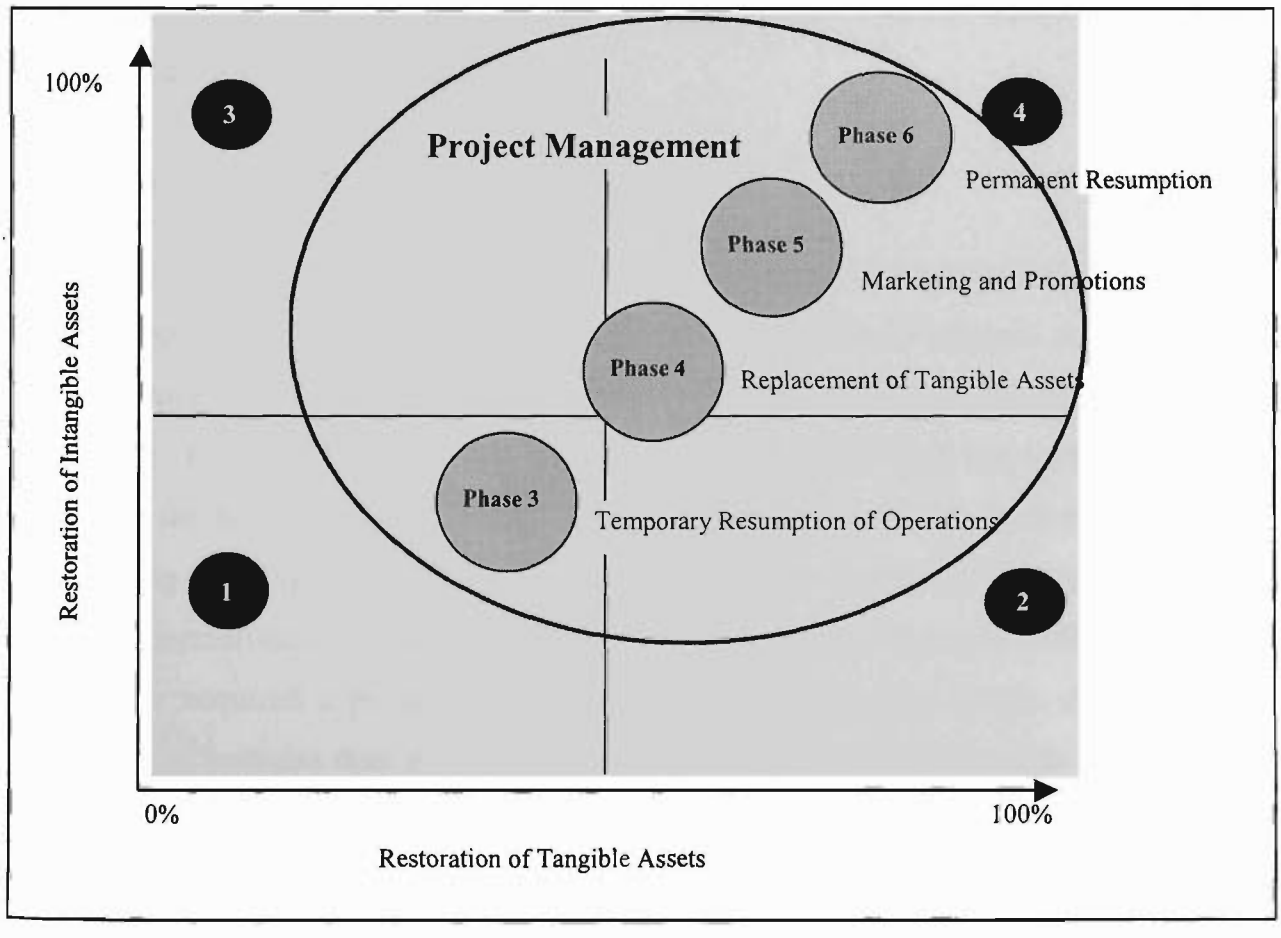


Figure 8.2
Application of Project Management to Financial Crisis Management

By using the concept and techniques of PERT/CPM, SMEs are able to thoroughly analyse the tasks involved, accurately estimate the time and resources required, and understand the physical and logical interdependencies (Ragsdale 2001) of various activities required to complete the recovery process. The CPM developed during this phase should cover the tasks to be performed during the remaining phases of the crisis management process and need to be seen as a dynamic tool because things might change as the company proceeds from one phase to another and as new solutions are found and implemented. None of the 12 SMEs studied in this thesis had prepared or thought of CPM other than having a broad idea of what was going to happen. With this sort of planning and instruments, SMEs can reduce the chance of confronting unexpected variables and cost blowouts. Also having such a plan will help in setting mini targets towards which SMEs can work to recover in time and at a minimal cost. The following diagram (Figure 8.2) shows the main phases of an abrupt financial crisis management process covered by project management.

While an Excel spreadsheet can be used to develop both CPM and PERT, specialised project management software such as Microsoft Project (MS Project) can make the tasks much easier and simpler. Information regarding MS Project can be accessed on www.microsoft.com/office/project.

8.3.3 Phase 3: Temporary Resumption of Operations

Depending upon the extent of the damage and the alternatives laid out in the disruption management plan, SMEs in crisis situation might decide to relocate to temporary premises, hire equipment or outsource certain activities in order to resume operations temporarily. It should be noted that the level of operations during this period could be lower than the normal time operations. In any case, this is a critical phase as the actions taken during this stage of the crisis will have a significant impact on the length of a full recovery (normalisation of the system) once the business is relocated to its permanent premises or acquired a permanent replacement of its productive assets. A permanent resumption of business does not necessarily mean that the system is back to normal.

During this phase the plan established during the planning process should not only be implemented but also be reviewed in the light of new information to modify the plan to suit the internal and external environment. From this research, temporary resumption of

operations is always advantageous but hard to assume that this path should always be considered due to different loss scenarios (physical, financial or legal factors) in different crises environments. Given the importance of this phase during an abrupt financial crisis management process, the production/operation subsystems of the SMEs covered by the survey will be discussed below.

Production is generally viewed as a process of transforming raw materials, direct labour and factory overheads into finished goods. As a result it is commonly used in relation to manufacturing activities. On the other hand, Thompson and Strickland (1999) describe operation as having a broader meaning and it includes activities, costs and assets associated with converting inputs into a final product or service (production, assembly, packaging, equipment maintenance, facilities, quality assurance, environmental protection). For the purpose of this research both terminologies can be used interchangeably but the context of their use may determine the actual meaning of the word.

Nine out of the twelve SMEs surveyed in this research had a separate team or an independent functional unit within their organisation responsible for production or operations. Their functions during normal business operations were generally to produce goods or services following the instructions of their immediate boss or the owner manager. The incidents that were identified and discussed in Chapter 4 mainly affected these core activities of the SMEs as all of them were unable to produce or service their customers partially or at all for certain period of time.

This subsystem would play a central role during an abrupt financial crisis management process, if the SMEs involved in a crisis made a decision to resume operations temporarily and partially to service their customers using substandard facilities, and pushing their employees to the limit to create a 'miracle'. In this situation, the quality of the products or services must not compromised, nor should the employees be stressed or their safety neglected. This can be achieved by adopting various strategies including the relocation of business, outsourcing, hiring machine, sharing facilities and importing. Table 8.4 is extracted from Appendix 5.7 and shows the strategies followed by the SMEs surveyed.

Table 8.4 Mitigation Strategies for Production Loss

SMEs	*Temporary Relocation*	*Permanent Relocation*	*Machine Hire*	*Outsource*	*Import*
Company A	Yes	No	Yes	No	No
Company B	No	Yes	No	Yes	No
Company C	No	No	No	Yes	No
Company D	Yes	Yes	No	No	No
Company E	No	N/A	No	No	Yes
Company F	No	Yes	No	No	No
Company G	No	No	Yes	Yes	No
Company H	No	No	No	No	No
Company I	Yes	No	No	No	No
Company J	Yes	No	No	No	No
Company K	No	No	No	No	No
Company L	Yes	No	No	No	No
Total	5	3	2	3	1

From the above table it can be seen that in order to resume operations and deliver goods and services, the SMEs used different strategies with varying degrees of results. Some of them used more than one strategy at a time (Company A and Company G), or at different times (Company B and Company D). Company B for example first outsourced production and operations and then permanently relocated its business. In some cases depending on the nature of the business, none of the strategies could be applied as in the case of the hotel business (Company K). While there is no ready-made formula to be applied, SMEs need to map out their strategies during the second phase of the crisis management process as discussed in 8.3.2.

The consequences of not considering alternative operational facilities or methods on a temporary basis can be severs such as what happened to Company H following the water damage to computers and showroom. Temporary relocation of the showroom within the existing premises and computers hire would have saved the company hundreds of thousands of dollars.

8.3.4 Phase 4: Replacement and Reconstruction of Tangible Assets

It is generally assumed that the business is now operating in a temporary mode and it is also involved in the procurement or reconstruction of its tangible assets damaged or

destroyed as a result of the incident assessed during Phase 1. It also may be directly undertaking this process by skipping Phase 3 because it was assessed to be unviable or impossible.

Given the plan developed to undertake this process and new information that has emerged since then, several strategic, operational and financial decisions need to be taken during this phase. For example, the business may have to move to a completely new location, alter the factory layout, upgrade the machinery or abandon the whole business. It should be noted that Chapter 6 provided in-depth analysis of such activities and no further discussion is needed here. However, it should be noted that there are other factors such as recruitment of personnel in case the business lost its manpower due to temporary shutdown, re-negotiation with suppliers and major customers, arrangement of lease and re-accreditation of quality standards, that must be considered as part of the activities to be undertaken during this phase of the crisis management process.

8.3.5 Phase 5: Marketing and Promotion

During this phase, the business should step up its marketing effort as it is going to operate in full capacity and in some cases in better and bigger condition. This is primarily the relaying of a positive message to old, new and potential customers that the business has not only survived the damage but has also come out in better and bigger shape.

The cost and impact of various marketing strategies should be revisited during this phase (the initial plan was laid out during Phase 2) with the ultimate aim of recapturing the ground lost or to be lost during the remaining disruption period i.e. up to such a time when full and total recovery of the system is attained.

The consideration of effective marketing programs for the entire crisis period and beyond, so that the business is able to maintain its competitive advantage. A company is said to have a competitive advantage whenever it has an edge over its rivals in attracting customers and defending against competitive forces (Thompson and Strickland 1999). Porter (1985) describes competitive advantage as the ability to create a value for a buyer that exceeds the firm's cost of creating it.

Table 8.5 Marketing Strategies

	Product		***Price***		***Place***		***Promotion***	
SMEs	***During***	***Post***	***During***	***Post***	***During***	***Post***	***During***	***Post***
A		New			Selected	Expand	Contact	
B					Selected	New		
C	Quality						Contact	
D	Selected	Selected						
E							Contact	
F								Vouchers Ads, etc.
G	Quality						Contact	
H			Low		Shift			
I	Selected	Full						
J	Selected	Full						
K	Selected	Selected	Low	Low	Selected		Ads, salesmen	Brochures Ads
L	Selected	Full					Local Ad	Local Ad

Table 8.5 is based on the discussions provided in Chapter 3, and constructed to identify marketing strategies adopted during and post the reconstruction of the physical assets damaged as a result of a disastrous situation. The purpose of marketing strategies post the reinstatement period (i.e. Phase 4) is to regain the competitive advantage including market share and reputation that might have been lost or damaged during the physical disruption period and is unlikely to be restored immediately after the restoration of the physical assets.

From Table 8.5, it is clear that the SMEs followed different strategies during and after the physical disruption period in an attempt to maintain their market position that is ultimately measurable in terms of sales. The strategies followed are discussed below.

1) **Product Strategy:** Most of the SMEs that adopted different product strategies during and or post disruption periods attempted to offer selected products (or services) that could be produced, those that were required by their most valuable customers or those with a high profit margin. It is quite dangerous to offer selected products on cost or convenience basis without considering customer needs and preferences because the company might be pushing what it wants to sell rather than what the customers want to buy.

The above strategy could backfire and alienate the company as in the case of Company K, where the owner decided to close down the café and run the restaurant only to minimise cost. But the local communities and clienteles were more interested in the café and its services rather than the restaurant designed to cater for the guests that stayed overnight. The result was devastating as reported earlier in this thesis.

In general a strategy based on selected products or services pays off, if it is based on a proper analysis of customers' needs and requirements and products availability and profitability by using a technique such as ABC Analysis as discussed in Chapter 7.

2) **Pricing Strategy:** A couple of SMEs offered low prices for their normal products or services during the crisis period. Company H's low pricing strategy was necessitated due to some specific products with a short shelf life. From the previous discussions, it is obvious that most of the problems of this SME emanated from poor assessment and planning of the crisis from the outset. At the end the strategy did not work well as it created unnecessary conflict with it wholesale customers that were unhappy due to poor service and unfair competition at the retail end of the business.

   Company K attempted to attract customers by lowering its prices but by offering the 'unwanted' services. Once again this strategy failed spectacularly and shows that it is vital to understand the basic economics concept of demand elasticity with respect to price before making any attempt to attract and retain customers on a lower price basis.

3) **Place:** Company A created a niche market within its own larger market, as the appropriate marketing strategy during the disruption period. This targeting was quite deliberate and clever given the target market was the most profitable, loyal and long-term one. As soon as the physical capacity improved, the company embarked on its expansion strategy that was stopped during the severe disruption period.

   Another SME, Company B concentrated on the long-term and loyal customers during the severe disruption period. At the same time the company was also

researching whether it was worthwhile to continue to operate in Australia after so much damage was done to its reputation and its loss of in-house access to very important technology. At the end it decided to move to China.

The decision to shift products from wholesale to its own retail outlets by Company H was not only a change of market but also a distribution channel in that the company did cut out other retailers from selling its products to final consumers. Wholesale customers saw this as a deliberate act by Company H and finally deserted the business. This had a mixed result in that it helped the company to concentrate now on its retail business, which is more profitable, but it led to the loss of the wholesale business built over many years.

The closure of the café and the operation of the restaurant only by Company K was motivated by cost cutting but had unintended consequences in that it alienated a certain group of customers. In other words, this decision was tantamount to withdrawal of market that resulted in a bad outcome.

The implications of the decisions taken by Company H and Company K show that any marketing decision taken in relation to one mix in isolation of the others can have negative implications and requires that the decision maker should consider the whole marketing mix as one package instead of mutually exclusive alternative marketing strategies.

4) **Promotion:** The common form of promotional strategy adopted by the SMEs during the disruption period was maintenance of high-level contact with the majority of their customers. It was applied and worked for those SMEs with commercial customers, and it was viewed as an effective and cheaper method of keeping customers informed about the incident, the plan for recovery and the progress from time to time. Company G applied this technique but used a different mode of communication in relation to different market segments.

Company K produced local radio and newspaper ads and used externally based salespersons to promote the company's services. Following the restoration of some of the assets and change of season, the company produced new brochures, modified its website and even made some TV ads to viewers in Melbourne to attract traditional winter customers. But the whole effort

produced little benefit due to misplaced priorities in terms of services offered, rumors and bad publicity in the community and local townships.

From the experience of Company K, it is possible to note that without the appropriate products and services in place, it is hard for any business to reap substantial benefit from any form of promotional strategy. Once again, this point reinforces the previous position that all marketing mixes should be analysed and applied as a whole package.

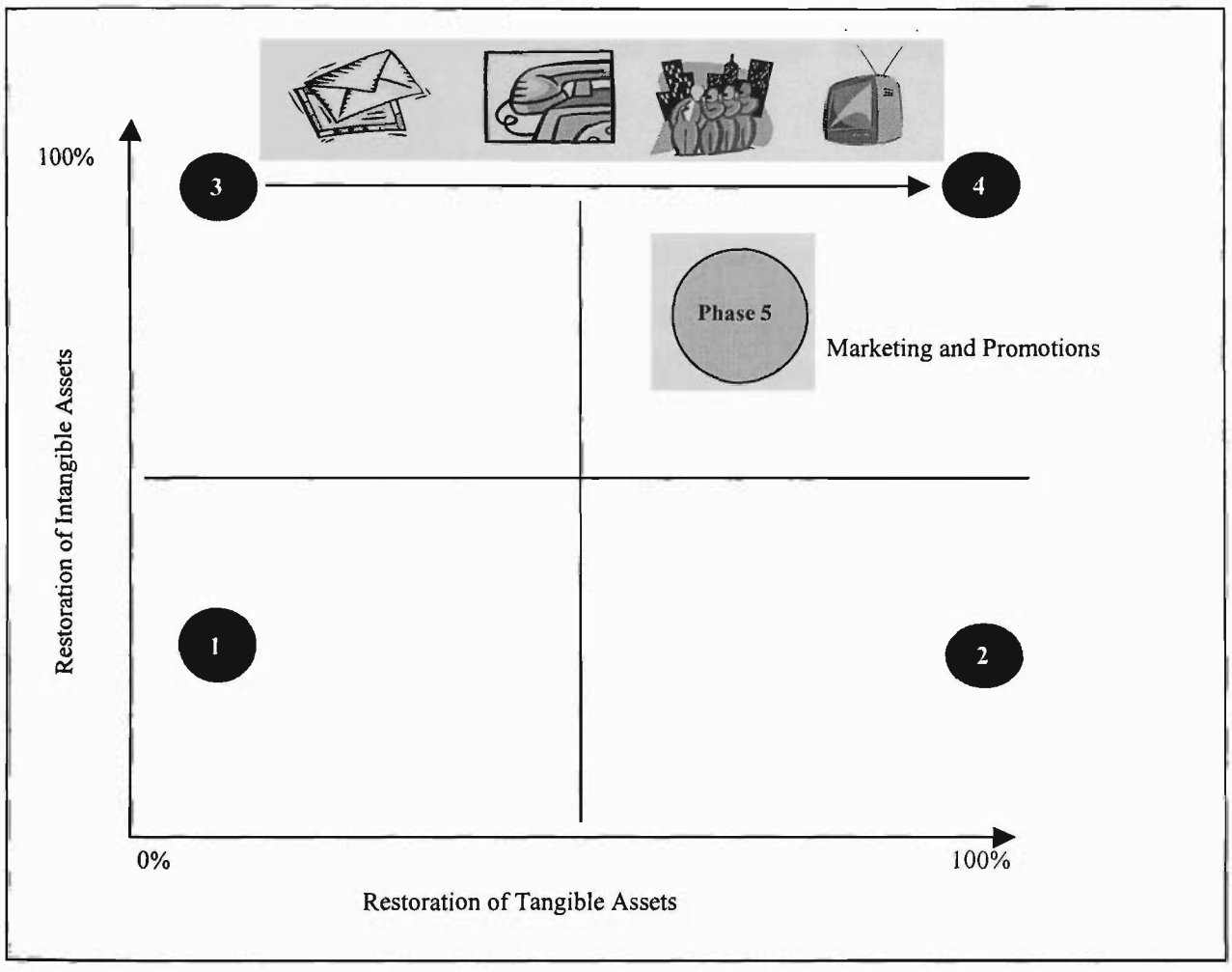


Figure 8.3
Application of Marketing Strategies to Financial Crisis Management

It should be noted that an effective marketing strategy is important during a disruption period to work out a strategy that helps recover fully from a crisis in terms of market share and sales growth once the reconstruction of the physical asset is over. As shown in Figure 8.3, the focus of marketing strategy during Phase 5 of the financial crisis management process is to move the SME back to its former 'glory' (Position 4 on the financial crisis management model developed in Chapter 2). As was set out in

Chapter 2, the target of the business is to be able to achieve the same level of sales and sales growth based on the expectation of the management existing before the crisis.

On top of the marketing strategies based on the 4 Ps, SMEs also need to conduct a SWOT analysis to ensure that any marketing strategies they develop take into account new threats and weaknesses or opportunities and strengths. All these strategies should be developed during Phase 2 of the crisis management process and revisited in the light of new information during the current phase and before being implemented. Most importantly, a crisis can also bring new opportunities and benefits (Meyers and Holusha 1986) in terms of new technology and shift in strategic thinking that must not be forgotten.

Once again the main target of the financial crisis management model during this phase is to restore the intangible assets of the business organisation including market share, sales growth and reputation. The instruments used for this purpose include the 4 Ps of marketing mix and SWOT analysis. The strategies cover traditional and electronic media, lower prices, gift vouchers, new brochures and personal contact.

8.3.6 Phase 6: Permanent Resumption of Operations

The final step in this journey is to reacquire the pre-loss physical and operational facilities and to realise the expected capabilities at this point in time. It is the process of ensuring that the business will be able to serve its customers without any disruption or undue pressure on the system. In other words, all of the elements of the system are in agreement and in an optimal position (Position 4 on the financial crisis management model). In essence this is a continuation of Phases 4 and 5 and can take a very long time to complete if the business has already lost its competitive edge due to poor crisis management or changes in the external environment.

It should be noted that these phases are all post-incident activities and refer to the financial crisis management processes and actions that may be necessary to mitigate the loss and restore normal business operations. These phases should be handled with a varying degree of skills, knowledge and expertise, as they require different professional approaches at each and every stage.

For example, Phase 1 involves claim preparers, loss adjusters, quantity surveyors, and salvage and recovery specialists. Phase 2 requires the involvement of owner manager, senior staff and claims prepares. On the other hand Phase 5 relies on the expertise of marketing specialists. Phases 3 and 4 are concerned with the reinstatement of tangible assets and operational matters, while Phase 5 is concerned with the restoration of intangible assets of the business. More specifically, Phase 5 is required to restore market share, sales growth and reputation while Phases 3 and 4 are required to restore buildings, plant and machinery, stock and contents on a temporary or permanent basis.

Some of the phases can overlap and some of them may not be necessary if the incident does not warrant them such as temporary resumption of the business not being possible for financial or physical reasons or state and local government requirements. In case of partial destruction of a productive asset (plant and machinery), temporary resumption of business is easy as in the case of Company G. In case of the hotel (Company L) or the textile printing business (Company B), temporary resumption of operations was impossible because the businesses could not be relocated for physical reasons. For example, the hotel business could not have been physically relocated, as its main offer (attractions) to customers was the historic building and the scenery surrounding the hotel. The premises of Company B were a 'no-go zone' and therefore no one can move anything.

The various phases of the model should also been seen as different elements of the crisis management system that interact with each other for the purpose of accomplishing the normalisation of another system that is an SME in crisis mode. This approach requires that the various phases should be seen to have an impact on each other and should be in agreement to achieve their purpose.

8.4 Strategies and Policies in Crisis Management

So far in this thesis the emphasis was on the identification of the targets and the development of the instruments of the financial crisis management model developed in Chapter 2. In this section some general strategies and policies that affect the planning and implementation of an effective crisis management process will be discussed. To this effect, business ethics and stakeholders analysis, corporate governance and corporations' law will be presented as follows.

8.4.1 Business Ethics and Stakeholders Analysis

On the basis of the stakeholder theory that was discussed in Chapter 3, the owner managers of SMEs in an abrupt financial crisis mode need to identify both types of stakeholders and manage them appropriately so that the impact of the damage will not be exacerbated or the recovery process is not unnecessarily delayed. Table 8.6 contains a list (not exhaustive) of both types of stakeholders in relation to SMEs during normal business operations and in a disruption mode. It should be noted that some groups identified below might not have any impact on SMEs during normal business operations but become important stakeholders during a crisis. Some of them have minimal impact during normal operations but increase their influence in a crisis mode.

Table 8.6 Stakeholders Analysis – Case Studies

No.	*Stakeholders*	*Type*	*Normal Operations**	*Crisis Mode**
1	Owners	Normative		
2	Employees	Normative		
3	Customers	Normative		
4	Unions	Normative		
5	Suppliers	Normative		
6	External Accountants	Normative		
7	Financiers (banks, etc.)	Normative		More relevant
8	Workcover	Normative		More relevant
9	Insurers	Normative		
10	Insurance Brokers	Normative		
11	Loss Adjusters	Normative	Not relevant	
12	Claims Preparers	Normative	Not relevant	
13	Fire Authorities	Normative		
14	Competitors	Derivative		
15	Australian Taxation Office	Derivative		More relevant
16	Media	Derivative		More relevant
17	Local Government (city council, etc.)	Derivative		More relevant
18	Police	Derivative		More relevant
19	Local Community	Derivative		More relevant
20	State Emergency Services	Derivative		More relevant

** All stakeholders are relevant during normal operations and in crisis mode unless stated differently.*

Table 8.6 lists 20 stakeholders and their types i.e. whether a stakeholder is normatively legitimate or derivatively legitimate. In the third column, two stakeholders are shown as being not relevant during normal business operations, because loss adjusters and claim

preparers are remotely related to any small business and even their existence is less known to many of them. However, in the event of any insured loss, both of these entities become very important stakeholders as they extensively interact with an SME involved in a crisis and can immensely influence the pace of a recovery.

Loss adjusting is ancillary to the insurance industry and it is concerned with the adjustment of loss to be presented to insurers (detailed information regarding loss adjusters can be found on www.aila.com.au). In essence, loss adjusters represent insurance companies and are supposed to verify material damage and business interruption loss prepared by the insured. As their professional name suggests, the main thrust of their professional service is not to verify loss and make adjustments (probably a term borrowed from accounting) if necessary, but to adjust the loss from the outset with the intent to reduce claims so that the cost to the insurance companies is minimised. This is achieved in most cases by being or looking the 'tough guy', cynical and intimidating. The expressions of all of the 12 SMEs indicate that the attitude of the loss adjusters did not help much the recovery process.

For best results, it is important to identify the nature and influence of these two important stakeholders (loss adjusters and claims preparers) early during the first phase of the crisis management process in order to map out a strategy for dealing with them. The starting point for SMEs in doing so is their insurance brokers who have better knowledge of who the loss adjuster is, what he/she expects and how he/she has approached other losses in the past. A pre-conceived idea of loss adjusters is certainly not helpful and SMEs need to manage them with some degree of openness and cooperation to help their own cause. After all the ideal of loss adjusting is not to 'rip off' SMEs in the event of an insured loss but to verify the quantification of the loss in accordance with the insurance policy under which the pure risk was covered.

From experience, claims preparers are appointed with the help of insurance brokers to prepare and present the SME's claim in the best possible way and negotiate with loss adjusters and insurers for best results and speedy cash flows. However, this appointment should be done with maximum care as claims preparers add to the problems in certain cases instead of helping the recovery process by complicating insurance claims, creating unnecessary delays and engaging in professional rivalries with loss adjusters.

Other stakeholders such as Workcover Authorities, the media, the police, the local city councils and the local community play a greater role in the event of a crisis due to their involvement with various aspects of the incident, the recovery process and the operations of the business during the disruption period. Some SMEs fail to secure planning permits within a reasonable period of time from their city councilors and as a result the recovery process takes longer than anticipated. Company F, for instance, had to go through a very lengthy process to get approval on the colour and material to be used for its shop front and nearly missed the important Christmas trade. The point is to uncover all stakeholders in advance and put the necessary strategies in place so that the crisis is effectively managed and its impact is minimised. Some stakeholders come into play during a crisis and some other stakeholders increase their influence during this period. SMEs need to know this, not as they encounter them but much earlier, i.e. during the assessment stage of the financial crisis management process.

8.4.2 Corporate Governance

In its strictest sense, corporate governance issues are less relevant in relation to SMEs because there are fewer problems that arise as a result of the separation of ownership from control (Allen and Gale 2001; Herzel and Shepro 1990). The owners of SMEs are generally in control of their business and make decisions in their own best interest during normal business operations or in crisis mode. Bad decisions in SMEs, in most cast cases arise out of bad management rather than out of bad governance. If owners engage in bad governance during normal business operations by neglecting the interest of other stakeholders such as employees, suppliers, creditors, and the community at large, then it will be very hard for them to get the necessary cooperation from these stakeholders when it is needed most, i.e. in crisis mode. Company K is once again a good example, where a failure in governance prior to the crisis, exacerbated the problems during the crisis and finally led to its demise. Company G, on the other hand, enjoyed a great deal of support from various stakeholders including customers and competitors because the owners followed good governance practices.

With some larger SMEs it is also possible for some controls to be entrusted to non-owners or salaried executives to perform some duties on behalf of the company. In such circumstances, corporate governance issues arise in their classical form and require the application of some of the methods or models designed to control them. Like any other

decisions, crisis related decisions involve the commitment of financial resources with different outcomes. If an agency problem exists in the business, it is then possible for the decision maker to follow risk management and control procedures that best serve his or her interest rather than the interest of the business owners and other stakeholders.

This thesis, by outlining one of the best methods of managing an abrupt financial crisis, provides a basis for effective corporate governance policy. Any deviations from these methods can easily expose managers and therefore discourage them from engaging in decision-making practices based on self-interest. Also having the knowledge of good corporate governance practices helps design an effective crisis management plan.

8.4.3 Corporations Law

In 1988 the Commonwealth Government introduced legislation into the Parliament with a view to enabling the federal government of Australia to unilaterally assume control for the regulation of Australian corporate and securities laws and to replace the Companies, Takeovers and Securities Code with a single piece of federal legislation. The principal enactment aimed at achieving this goal was the Corporation Act 1989. However, due to some constitutional disagreements between the Federal and State governments, this enactment did not become fully effective until January 1, 1991.

After the commencement of the above law, there were a series of decisions by the High Court of Australia which created considerable uncertainty as to the nature of the Commonwealth powers over corporations and finally led to political agreement between the Commonwealth and the states for the latter to refer powers in relation to corporations to the Commonwealth and to the enactment of Corporations Act 2001 (Cth) (Tomasic, Jackson and Woellner 2002). The substantive provisions of the Corporations Act 2001 are largely similar to those found in the previous Act but the current Act is different in presentation and style.

Following the Company Law Review Act 1998, the Corporations Act 2001 (Cth) provides a number important small business guides. The relevant sections of this Act in relation to this thesis are given below.

*"**Section 1.3 Director's liability for company's debt***

A director of a company may be liable for debts incurred by the company at a time when the company itself is unable to pay those debts as they fall due.

A director of a company may be liable to compensate the company for any losses the company suffers from a breach of certain of the director's duties to the company (see 5.3).

In addition to having a liability for the company's debts or to pay compensation to the company, a director may also be subject to a civil penalty.

If a company holds property on trust, a director of the company may be liable in some circumstances for liabilities incurred by the company as trustee."

*"**Section 5.3 Duties and liabilities of directors***

In managing the business of a company (see 1.7), each of its directors is subject to a wide range of duties under the Corporation Law and other laws. Some of the more important duties are:

- *to act in good faith*
- *to act in the best interests of the company*
- *to avoid conflicts between the interests of the company and the director's interests*
- *to act honestly*
- *to exercise care and diligence*
- *to prevent the company trading while it is unable to pay its debts*
- *if the company is being wound up – to help the liquidator (by, for example, giving to the liquidator any records of the company that the director has).*

A director who fails to perform their duties:

- *may be guilty of a criminal offence with a penalty of $200,000 or imprisonment of up to 5 years, or both; and*
- *may contravene a civil penalty provision (and the Court may order the person to pay to the Commonwealth an amount of up to $200,000); and*

- *may be personally liable to compensate the company or others for any loss or damage they suffer; and*
- *may be prohibited from managing a company.*

A director's obligations may continue even after the company has been deregistered."

From the above provisions of the Act, SME owners (hence company directors in most cases) must refrain from trading in the event that their business is unable to pay its debt when it falls due. The penalty for breaching this law is severe both at human and financial levels. From the case studies presented in Chapter 5 and the impact analysis in Chapter 5, it is common for SMEs to trade at a capacity below normal level and experience cash flow problems. If such circumstances are to continue and the business is unable to pay its debts when it falls due, the directors will have a responsibility to stop trading in their own right and appoint an administrator in accordance with Section 12.1 of the Act. The owner of Company K did exactly this when he realised that his business was not going to recover from the bushfire and could not pay its debts.

Detailed information regarding the appointment of an administrator, receiver or liquidator and their legal rights and responsibilities is contained in the Corporations Act 2001 (Cth). For the purpose of this thesis, it is sufficient to highlight the responsibilities of owner directors in relation to the administration of their business, particularly when there is a likelihood of financial trouble.

8.5 Conclusion

This chapter has covered various important issues across many disciplines and shown the multi-disciplinary nature of this study. The emphasis is given to the need for crisis preparedness, non-financial matters, organisational functions and subsystems that can affect and be affected by a crisis, and broad strategies and principles applicable to an effective crisis management process.

It should be noted that the success of any financial crisis management system depends on, among other things, an organisational and managerial preparedness for a crisis before it happens. Crisis preparedness is more than buying an adequate insurance policy

that covers the physical and financial assets of the business organisation. A crisis-prepared SME should have an organisational plan that deals with a crisis if and when it happens. This does not have to be sophisticated, but clearly stipulated and understood by management and staff. The 13-point plan stated earlier in this chapter can be sufficient if it is understood and followed by any SMEs.

A comprehensive and complete financial crisis management model should also take into account the operational, financial and managerial variables existing prior to the occurrence of the crisis, as a business might simply fail due to its internal structural weaknesses rather than the impact of the crisis that will trigger the failure or increase the speed of collapse. To this end, SMEs can apply with some degree of care, financial ratio analyses and non-financial indicators, including the concept and practices of the trajectory of failure.

Based on the new approach to crisis management developed in Chapter 2 and the case studies provided in Chapter 4, abrupt financial crises can be better managed by handling the situation phase by phase, that is, by: (i) assessing the incident with a view to establishing the level of damage and the likely impact on various systems and subsystems within the SME; (ii) mapping out the immediate and future course of actions and disruptive management blueprint that will minimise the impact of the crisis; (iii) temporarily resuming business operations provided that the circumstances of the loss allow this to happen; (iv) procuring or reconstructing tangible assets in a value-maximising way, as the ultimate goal of crisis management is to restore the value of the business organisation through reinstatement of productive assets assuming all other factors remain the same; (v) undertaking marketing and promotional activities aimed at all relevant stakeholders, as the reinstatement of tangible assets only does not always guarantee the total and full recovery or normalisation of the system; and (vi) permanently resuming business operations and continuing to monitor the recovery to ensure that the system is optimal.

Finally, to effectively utilise the instruments of the financial crisis management model developed in this thesis, it is necessary to follow the strategies and policies of good corporate governance practices, and business ethics and stakeholders analysis. SMEs do affect and are affected by their capital providers and a range of other stakeholders such as employees, customers, suppliers, local communities, the police and the media. In the

event of a crisis, all stakeholders need to be identified and managed appropriately to ease the burden and pain of the unfortunate incident on all stakeholders, and to ensure the continuation of the business into the future with all its resources and reputation intact. Legal issues should also be considered, to avoid any unnecessary personal liabilities and a breach of the Corporations Act by owners of SMEs that act as directors.

Chapter 9
SUMMARY AND CONCLUSIONS

9.1 Introduction

The issue of crisis management is very real in the Australian economy due to the frequency and severity of disasters in all sectors of national economic activities as discussed in Chapter 1. While large businesses withstand damage to a productive asset for various financial and operational reasons, SMEs suffer severely from such disastrous incidents, and need effective managerial and financial tools to overcome the impact of crises and to continue to trade viably and profitably. As such, the principal objective of this thesis was to develop such tools based on the theories and principles of accounting (eg. Henderson and Peirson 2004), corporate finance (eg. Peirson et al. 2002), risk management and control (eg. Doherty 2000), corporate financial distress analysis (eg. Altman 2002), strategic crisis management (eg. Myers 1999), corporate governance (eg. Banks 2004), marketing management (eg. Kotler 2003) and the case studies of SMEs (Chapter 5) that suffered financial and other losses as a direct result of either partial or full destruction of productive assets during the years 2001 to 2003.

This chapter is structured to present a summary of the new approach in Section 9.2, the major findings of the thesis in Section 9.3, the implications of the research in Section 9.4, validation and plausibility of the model in Section 9.5, the research contributions in Section 9.6, and the limitations and future research areas in Section 9.7.

9.2 The New Approach to Financial Crisis Management

The development of effective financial crisis management tools and techniques applicable to SMEs requires a new framework based on a multi-disciplinary approach. Such a framework was developed in Chapter 2 (Figure 2.1) based on mathematical modeling techniques such as a cash flow optimisation model, optimal post-loss investment model, EOQ, optimal capital structure and strategic crisis management tools: business continuity planning and business impact analysis. Project management and insurance are also considered to be part of this new framework. In general, these financial and managerial tools serve as the instruments of the financial crisis management model depicted in Figure 2.2, applied using systems approach and

corporate planning format.

The impact of any disastrous incidents primarily affects the productive assets of business organizations, and those which are normally utilised in the process of manufacturing and/or delivery of products or services. More specifically, a loss of productive assets can lead to the loss of sales (hence market share and reputation), the loss of cash flow, the loss of key employees, the withdrawal of suppliers, the cancellation of major contracts, the loss of accreditation (eg. ISO 9000), and a number of other quantifiable and unquantifiable benefits, either in the short- or long-term. Hence, an SME that has experienced some sort of disastrous situation will suffer from the loss of tangible assets (ie. the partial or full destruction of physical assets of different sorts) and intangible assets (ie. its goodwill including market share and reputation). Therefore, the two broad targets of the financial crisis management model, based on a corporate planning format, are the restoration of both types of assets by utilising the instruments identified in the previous paragraph. The model seeks to restore these assets systematically as the crisis passes through different phases as discussed in Chapters 2 and 8.

In this thesis, two financial optimisation models, the cash management model (Thompson 1996), and optimal post-loss investment model (Doherty 2000), were discussed in great detail due to their central role in the recovery process of any business organisation. The judicious utilisation of cash during all phases of crisis is of paramount importance as it is needed to pay for all expenses incurred at a normal or higher rate due to loss of efficiencies, but earned at a lower rate due to limited products and services available for sale. To avoid insolvency and ensure its efficient utilisation, SMEs need to prepare detailed free cash flow projection including the direct cost of the crisis on a weekly and monthly basis so that a clear and complete picture of the cash position is known in advance. Such projections can then be used as an input to run the cash flow optimisation model as developed in Chapter 6. The cash flow optimisation model can be applied whether the cash flow balance is negative or positive at the end of each interval in the planning period. In simple terms, the model serves to minimise the cost of borrowing if the net cash flow is negative, and to maximise the benefit of lending (investment) in the event of positive cash flows. This model can be run on a Microsoft Excel spreadsheet program, which includes standard Solver.

The optimal post-loss investment model was presented in Chapter 7, based on the

premise that SMEs need to restore their productive assets and/or acquire new ones in a value-maximising way. To this effect, the model uses the most commonly used capital budgeting technique, that is, the NPV method. This model should be applied using new cash flow parameters that emerge during the crisis period and are expected to reflect the trading circumstances of the business during the life of the asset. It should also be noted that other assets of an SME affected by an incident, eg. stock, should be replaced optimally using EOQ (eg. Yu and Qi 2004), rather than using the technique applied to non-current assets such as plant and machinery. Other business assets such as furniture and fittings will be replaced gradually on a 'needs' and cash flow planning basis.

The full recovery of a business from an abrupt crisis is achieved when the business organisation is able to produce the 'normal' level of products or services, and consequently generate the 'normal' level of cash flow from sales while incurring costs and expenses at the 'normal' rate. To be at this stage of recovery (Position 4 as shown in Figure 2.2), the restoration of intangible assets is of equal importance to that of physical assets to ensure the generation of sales. In a nutshell, for better results, abrupt financial crises must be managed systematically by identifying targets, instruments and strategies at each phases of a crisis as outlined in the previous chapters of this thesis. Figure 9.1 provides a summary of the new approach to crisis management.

In summary, the targets of a financial crisis management model are:

- Restoration physical assets in a value maximising way;
- Optimal maintenance of cash flows.
- Restoration and or maintenance of market share and sales growth.
- Retention of key personnel.
- Restoration and or maintenance of profitability, and a number of variables as identified throughout this thesis.

The model intends to achieve the above targets by utilising instruments such as:

- Cash flow optimization.
- Optimal post-loss investment.
- Optimal capital structure.
- EOQ.
- PERT/CRT.
- 4 Ps of marketing mix and other instruments identified earlier.

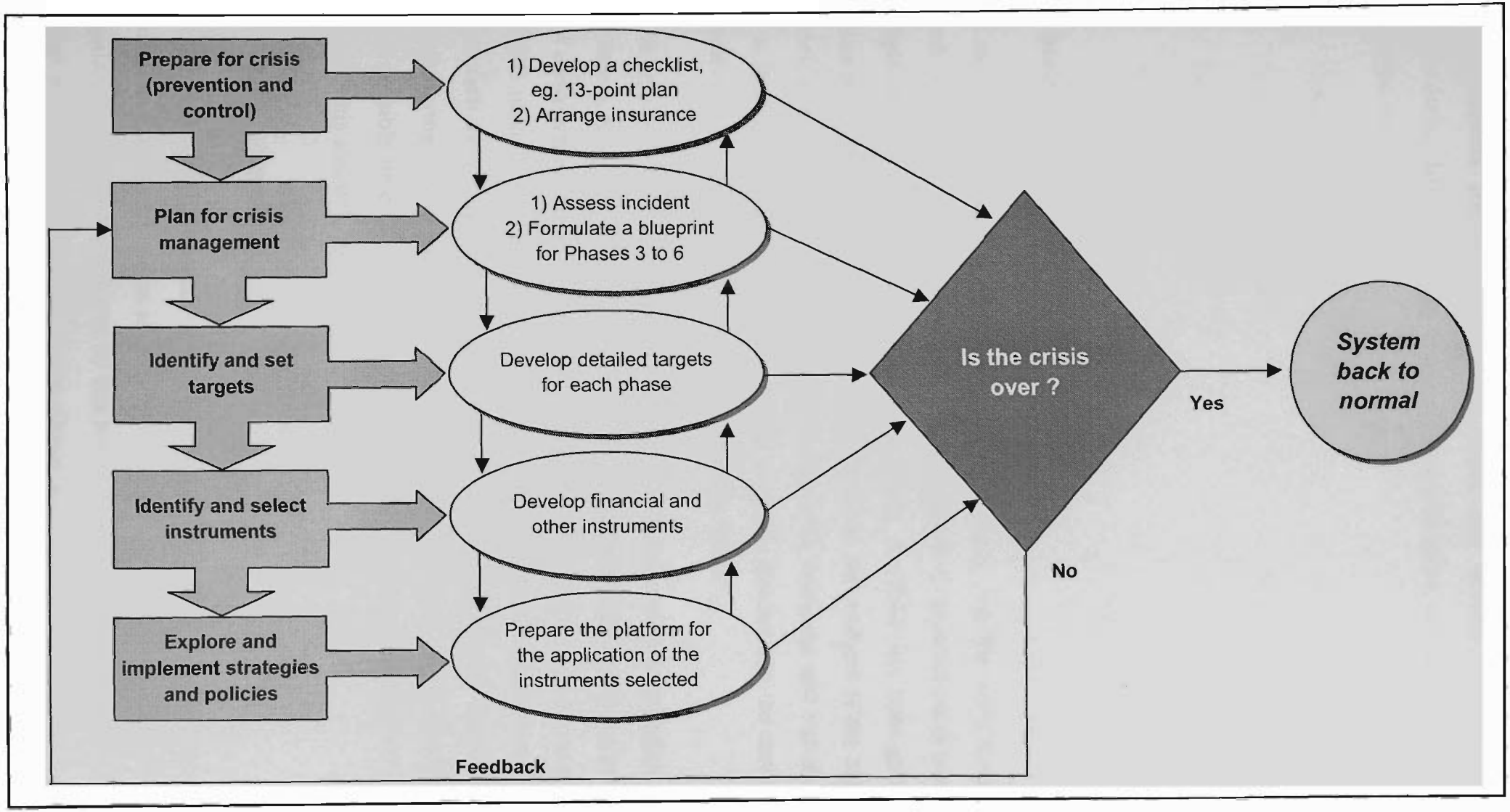


Figure 9.1
Financial Crisis Management Chart: The New Approach

These instruments (optimisation models, tools and techniques) should be used selectively during different phases of a crisis, and with better understanding of strategies and policies, including:

- Corporate governance
- Stakeholders analysis
- Marketing strategies
- Corporations law

9.3 Major Findings

From the previous chapters of this thesis, it is obvious that the main thrust of this research is to develop an effective and superior approach to financial crisis management for application by SMEs in Australia. As a result, emphasis has been given to the activities performed during the crisis period. However, the analysis of the case studies and various materials show that the risk management functions and attitude existing prior to the crisis can substantially affect the recovery process and the success of the financial crisis management model developed in this thesis.

In other words, this research found that those SMEs that are crisis-prepared (in one form or the other), and have an adequate insurance policy in place (though it can be treated as part of crisis preparedness, it is singled out here due to its importance and use by almost all SMEs) prior to the crisis, and those SMEs that apply crisis management planning, optimal cash flow management, optimal replacement strategy and customer-focused approach during crisis, will have a much better chance of recovering in full and in the shortest possible time. Hence, these issues are discussed in connection with the major findings of this research, as follows.

9.3.1 Crisis Preparedness

From the case studies presented in Chapter 5 and the observations made in relation to the risk management strategies adopted by the SMEs, there is no evidence that any of the business organisations covered by this research had an operational plan to deal with any sort of disastrous situation. Some simple and routine activities such as backup

procedures were largely neglected (see Appendix 5.4) by most the SMEs surveyed. The only major risk management tool utilised in anticipation of abrupt crises was the acquisition of insurance policies.

As previously reported, this finding was similar to other studies undertaken in New Zealand and the US, in that SMEs are generally unprepared for disastrous situations. In the case of New Zealand, Ewing-Jarvis (2001) also found that the Polynesian culture had a great deal of influence on management's attitude towards crisis preparedness. While it is difficult to assume the existence of such a culture in Australia and its influence on the attitude of SMEs' owners and managers towards risk, it is worrying at the same time to see the lack of crisis preparedness displayed by the 12 SMEs surveyed in this thesis.

9.3.2 Adequate Insurance

While insurance policies are generally used as a major risk management control tool by most SMEs in Australia, given their significant role as a source of finance, the survey conducted for the purpose of this research shows that 50% of the SMEs were underinsured with respect to material damage and business interruption loss.

The level of underinsurance is quite alarming in the case of business interruption, given that only 59% of gross profit at risk is insured. In other words, those SMEs that are underinsured are risking on average 41% of their gross profit with little prospect for recovery in the event of prolonged business disruption. Applying the same methodology (the sum insured divided by value at risk), the level of insurance for the assets of the business organisations that were underinsured stood at 77%. When a business organisation is both operationally unprepared and financially underinsured, it will take more than luck to overcome the crisis and restore the value of the business within a reasonable period of time.

9.3.3 Crisis Management Planning

The development of a new framework for crisis management planning in Chapter 2 and the case studies presented in Chapter 5 highlight that a crisis management program can be developed easily and applied effectively if SMEs approach an abrupt crisis

systematically and formulate a detailed plan during the initial stages of the crisis. Assessment of incidents and crisis management planning form the first two phases of the crisis management process and spell out the impact of the disastrous situation on all aspects of the operations of the business organisation, the loss mitigation strategies to be adopted and the restoration process to be followed.

The case studies presented in Chapter 5 show that those SMEs that were involved in the assessment of incidents and planning of the recovery process had achieved better results compared to those SMEs that confronted the situation on a day-by-day basis. Company G mapped out its strategies and followed them through to the end with a very good outcome. Conversely, Company H made no effort in assessing the impact of the damage, which it thought to be minor, and ended up losing a big part of its business.

9.3.4 Cash Flow Management and Cash Reserve

From the cash flow analysis undertaken in Chapter 6, it can be seen that the cash flow of SMEs in crisis mode can rapidly deplete, and necessitates greater attention of owner managers until the crisis is over. SMEs that are able to apply appropriate cash flow management will be in a better position to survive because they can identify their position well in advance and can improve their cash position with the help of the optimisation model introduced in this thesis.

It was also evident that a significant cash reserve can shield businesses against the immediate shock of a disastrous situation, and can help them survive in the short-term with limited goods and services. For example, Company A had more than $1 million in the bank prior to the fire which had a devastating impact, but it survived the loss and continued to trade thanks to those reserves. But having $1 million sitting idle in the bank is not that common, as the history of the SMEs surveyed in this research clearly shows. It should also be noted that spending an existing reserve may not be a wise option, but it is one of the alternative ways to overcome the impact of abrupt crisis in the short-term.

9.3.5 Optimal Replacement Policy

The discussion of an optimal post-loss investment analysis undertaken in Chapter 7 shows that the NPV method of project evaluation can assist SMEs in responding to

replacement decisions in a value-maximising way. It also shows that this method can be employed by SMEs using their own internal resources or with the help of their external service providers, such as accountants, without any major problem.

The case study of the SMEs covered by this research shows that no SME undertook any meaningful analysis of the post-loss replacement decision or applied any sort of financial techniques. Despite its successful recovery, Company G's further investment decisions were not undertaken in a value-maximising way, and this shows that the company failed to employ a proper project evaluation technique such as the optimal post-loss investment model provided in Chapter 7.

9.3.6 Customer-Focused Recovery

Chapter 3 outlined various theories that argue for the consideration of the vast interests of different groups of stakeholders for reasons ranging from sheer survival to pure business ethics. Customers are the most important group of stakeholders that cannot be neglected at any time, and are usually the principal reason for the existence of any business organisation (Hilmer 1990). Any crisis management process that is not designed with customers' needs as its central role is doomed to fail.

A case study of Company K shows that its recovery process focused on cost savings and operational convenience rather than the interest and service of the wider customer-base. This strategy largely contributed to its demise, and highlights the cost of any misplaced strategy during the recovery process. In contrast to the strategies adopted by Company K, Company G planned its productions and operations around its various customer-bases and managed to recover from the crisis with minimum customer frustration and complaints. The owners made their customers feel that they were part of the recovery process, and nothing was spared to serve their customers to the maximum of the company's capabilities.

9.4 Implications

The implications of this research are presented in the following three sections.

9.4.1 Crisis Management Studies

The theories, principles and models analysed and presented in this research show that a

new approach in crisis management studies is required in order to provide a sound basis for the development of effective crisis management tools. The approach adopted in this thesis is multidisciplinary in nature and multifunctional in purpose.

Using the above approach, the crisis management model developed in this research indicates that there are two major elements in the crisis management process, and any studies undertaken for this purpose should focus on both aspects, in order to be effective. The implication for those who study crisis management, particularly from an SME's point of view, is to consider both aspects of the recovery process: the physical and non-physical, and/or the financial and non-financial aspects of the impact of any disastrous situation on a business organisation.

9.4.2 SME Management in the New Millennium

With increasing sophistication in IT and globalisation of the world economy, SMEs in Australia face both major opportunities and threats (Hall 2004). Disastrous situations increase the vulnerability of SMEs to competitive threats from all players, domestic and abroad, and call for sophisticated, although not necessarily complicated, managerial tools in running business organisations. SMEs also perceive more uncertainty in their environment than larger companies (Bill and Raymond 1993) and require effective crisis management planning.

This research shows that a highly sophisticated, without being complicated, financial crisis management tool can be developed and used in protecting competitive positions and fending off domestic and global threats by SMEs.

9.4.3 Insurance Industry and Affiliated Services

As a major risk management and control tool, insurance policies provide funds to SMEs in the event of a loss, in exchange for premiums paid in anticipation of the occurrence of some risky events. From the case studies and other materials presented in this thesis, insurance companies generally use loss adjusters to assess and verify losses so that SMEs can be compensated in a reasonable and timely manner. From experience, insurance companies and their agents hardly meet both criteria ('reasonableness in quantum' and 'timeliness in payment') for a number of reasons that have not been explored in this thesis.

Legally speaking, insurance companies have no further obligations once they pay the sum amount of money required under the terms of the policy held by the SME. However, the insurance industry can do better for their customers (SMEs in particular) and their own reputation by assisting SMEs in dealing with a crisis at managerial and operational levels. The methods and tools developed in this thesis imply that the insurance industry can achieve this objective by informing and encouraging SMEs to apply effective financial crisis management tools.

9.5 Validation and Plausibility of Models

Kallrath and Wilson (1997) state that optimisation models would normally be tried out on test data to ensure that the model is robust, is predicatively valid (produces predictions that are in line with existing possibilities) and is replicatively valid (produces a working solution). Naylor (1979) argues that a valid model is one that is used for corporate planning; an invalid model is a model that is not used by management. According to Naylor, the ultimate criteria for a model's validity rests on whether or not management uses it for corporate planning purposes.

Islam (2001) offers three levels of validation tests: (i) descriptive; (ii) analytical; and (iii) experimental. Each level is subject to various validation tests before the model is accepted as valid and its results are plausible. The models developed in this thesis, including the cash optimisation model and the optimal post-loss investment model, are valid and plausible because:

- The models adopt a comprehensive approach to cash management problems and investment analysis.
- The models can be applied consistently under different scenarios and to data extracted from different entities.
- The results are plausible, being consistent with the findings of other studies and the purpose for which they are intended.
- The results are consistent with the underlying theories and principles.

In general, the models are appropriate for application by SMEs in the event of a financial crisis resulting from a disastrous situation as shown in Chapters 6 and 7. The

design used to formulate the optimisation problems in Microsoft Excel also looks appealing to small businesses, as they do not appear to be overly complicated or too hard to understand.

Clayton and Radcliffe (1996) provide four basic aspects of model validity from a system's point of view. It is essential to look at these to test the validity of the financial crisis management model developed in this thesis:

1) **Structural:** It is important to be reasonably sure that the model has captured the essential system structure, and that the structure of the model reflects the elements, interconnections and feedback loops present in reality. The structure of the financial crisis management model is based on two major elements of an abrupt financial crisis model, ie. the destruction or loss of (i) tangible assets and (ii) intangible assets of the economic entity involved in the crisis.

2) **Behavioral:** One important check is whether the model generally behaves in the same way as the real system, and manifests the oscillations, thresholds, instabilities, changes, equilibria and so on. The behavior of the model developed in this thesis reflects the natural progression in crisis management that starts with the assessment of incidents and ends with the restoration of normal business activities.

3) **Empirical:** The next step is to ensure that the model actually performs well given the same parameters and conditions. The model is also robust empirically as it is based on the experience of SMEs that were involved in crises.

4) **Application:** The whole point of developing a model is that it should help to answer questions and thereby form policy. A good model will therefore generate information that is in a useful form. The model can guide SMEs in managing abrupt financial crisis by outlining the steps to be taken and instruments to be applied.

In general, it can be seen that the financial crisis management model developed in Chapter 2 and subsequent chapters captures the main elements of abrupt financial crises that manifest themselves in the form of partial or full destruction of physical assets and probable loss of market share. It also reflects the path to be followed during the

restoration process, including the instabilities and changes that might be encountered, etc. The model also helps owner managers in making informed decisions by identifying the necessary steps and phases involved in the crisis management process and the instruments to be used.

9.6 Research Contributions

The following summaries (from 9.6.1 to 9.6.5) present the major contributions of this research, both at theoretical and practical levels regarding abrupt financial crises.

9.6.1 Corporate Planning Format

By adopting a corporate planning format, this research establishes a new approach in crisis management, and provides a superior method that can identify and deal with endogenous and exogenous business variables, which can affect a recovery process. The format adopted is better structured to understand, formulate and implement crisis management strategies.

9.6.2 Systems Approach to Crisis Management

Unlike the previous studies of crisis management, this research adopts a systems approach both at organisational and crisis management planning and implementation levels. In the previous chapters, it was shown that SMEs function as a system involving various subsystems, such as human resources, accounting and finance, operations, marketing and IT. Given their size, SMEs may not have independent units that will be solely responsible for each subsystem, but they functionally exist and interact in performing the activities of the business. Each subsystem can suffer from disastrous situations and can also affect the disaster recovery process.

Likewise a crisis management program in this research is viewed as a system with various elements (subsystems) that need to be coordinated for best results. Different activities that are undertaken during different phases of financial crisis management process (assessment of incident, crisis management planning, temporary relocations or measures, restoration of physical assets, permanent relocation, etc) are interdependent in that the actions taken in relation to certain elements of the program will impact on other

elements and the overall recovery process. This research makes a contribution towards crisis management studies and programs by adopting a system approach both at organisational and crisis management levels.

9.6.3 Holistic Approach to Crisis Management

Skyttner (2000) states that a holistic approach is an attempt to bring together fragmentary research findings into a comprehensive view on man, nature and society. The current study of crisis management, with a major emphasis on financial crisis resulting from disastrous situations, applies a holistic approach in that it looked at crises from multiple perspectives and attempted to develop the methodology to deal with them on a multidisciplinary basis.

The result of such an approach helped in the development of the financial crisis management model, which can assist SMEs in dealing with crisis in a comprehensive way. Past studies tend to concentrate on certain aspects of a crisis or have a mono-disciplinary (or limited disciplinary) approach to the development of crisis management methods, tools and models.

9.6.4 Financial Crisis Management Curves

The financial crisis management model developed in Chapter 2 of this thesis identifies 5 broad paths to recovery from different positions of organisational health on the financial crisis management charts (Figure 2.3 to 2.7). These five curves, identified as the 'S Curve, the 'N Curve', the 'D Curve', the 'H Curve', and the 'V Curve', serve as a roadmap in the development of an effective crisis management plan.

The 5 curves are a general picture of a path to be followed in the process of recovery from a crisis. The curves can help SMEs think clearly, isolate the impact of the damage, and concentrate on the remedies. The financial crisis management curves are easy to understand and make a significant contribution in studying, developing and applying crisis management tools.

9.6.5 Financial Crisis Management Phases

Past studies identified various phases of strategic crisis management in similar fashions.

Mitroff (1993) identified 5 stages of crisis management, Rike (2003) divided a disaster recovery process into 4 steps, Campbell (2004) classified the same into 5 stages, and Myers (1999) argued that a disaster should be viewed to have a life cycle consisting of 4 phases.

The current study views financial crisis management as a process of recovery that involves 6 distinct but interlinked phases. Unlike the previous studies, these phases are developed in conjunction with the financial crisis management model, concentrate on business disruption and the recovery process, and focus on financial activities of SMEs in crisis mode.

9.7 Limitations and Future Research

The financial crisis management model, cash optimisation model and optimal post-loss investment model developed and used extensively in this research, are based on the experience of 12 SMEs selected out of 20 SMEs (based on the availability and depth of information collected) that suffered financial losses due to disastrous incidents such as fire, storm, flood, contaminations, and so on.

The models developed in this thesis also assume that the data provided by the SMEs, particularly the future cash flows estimated by management, are reflective of future operations because owners are better placed to know their business, its future performance and the business environment in which it operates. In other words, the optimisation models follow a deterministic approach, assuming that future cash flows can be predicted with a greater degree of accuracy. In reality, these assumptions hardly reflect the facts, as business activities in the future are always characterised by uncertainties.

Being non-reporting entities, SMEs are not required to prepare general-purpose financial reports that have to comply with the requirements of the Corporations Law and approved Australian Accounting standards. As a result, SMEs' financial statements cannot be compared with one another or over time with a high degree of confidence due to lack of standardisation and less disclosure requirements. On the basis of the above implicit and explicit assumptions used in this thesis, the main limitations of this research can be summarised as follows:

1) The sample of 12 SMEs surveyed in this research is not only limited in size but also clustered geographically, as 11 of them are located in the state of Victoria.

2) The scope of the definition of crisis was also limited as it was based on the impact of the damage to the physical assets of a business organisation instead of covering other family of crises.

3) The data obtained was limited in certain cases and inhibited more in-depth analysis of certain activities involving investment and financing decisions.

4) The financial reports used in this thesis were prepared for special purposes (owners' use only) and might lack a high degree of precision.

5) Given uncertainties in future business activities, the best optimisation models are stochastic models instead of deterministic ones. Due to the nature of software (Microsoft Excel) utilised in this research, the application of stochastic models could not be thoroughly explored and applied to the financial problems on hand.

6) This research is made from SMEs point of view and its application to large organization is not tested.

Future studies in the area of financial crisis management with respect to SMEs can achieve a great deal by addressing the above issues, by investigating alternative strategies in relation to various organisational functions that have not been fully considered in this research, and by establishing best financial crisis management practices that can be applied across rural industries in Australia and overseas. Also further follow-up research on the business organisations covered by this thesis will provide some valuable information on their risk management attitude and crisis preparedness following the disasters they experienced in the past. Finally the value and significance of this research will greatly enhance if further research is undertaken to test its applicability to large corporations, and modify it if necessary.

9.8 Conclusions

Crises are not necessarily bad things, as sometimes heroes are born, changes are accelerated, new strategies evolve, and new competitive edges appear (Meyers and

Holusha 1986). However, the most common outcomes of crises involving SMEs are financial ruin, family breakdowns and suicides in some extreme cases, as witnessed by the writer in his professional dealings with SMEs. The cost to the economy both in the short- and long-term is also high due to a significant role of SMEs in job creation, in providing a resilient industrial base for adapting to turbulence, and in the creation of an internationally competitive industrial structure (Hall 2004). To minimise its impact on an individual business and protect all of its stakeholders, it is vital to devise effective crisis management tools and techniques.

In this research, significant progress has been made in understanding abrupt crises, in analysing their impact on SMEs, and in developing a new framework for crisis management planning, a financial crisis management model and associated strategies, and tools and techniques. Armed with these new approaches and models, SMEs can contain crises, as well as protect and restore their vital tangible and intangible assets within a reasonable period of time.

Appendix 1.1

Table A1.1/1 Annual Cost of Major Disasters (1976 to 2004)

Year	No. of Disasters	Original Cost ($m)	Equivalent Current Cost ($m)
1967	2	19.0	137.0
1968	1	1.5	12.0
1969	0	-	-
1970	2	17.0	110.0
1971	2	27.0	159.0
1972	1	2.0	12.0
1973	1	30.0	150.0
1974	6	314.0	1,393.0
1975	2	35.0	137.0
1976	4	70.0	241.0
1977	4	35.0	115.0
1978	4	40.0	119.0
1979	3	28.5	77.0
1980	5	40.7	110.0
1981	1	20.0	49.0
1982	1	10.0	19.0
1983	2	176.0	324.0
1984	3	110.0	189.0
1985	2	190.0	316.0
1986	5	214.0	345.0
1987	3	17.0	27.0
1988	5	74.0	107.0
1989	4	925.0	1,208.0
1990	8	455.0	590.0
1991	6	231.4	319.0
1992	2	122.0	123.0
1993	2	24.0	24.0
1994	4	162.3	162.3
1995	3	61.0	61.0
1996	9	240.0	240.0
1997	6	76.0	76.0
1998	13	354.3	354.3
1999	8	1,800.0	1,800.0
2000	8	63.5	63.5
2001	8	253.0	253.0
2002	5	50.4	50.4
2003	4	503.0	503.0
2004	2	46.5	46.5
Total	151	6,838.1	10,022.0

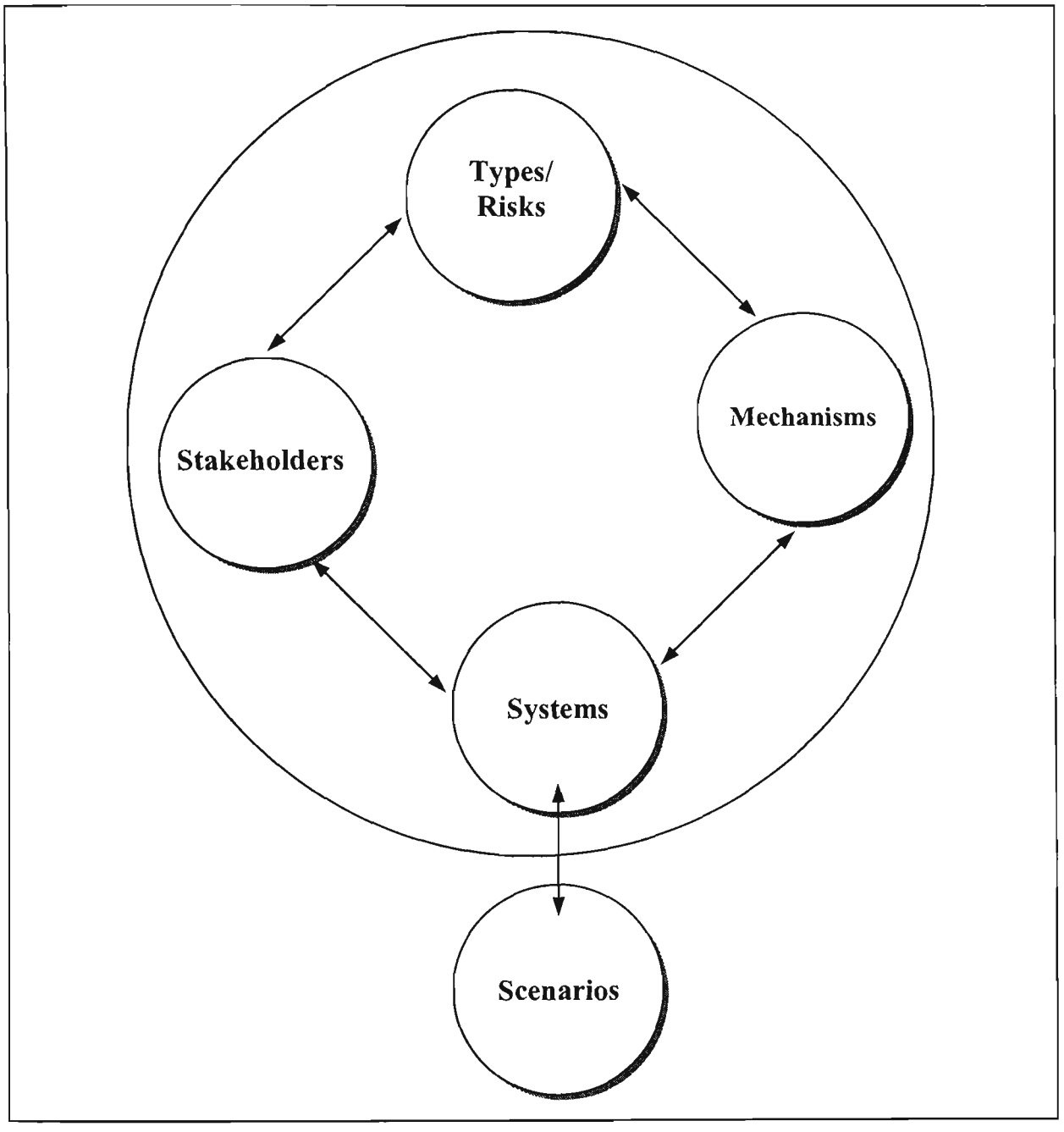
Source: www.idro.com.au (accessed 02/04/04)

Appendix 2.1

Table A2.1/1 Potential Types of Exposures (Rike 2003)

Natural Threats and Hazards	*Technical and Mechanical Hazards*	*Human Activities and Threats*
Fire	Power outage/failure	Computer error
Flood	Gas leak	Lost or misfiled documents/records
Hurricane	Software failure/malfunction	Vandalism
Earthquake	Sewage failure/backup	Theft
Lighting strike	Building structural failure	Bomb threat
Tornado, wind storm	Electrical shortage/faulty wiring	Civil disorder
Snow and ice storms	Toxic spill	Strikes
Wind	Radiation contamination	Kidnapping
Tidal Wave	Loss of physical access to resources	Terrorism
Typhoon	Biological contamination	Sabotage
Mold and mildew	Train derailment/airplane crash	Loss of key personnel
Insects and rodents		Epidemic

Appendix 3.1



Source: Mitroff and Anagnos (2001)

Figure A3.1/1
The Component of Best Practice Model for Crisis Management

Appendix 3.2

Table A3.2/1 13-Point Plan for Crisis Control

1) Make priority lists of for the retrieval of items from the office if there is limited time to remove equipment.

2) Study the building layout and the location of utilities.

3) Have phone numbers of customers, suppliers, and contractors in two separate locations.

4) Determine where the most accurate news and weather reports can be attained.

5) Store key records off-site.

6) Consider locating essential equipment on upper floors (in case you have one), rather than on basement or ground floors that could be vulnerable to flooding.

7) Keep company vehicles fueled and ready to go.

8) Make provisions for emergency lighting, including candles and flashlights.

9) Purchase fire-proof file cabinets and be neat.

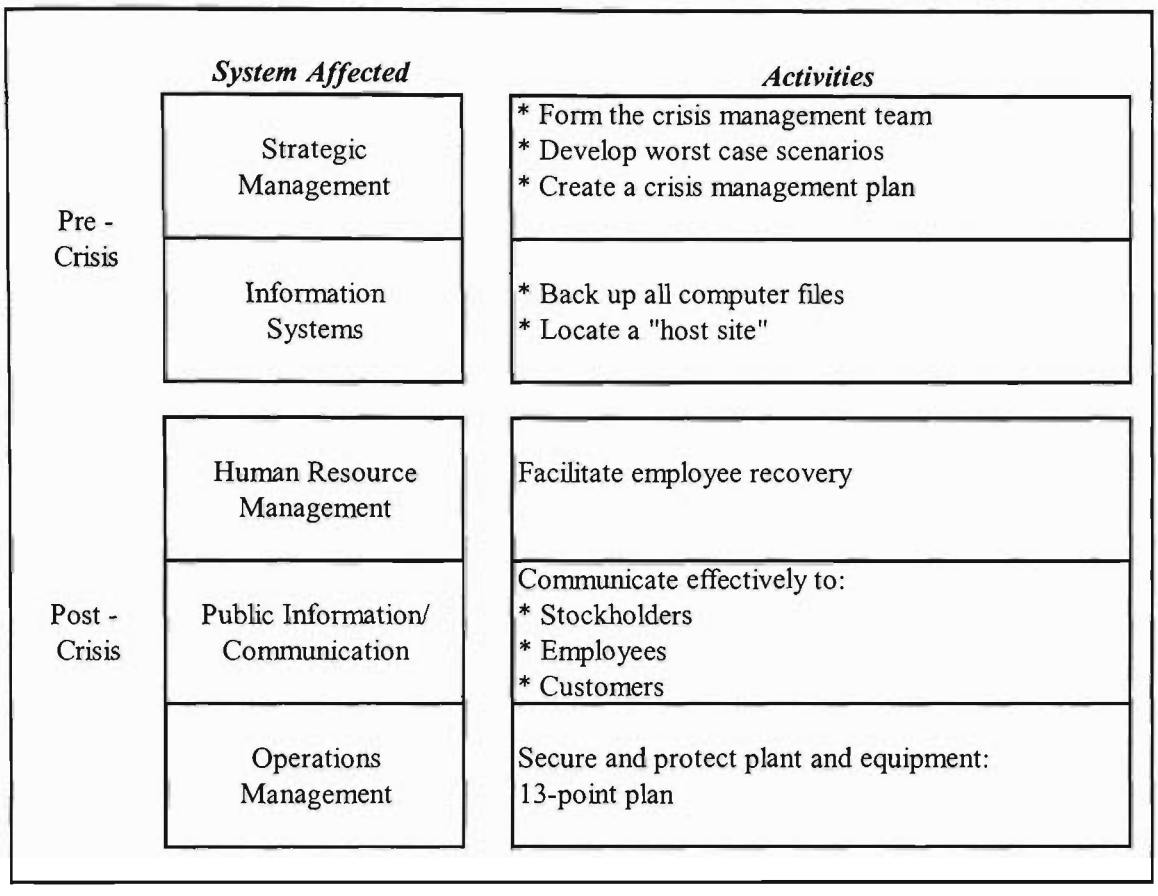
10) Keep a record of office inventory, with photos if possible.

11) Have a fire evacuation route posted and practice fire drills regularly.

12) Consider CPR training for employees.

13) Keep current records of insurance policies, and be aware of what type of insurance you are eligible for.

Source: Hickman and Crandall (1997)

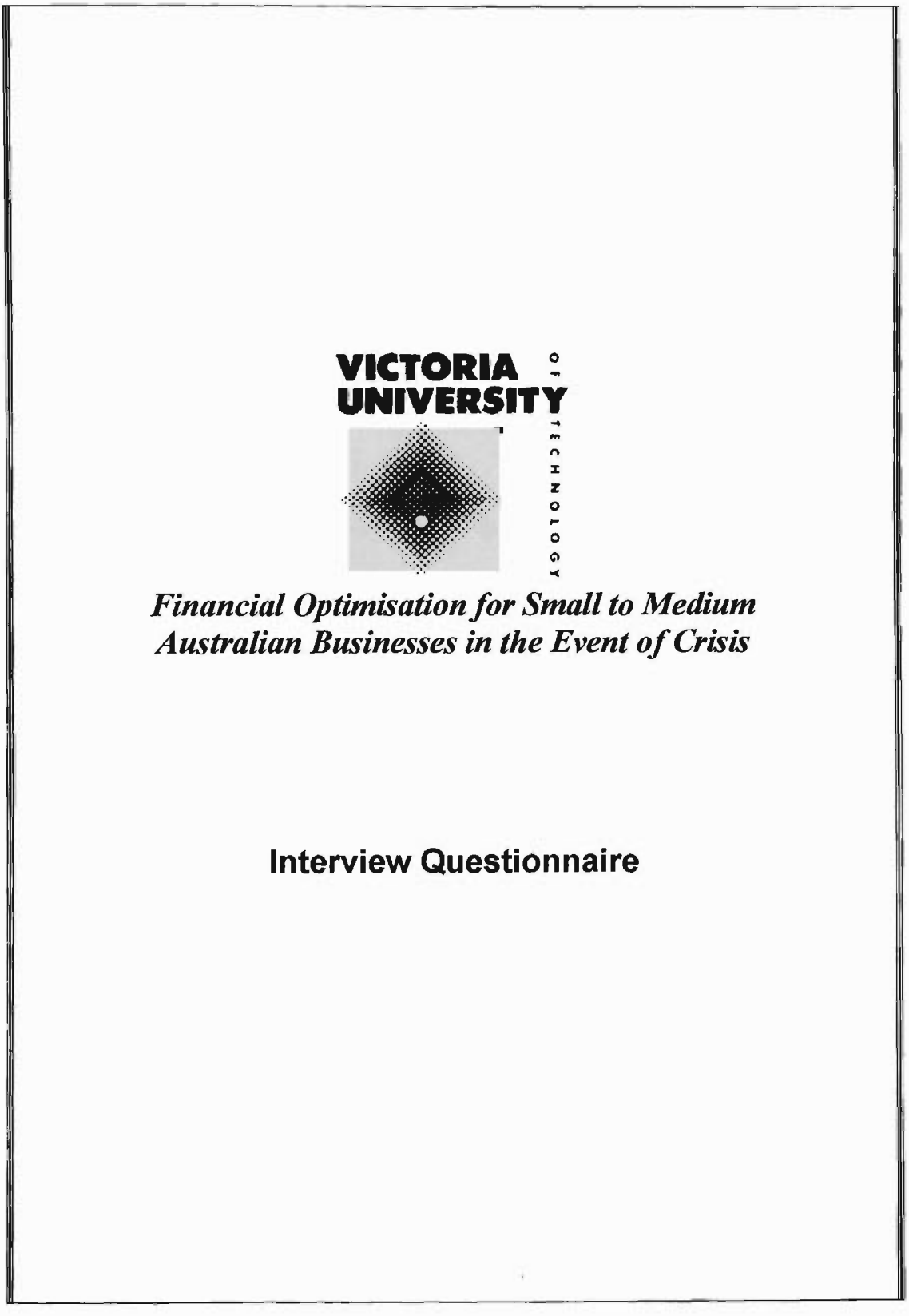


Source: Hickman and Crandall (1997)

Figure A3.2/1
A Multifaceted Approach to Crisis Management

Appendix 4.1

Figure A4.1/1 Interview Questionnaire



A. Basic Business Details

A-1 What business name do you trade under? _____

A-2 Is your business name registered? _____

A-3 Is your logo or business name a registered trademark?

No ❑
Yes ❑ What is registered? _____

A-4 If you have an ACN, please provide the number. _____

A-5 What date was the company incorporated? _____

A-6 Principal place of business? _____

A-7 What is the annual turnover of the business? _____

A-8 Does the business operate at any other location? *(Please tick appropriate box.)*

No ❑
Yes ❑

A-9 If answering "Yes" to question A-8, please detail the addresses and what is performed at those addresses.

Situation Number	*Location*	*Products and/or Services Performed at this Location*
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

A-10 What is your industry classification according to the Australian Taxation Office? _____

A-11 What goods and/or services do you provide? _____

A-12 What structure is the business or company trading in? *(Please tick appropriate box.)*

Sole Trader ❑
Partnership ❑
Private Company ❑
Publicly Listed Company ❑

A-13 Number of employees?

Administration _____
Operational _____
Total _____

B. Information Technology

B-1 In what ways is the whole business reliant on Information Technology? _____

_____

B-2 Did the business have backup and data recovery procedure/system in place at the time of the crisis?

No ❑ *Proceed to **Question B-8**.*
Yes ❑ *Please provide a copy of the procedures (mark as **Answer B-2**) and/or comment.* _____

B-3 Was the recovery system internally or externally developed? _____

B-4 Were records kept off site?

No ❑
Yes ❑

B-5 How often was a backup of computer records made? _____

B-6 Had the backup and recovery plan been tested prior to the crisis?

No ❑
Yes ❑

B-7 Did the Company follow the procedure prior to the crisis?

No ❑
Yes ❑

B-8 How long did it take before the company records were restored? _____

B-9 Were any records lost permanently?

No ❑
Yes ❑

B-10 What effect, if any, did the loss of any records cause? _____

_____

_____

_____

C. Financial Modelling

C-1 Please indicate if you have/had a computerised accounting system for the following. *(Please tick as appropriate.)*

	Current	Pre-Loss
Cash Banking	❑	❑
Sales	❑	❑
Purchases	❑	❑
Inventory	❑	❑
Accounts Receivable	❑	❑
Accounts Payable	❑	❑
Asset Register	❑	❑
Payroll	❑	❑
Other: _____	❑	❑
_____	❑	❑

C-2 Which of the following spreadsheet programs do/did you use? *(Please tick as appropriate.)*

	Current	Pre-Loss
Microsoft Excel	❑	❑
Lotus 1-2-3	❑	❑
Quattro Pro	❑	❑
Other: _____	❑	❑
_____	❑	❑

C-3 How often do/did you use spreadsheets? *(Please tick as appropriate.)*

	Current	Pre-Loss
Daily	❑	❑
Weekly	❑	❑
Fortnightly	❑	❑
Monthly	❑	❑
Occasionally	❑	❑

C-4 For what purpose(s) do/did you use the spreadsheet program(s):

(i) Currently? _____

_____

(ii) Pre-loss? _____

_____

C-5 Have you ever used Microsoft Excel Solver/Goal Seeker or similar program(s)?

No ❑ *Please proceed to **Question D-1**.*
Yes ❑

C-6 If answering "Yes" to the above question:

(i) What was the purpose of its use? _____

_____

(ii) The frequency? _____

D. Cashflow Analysis

D-1 Do/did you project your cashflow requirements?

	Current	Pre-Loss	
No	❑	❑	*Please proceed to **Question D-3**.*
Yes	❑	❑	

D-2 If answering "Yes" to the above question, what was the frequency? *(Please tick as appropriate.)*

	Current	Pre-Loss
Weekly	❑	❑
Fortnightly	❑	❑
Monthly	❑	❑
Annual	❑	❑
Occasionally	❑	❑

D-3 How do you overcome short/long term cashflow requirements? _____

_____

D-4 Do/did you use any optimisation technique in determining your cashflow requirements?

	Current	Pre-Loss
No	❑	❑
Yes	❑	❑

D-5 Please provide a copy of your Cashflow Statements (on a monthly basis) for the three years leading up to the crisis *(marked as **Answer D-5**)*.

D-6 Please provide a copy of your Cashflow Statements (on a monthly basis) for the post-crisis period, up to two years *(marked as **Answer D-6**)*.

E. Analysis of Balance Sheet

E-1 Do/did you monitor any element or part of your Balance Sheet, other than cash ?

	Current	Pre-Loss	
No	❑	❑	*Please proceed to **Question E-3**.*
Yes	❑	❑	

E-2 If answering "Yes" to the above question, please explain? _____

_____

E-3 Do/did you apply Financial Ratio Analysis in managing or monitoring your Balance Sheet items ?

	Current	Pre-Loss	
No	❑	❑	*Please proceed to **Question E-4**.*
Yes	❑	❑	

E-4 How do you finance your fixed assets, stock and other supplies? _____

_____

E-5 Please provide a copy of your Balance Sheet (on a monthly basis) for the three years leading up to the crisis *(marked as **Answer E-5**)*.

E-6 Please provide a copy of your Balance Sheet (on a monthly basis) for the post-crisis period, up to two years *(marked as **Answer E-6**)*.

F. Analysis of Profit & Loss Statement

F-1 How do/did you monitor your company's profitability:
(i) Currently? _____

_____

(ii) Pre-loss? _____

_____

F-2 What is/was your cost of capital:
(i) Currently? _____ (ii) Pre-loss? _____

F-3 What is/was your minimum Profit Margin:
(i) Currently? _____ (ii) Pre-loss? _____

F-4 Please provide a copy of your Profit & Loss Statement for the three years leading up to the crisis *(marked as **Answer F-4**)*.

F-5 Please provide a copy of your Profit & Loss Statement for the post-crisis period, up to two years *(marked as **Answer F-5**)*.

G. Business Continuity Planning

G-1 Had the company implemented a Business Continuity Plan prior to the crisis?

No ❑ *Proceed to **Question G-2**.*
Yes ❑ *Proceed to **Question G-3**.*

G-2 If your answer to the above question was "No", do you believe a Business Continuity Plan would have been beneficial?

No ❑ Why not? _____
Yes ❑ In what ways? _____

_____

*Proceed to **Question G-9**.*

G-3 Please provide a copy of the Business Continuity Plan *(mark the plan as **Answer G-3**.)*

G-4 Did you obtain outside assistance to prepare the Business Continuity Plan?

No ❑
Yes ❑

G-5 While not a full-blown Business Continuity Plan, had the Company prepared a contingency plan for Y2K?

No ❑
Yes ❑

H. Details of Crisis

H-1 What was the date of this crisis? _____

H-2 What was the cause of this crisis? _____

H-3 Describe how your business managed the crisis. Include details of any procedures and techniques applied. _____

_____

_____

_____

H-4 What was the indemnity period provided under the policy? _____

H-5 Was this adequate in your opinion?

No ❑ Why? _____
Yes ❑ Why? _____

I. Insurance Details

I-1 *Please complete the following table.*

Item	*Sum Insured / Declared Value*	*Value at Risk*	*Co-Insurance Applied?*	*Loss Amount*	*If "Yes", what Percentage of Loss was Paid?*
Building					
Removal of Debris					
Stock					
Machinery & Plant					
Other Contents					
Customers Goods					
Gross Profit					
Additional Increased Cost of Working					
Wages					
Claims Preparation					

I-2 Please complete the following schedule of progress claims.

Progress Claim Number	*Date Submitted*	*Amount Claimed*	*Date Paid*	*Amount Paid*
1				
2				
3				
4				
5				
6				
7				
8				

J. Previous Losses

J-1 Had the business suffered a major crisis, other than the one under review, in the past?

No ❑ *There are no further questions to be answered.*
Yes ❑

J-2 What was the date of the previous crisis? _____

J-3 What was the cause of the previous crisis? _____

_____

J-4 Was it covered by an insurance policy?

No ❑
Yes ❑

J-5 What was the financial cost of the previous crisis? _____

J-6 Was the insurance adequate in the previous crisis?

No ❑
Yes ❑

J-7 What was the indemnity period of the policy? _____

J-8 Was the indemnity period long enough in your opinion?

No ❑
Yes ❑

Your time and input in completing this Survey Questionnaire is appreciated. Thank you.

Comments/Calculations/Notes

Appendix 5.1

Table A5.1/1 Textile Tariff (%)

Details	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*
Clothing and finished textiles	31	28	25	25	25	25	25	17.5
Cotton sheeting and fabrics	19	17	15	15	15	15	15	10
Sleeping bag, table linen	12	11	10	10	10	10	10	7.5
Carpet	19	17	15	15	15	15	15	10
Footwear	21	18	15	15	15	15	15	10
Footwear parts	14	12	10	10	10	10	10	7.5
Other (e.g. yarns, leather)	5	5	5	5	5	5	5	5

Source: AusIndustry (www.ausindustry.gov.au)

Appendix 5.2

Table A5.2/1 General Information

No.	*Company*	*Established*	*Structure of Ownership*	*Change of Ownership*	*Succession in Family*	*Annual Sales ($m)*	*Total Assets ($m)*	*Net Equity ($m)*	*Number of Employees*	*Size*
1	Company A	1933	Company	No	Yes	6.70	4.10	3.10	30	Medium
2	Company B	1992	Company	Yes	No	1.20	0.30	-0.03	14	Small
3	Company C	1975	Company	Yes	No	5.40	2.90	1.20	35	Medium
4	Company D	1979	Company	No	No	0.80	0.40	0.00	7	Small
5	Company E	1962	Company	No	Yes	3.20	2.80	0.50	15	Small
6	Company F	1955	Company	No	Yes	1.20	2.00	1.30	11	Small
7	Company G	1955	Company	No	Yes	18.00	20.40	14.70	70	Medium
8	Company H	1960	Company	No	Yes	14.00	4.00	0.02	50	Medium
9	Company I	1990	Sole trade	Yes	No	0.10	0.01	-0.05	5	Small
10	Company J	1985	Partnership	No	No	0.30	0.40	0.10	3	Small
11	Company K	1930	Company	Yes	No	5.00			40	Medium
12	Company L	2002	Company	Yes	No	0.70	0.50	-0.20	12	Small
	Total - $/"Yes"	N/A	N/A	5	5	56.60	37.81	20.64	292	N/A

Appendix 5.3

Table A5.3/1 Business Structure

No.	*Company*	*Industry*	*Competition*	*Competitive Advantage*	*Products/ Services*	*Customer Base*	*Export*	*Machine Utilisation*	*Labour Utilisation*	*Managerial Skills*
1	Company A	Manufacturing	High	TR	Limited	Limited	Yes	Yes	High	Medium
2	Company B	Manufacturing	High	Access	Single line	Wide	No	No	Medium	High
3	Company C	Manufacturing	High	QP, CS	Single line	Wide	No	Yes	Medium	High
4	Company D	Retail	High	Hard Work	Single line	Wide	No	Yes		High
5	Company E	Manufacturing	High	TR	Limited	Limited	No	Yes	Medium	High
6	Company F	Retail	Moderate	Reliable/QP	Limited	Wide	No	Yes	Low	High
7	Company G	Manufacturing	Moderate	QP, Market Power	Limited	Wide	Yes	No	High	Medium
8	Company H	Retail/Wholesale	High	LC	Multi line	Wide	No	Yes	Medium	High
9	Company I	Service	Low		Limited	Local	No	No		High
10	Company J	Retail	Low		Limited	Local	No	No		High
11	Company K	Service	Moderate		Limited	Wide	No	No		High
12	Company L	Service	High	Brand	Limited	Local	No	No		High
	Total - "Yes"	N/A	N/A	N/A	N/A	N/A	2	6	N/A	N/A

Appendix 5.4

Table A5.4/1 IT/Accounting Systems

No.	*Company*	*In-house Accounting*	*Accounting Package*	*Specialised Software*	*Use of Spreadsheet*	*Internal/Ext IT Support*	*Use of Budget*	*Use of Cash Flow*
1	Company A	Yes	Attache	Yes	Yes	Yes	Yes	Yes
2	Company B	Yes	MYOB	No	Yes	No	No	No
3	Company C	Yes	CBA	No	Yes	Yes	Yes	Yes
4	Company D	No	N/A	N/A	Yes	No	No	No
5	Company E	Yes	Arrow		Yes	No	No	No
6	Company F	No	N/A	N/A	Yes	No	No	No
7	Company G	Yes	Custom-made	Yes	Yes	Yes	Yes	Yes
8	Company H	Yes	Accpac		Yes	Yes	No	Yes
9	Company I	No	N/A	N/A	Yes	No	No	No
10	Company J	No	N/A	No	Yes	No	No	No
11	Company K	Yes	MYOB	No	Yes	No	Yes	Yes
12	Company L	Yes	MYOB	No	Yes	No	No	No
	Total - "Yes"	8	N/A	2	12	4	4	5

Appendix 5.5

Table A5.5/1 Risk Management Practices ($ million)

No.	Company	Insured	Type of Insurance	Underwriter	VAR (V1) Materials	Insured (I1) Materials	Adequacy - Is I1>=V1?	VAR (V2) Gross Prof	Insured (I2) Gross Prof	Adequacy Is I2>=V2?	Indemnity Period (mths)	BCP*	Back-up Procedure
1	Company A	Yes	ISR IV	CGU	7.50	7.50	Adequate	2.50	3.00	Adequate	12.00	Yes	Yes
2	Company B	Yes	IUA	QBE	1.00	1.20	Adequate	0.90	1.30	Adequate	12.00	No	No
3	Company C	Yes	Comm. Pack	CGU	1.20	1.20	Adequate	2.40	2.20	Under	12.00	No	Yes
4	Company D	Yes	Comm. Pack	CGU	0.90	0.58	Under	0.35	0.00	Under	12.00	No	No
5	Company E	Yes	ISR IV	AXIS	3.00	2.50	Under	2.00	1.50	Under	12.00	No	Yes
6	Company F	Yes	Comm. Pack	Lloyds	0.80	0.80	Adequate	0.80	0.60	Under	12.00	No	No
7	Company G	Yes	ISR IV	Zurich	18.00	18.00	Adequate	13.40	13.40	Adequate	12.00	No	Yes
8	Company H	Yes	ISR IV	Lloyds	12.00	12.00	Adequate	6.00	6.40	Adequate	12.00	No	Yes
9	Company I	Yes	Comm. Pack	CGU	0.15	0.06	Under	0.10	0.04	Under	12.00	No	No
10	Company J	Yes	Comm. Pack	Zurich	0.30	0.14	Under	0.10	0.10	Adequate	12.00	No	No
11	Company K	Yes	ISR IV	CGU	20.00	15.60	Under	3.50	1.10	Under	12.00	No	No
12	Company L	Yes	ISR IV	MMI	0.40	0.28	Under	0.50	0.50	Adequate	12.00	No	No
	Total - $/"Yes"	12	N/A	N/A	65.25	59.86	6 (Adequate)	32.55	30.14	6 (Adequate)	N/A	1.00	5.00

Appendix 5.6

Table A5.6/1 Nature of Disruptions

No.	Company	Cause of Incident	Month of Incident	Level of Material Damage	Impact of Damage	Business Shutdown	Duration of Shutdown (months)	Duration of Disruption (months)	Previous Incident (10 Years)
1	Company A	Fire	Jun-01	Severe	Severe	Yes	<1	>24	Yes
2	Company B	Contamination	Aug-01	Minor	Severe	Yes	>6	>12	Yes
3	Company C	Fire	Nov-01	Minor	Minor	No		<12	Yes
4	Company D	Fire	Oct-01	Total	Severe	Yes	>2	>12	No
5	Company E	Storm	Jan-02	Minor	Medium	No		<12	Yes
6	Company F	Fire	Nov-01	Severe	Severe	Yes	>9	<12	No
7	Company G	Accidental Damage	Aug-02	Medium	Medium	No		<6	No
8	Company H	Flood	Mar-01	Minor	Minor	Yes	<1	<6	No
9	Company I	Fire	Aug-01	Total	Severe	Yes	<1	>12	No
10	Company J	Fire	Aug-01	Total	Severe	Yes	<1	>12	No
11	Company K	Bush Fire	Jan-03	Minor	Total	Yes	>2	>12	No
12	Company L	Fire	May-02	Total	Severe	Yes	>3	<12	No
	Total - "Yes"	N/A	N/A	N/A	N/A	9	N/A	N/A	4

Appendix 5.7

Table A5.7/1 Financial and Other Crises

No.	Company	Month of Loss	Material Loss ($m)	Consequential Loss ($m)	Loss of Contract	Loss of Customers (Permanent)	Loss of Customers (Temporary)	Product Withdrawal	Market Withdrawal	Supplier Withdrawal	Employee Resignation	Business Closed
1	Company A	Jun-01	5.50	2.40	Yes	Yes	Yes	Yes	Yes	No	Yes	No
2	Company B	Aug-01	0.00	0.80	Yes	Yes	Yes	No	No	Yes	Yes	No
3	Company C	Nov-01	0.13	0.18	No	No	Yes	No	No	No	No	No
4	Company D	Oct-01	0.60	0.14	No	No	Yes	No	No	No	Yes	No
5	Company E	Jan-02	0.02	0.22	Yes	Yes	Yes	No	No	No	No	No
6	Company F	Nov-01	0.43	0.62	No	No	Yes	No	No	No	Yes	No
7	Company G	Aug-02	0.60	1.60	No	No	Yes	No	Yes	No	No	No
8	Company H	Mar-01	0.04	0.31	No	Yes	Yes	No	Yes	No	Yes	No
9	Company I	Aug-01	0.15	0.03	No	No	Yes	No	No	No	No	No
10	Company J	Aug-01	0.31	0.12	No	No	Yes	No	No	No	No	No
11	Company K	Jan-03	0.60	2.20	No	No	Yes	No	No	Yes	Yes	Yes
12	Company L	May-02	0.40	0.18	No	No	Yes	No	No	No	No	No
	Total - $/"Yes"	N/A	8.78	8.80	3.00	4.00	12.00	1.00	3.00	2.00	6.00	1.00

Appendix 5.8

Table A5.8/1 Crisis Management Practices

No.	Company	Temporary Biz Relocate	Duration of Temporary Relocation	Relocate Permanently	Hire Machine	Outsource	Use of Ad/Promotion	Use of PR	Use of Accounting/ Finance	Engage Specialists	Engage Claims Preparers
1	Company A	Yes	<8	No	Yes	No	Yes	Yes	Yes	Yes	Yes
2	Company B	No	N/A	Yes	No	Yes	No	Yes	No	No	Yes
3	Company C	No	N/A	No	No	Yes	No	No	No	No	Yes
4	Company D	Yes	>12	Yes	No	No	No	No	No	No	Yes
5	Company E	No	N/A	N/A	No	No	No	No	No	No	Yes
6	Company F	No	N/A	Yes	No	No	Yes	No	No	No	Yes
7	Company G	No	N/A	No	Yes	Yes	No	Yes	Yes	No	Yes
8	Company H	No	N/A	No	No	No	No	Yes	No	No	Yes
9	Company I	Yes	>12	No	No	No	No	No	No	No	Yes
10	Company J	Yes	>12	No	No	No	No	No	No	No	Yes
11	Company K	No	N/A	No	No	No	Yes	Yes	No	No	Yes
12	Company L	Yes	>8	No	No	No	Yes	No	No	No	Yes
	Total - "Yes"	5.00	N/A	3.00	2.00	3.00	4.00	5.00	2.00	1.00	12.00

Appendix 6.1

Table A6.1/1 Implementation of the Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Week:											
Variable	*Start Week*	*Mature Week*	*Amount ($)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
A	1	2	0	-1	1.00067	0	0	0	0	0	0	0	0	0	0	0
B	1	5	0	-1	0	0	0	1.00346	0	0	0	0	0	0	0	0
C	1	9	0	-1	0	0	0	0	0	0	0	1.00769	0	0	0	0
D	1	13	0	-1	0	0	0	0	0	0	0	0	0	0	0	1.01312
A	2	3	0	0	-1	1.00067	0	0	0	0	0	0	0	0	0	0
B	2	6	0	0	-1	0	0	0	1.00346	0	0	0	0	0	0	0
C	2	10	0	0	-1	0	0	0	0	0	0	0	1.00769	0	0	0
A	3	4	0	0	0	-1	1.00067	0	0	0	0	0	0	0	0	0
B	3	7	0	0	0	-1	0	0	0	1.00346	0	0	0	0	0	0
C	3	11	0	0	0	-1	0	0	0	0	0	0	0	1.00769	0	0
A	4	5	0	0	0	0	-1	1.00067	0	0	0	0	0	0	0	0
B	4	8	0	0	0	0	-1	0	0	0	1.00346	0	0	0	0	0
C	4	12	0	0	0	0	-1	0	0	0	0	0	0	0	1.00769	0
A	5	6	0	0	0	0	0	-1	1.00067	0	0	0	0	0	0	0
B	5	9	0	0	0	0	0	-1	0	0	0	1.00346	0	0	0	0
C	5	13	0	0	0	0	0	-1	0	0	0	0	0	0	0	1.00769
A	6	7	0	0	0	0	0	0	-1	1.00067	0	0	0	0	0	0
B	6	10	0	0	0	0	0	0	-1	0	0	0	1.00346	0	0	0
A	7	8	0	0	0	0	0	0	0	-1	1.00067	0	0	0	0	0
B	7	11	0	0	0	0	0	0	0	-1	0	0	0	1.00346	0	0
A	8	9	0	0	0	0	0	0	0	0	-1	1.00067	0	0	0	0

				Investment/Borrowing Period Ended Week:											
Variable	*Start Week*	*Mature Week*	*Amount ($)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
B	8	12	0	0	0	0	0	0	0	0	-1	0	0	0	1.00346	0
A	9	10	0	0	0	0	0	0	0	0	0	-1	1.00067	0	0	0
B	9	13	0	0	0	0	0	0	0	0	0	-1	0	0	0	1.00346
A	10	11	0	0	0	0	0	0	0	0	0	0	-1	1.00067	0	0
A	11	12	0	0	0	0	0	0	0	0	0	0	0	-1	1.00067	0
A	12	13	0	0	0	0	0	0	0	0	0	0	0	0	-1	1.00067
W	1	2	0	0.99870	-1	0	0	0	0	0	0	0	0	0	0	0
X	1	5	0	0.99481	0	0	0	-1	0	0	0	0	0	0	0	0
Y	1	9	0	0.98962	0	0	0	0	0	0	0	-1	0	0	0	0
Z	1	14	0	0.98312	0	0	0	0	0	0	0	0	0	0	0	-1
W	2	3	0	0	0.99870	-1	0	0	0	0	0	0	0	0	0	0
X	2	6	0	0	0.99481	0	0	0	-1	0	0	0	0	0	0	0
Y	2	10	0	0	0.98962	0	0	0	0	0	0	0	-1	0	0	0
W	3	4	0	0	0	0.99870	-1	0	0	0	0	0	0	0	0	0
X	3	7	0	0	0	0.99481	0	0	0	-1	0	0	0	0	0	0
Y	3	11	0	0	0	0.98962	0	0	0	0	0	0	0	-1	0	0
W	4	5	0	0	0	0	0.99870	-1	0	0	0	0	0	0	0	0
X	4	8	0	0	0	0	0.99481	0	0	0	-1	0	0	0	0	0
Y	4	12	0	0	0	0	0.98962	0	0	0	0	0	0	0	-1	0
W	5	6	0	0	0	0	0	0.99870	-1	0	0	0	0	0	0	0
X	5	9	0	0	0	0	0	0.99481	0	0	0	-1	0	0	0	0
Y	5	13	0	0	0	0	0	0.98962	0	0	0	0	0	0	0	-1
W	6	7	0	0	0	0	0	0	0.99870	-1	0	0	0	0	0	0
X	6	10	0	0	0	0	0	0	0.99481	0	0	0	-1	0	0	0
W	7	8	0	0	0	0	0	0	0	0.99870	-1	0	0	0	0	0
X	7	11	0	0	0	0	0	0	0	0.99481	0	0	0	-1	0	0
W	8	9	0	0	0	0	0	0	0	0	0.99870	-1	0	0	0	0

				Investment/Borrowing Period Ended Week:												
Variable	*Start Week*	*Mature Week*	*Amount ($)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
X	8	12	0	0	0	0	0	0	0	0	0.99481	0	0	0	-1	0
W	9	10	0	0	0	0	0	0	0	0	0	0.99870	-1	0	0	0
X	9	13	0	0	0	0	0	0	0	0	0	0.99481	0	0	0	-1
W	10	11	0	0	0	0	0	0	0	0	0	0	0.99870	-1	0	0
W	11	12	0	0	0	0	0	0	0	0	0	0	0	0.99870	-1	0
W	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0.99870	-1
P		13	0	0	0	0	0	0	0	0	0	0	0	0	0	1
L		13	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
			0	0	0	0	0	0	0	0	0	0	0	0	0	0
Required Investments/Borrowing				-33	26	28.5	-36.5	13.5	13.5	13.5	-36.5	13.5	13.5	13.5	-36.5	13.5

Table A6.1/2 Solution of the Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Week:												
Variable	*Start Week*	*Mature Week*	*Amount ($)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
A	1	2	26.73293337	-1	1.00067	0	0	0	0	0	0	0	0	0	0	0
B	1	5	5.512687801	-1	0	0	0	1.00346	0	0	0	0	0	0	0	0
C	1	9	0	-1	0	0	0	0	0	0	0	1.00769	0	0	0	0
D	1	13	0.754378732	-1	0	0	0	0	0	0	0	0	0	0	0	1.01312
A	2	3	0	0	-1	1.00067	0	0	0	0	0	0	0	0	0	0
B	2	6	0.750845012	0	-1	0	0	0	1.00346	0	0	0	0	0	0	0
C	2	10	0	0	-1	0	0	0	0	0	0	0	1.00769	0	0	0
A	3	4	0	0	0	-1	1.00067	0	0	0	0	0	0	0	0	0
B	3	7	0	0	0	-1	0	0	0	1.00346	0	0	0	0	0	0

				Investment/Borrowing Period Ended Week:											
Variable	*Start Week*	*Mature Week*	*Amount ($)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
C	3	11	0	0	0	-1	0	0	0	0	0	0	0	1.00769	0	0
A	4	5	7.962902267	0	0	0	-1	1.00067	0	0	0	0	0	0	0	0
B	4	8	0	0	0	0	-1	0	0	0	1.00346	0	0	0	0	0
C	4	12	0	0	0	0	-1	0	0	0	0	0	0	0	1.00769	0
A	5	6	0	0	0	0	0	-1	1.00067	0	0	0	0	0	0	0
B	5	9	0	0	0	0	0	-1	0	0	0	1.00346	0	0	0	0
C	5	13	0	0	0	0	0	-1	0	0	0	0	0	0	0	1.00769
A	6	7	0	0	0	0	0	0	-1	1.00067	0	0	0	0	0	0
B	6	10	0	0	0	0	0	0	-1	0	0	0	1.00346	0	0	0
A	7	8	0	0	0	0	0	0	0	-1	1.00067	0	0	0	0	0
B	7	11	0	0	0	0	0	0	0	-1	0	0	0	1.00346	0	0
A	8	9	12.18585791	0	0	0	0	0	0	0	-1	1.00067	0	0	0	0
B	8	12	0	0	0	0	0	0	0	0	-1	0	0	0	1.00346	0
A	9	10	0	0	0	0	0	0	0	0	0	-1	1.00067	0	0	0
B	9	13	0	0	0	0	0	0	0	0	0	-1	0	0	0	1.00346
A	10	11	-1E-06	0	0	0	0	0	0	0	0	0	-1	1.00067	0	0
A	11	12	0	0	0	0	0	0	0	0	0	0	0	-1	1.00067	0
A	12	13	6.743075244	0	0	0	0	0	0	0	0	0	0	0	-1	1.00067
W	1	2	0	0.99870	-1	0	0	0	0	0	0	0	0	0	0	0
X	1	5	0	0.99481	0	0	0	-1	0	0	0	0	0	0	0	0
Y	1	9	0	0.98962	0	0	0	0	0	0	0	-1	0	0	0	0
Z	1	14	0	0.98312	0	0	0	0	0	0	0	0	0	0	0	-1
W	2	3	0	0	0.99870	-1	0	0	0	0	0	0	0	0	0	0
X	2	6	0	0	0.99481	0	0	0	-1	0	0	0	0	0	0	0
Y	2	10	0	0	0.98962	0	0	0	0	0	0	0	-1	0	0	0
W	3	4	28.53709779	0	0	0.99870	-1	0	0	0	0	0	0	0	0	0
X	3	7	0	0	0	0.99481	0	0	0	-1	0	0	0	0	0	0

				Investment/Borrowing Period Ended Week:											
Variable	*Start Week*	*Mature Week*	*Amount ($)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
Y	3	11	0	0	0	0.98962	0	0	0	0	0	0	0	-1	0	0
W	4	5	0	0	0	0	0.99870	-1	0	0	0	0	0	0	0	0
X	4	8	0	0	0	0	0.99481	0	0	0	-1	0	0	0	0	0
Y	4	12	0	0	0	0	0.98962	0	0	0	0	0	0	0	-1	0
W	5	6	0	0	0	0	0	0.99870	-1	0	0	0	0	0	0	0
X	5	9	0	0	0	0	0	0.99481	0	0	0	-1	0	0	0	0
Y	5	13	0	0	0	0	0	0.98962	0	0	0	0	0	0	0	-1
W	6	7	12.76314864	0	0	0	0	0	0.99870	-1	0	0	0	0	0	0
X	6	10	0	0	0	0	0	0	0.99481	0	0	0	-1	0	0	0
W	7	8	24.4004502	0	0	0	0	0	0	0.99870	-1	0	0	0	0	0
X	7	11	1.904302199	0	0	0	0	0	0	0.99481	0	0	0	-1	0	0
W	8	9	0	0	0	0	0	0	0	0	0.99870	-1	0	0	0	0
X	8	12	0.086758383	0	0	0	0	0	0	0	0.99481	0	0	0	-1	0
W	9	10	0.708798571	0	0	0	0	0	0	0	0	0.99870	-1	0	0	0
X	9	13	0.601220568	0	0	0	0	0	0	0	0	0.99481	0	0	0	-1
W	10	11	14.22729218	0	0	0	0	0	0	0	0	0	0.99870	-1	0	0
W	11	12	29.67016638	0	0	0	0	0	0	0	0	0	0	0.99870	-1	0
W	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0.99870	-1
P		13	6.589350876	0	0	0	0	0	0	0	0	0	0	0	0	1
L		13	0	0	0	0	0	0	0	0	0	0	0	0	0	-1
			-6.589350876	-33	26	28	-37	13	13	13	-36	13	13	13	-37	13
	Required Investments/Borrowing			-33	26	28.5	-36.5	13.5	13.5	13.5	-36.5	13.5	13.5	13.5	-36.5	13.5

Table A6.1/3 Answer Report

Target Cell (Max)

Cell	Name	Original Value	Final Value
$D$63	Amount $	0	-6.589350876

Adjustable Cells

Cell	Name	Original Value	Final Value
$D$7	A Amount $	0	26.73293337
$D$8	B Amount $	0	5.512687801
$D$9	C Amount $	0	0
$D$10	D Amount $	0	0.754378732
$D$11	A Amount $	0	0
$D$12	B Amount $	0	0.750845012
$D$13	C Amount $	0	0
$D$14	A Amount $	0	0
$D$15	B Amount $	0	0
$D$16	C Amount $	0	0
$D$17	A Amount $	0	7.962902267
$D$18	B Amount $	0	0
$D$19	C Amount $	0	0
$D$20	A Amount $	0	0
$D$21	B Amount $	0	0
$D$22	C Amount $	0	0
$D$23	A Amount $	0	0
$D$24	B Amount $	0	0
$D$25	A Amount $	0	0
$D$26	B Amount $	0	0
$D$27	A Amount $	0	12.18585791
$D$28	B Amount $	0	0
$D$29	A Amount $	0	0
$D$30	B Amount $	0	0
$D$31	A Amount $	0	0
$D$32	A Amount $	0	0
$D$33	A Amount $	0	6.743075244
$D$34	W Amount $	0	0
$D$35	X Amount $	0	0
$D$36	Y Amount $	0	0
$D$37	Z Amount $	0	0
$D$38	W Amount $	0	0
$D$39	X Amount $	0	0
$D$40	Y Amount $	0	0
$D$41	W Amount $	0	28.53709779
$D$42	X Amount $	0	0
$D$43	Y Amount $	0	0
$D$44	W Amount $	0	0
$D$45	X Amount $	0	0
$D$46	Y Amount $	0	0
$D$47	W Amount $	0	0
$D$48	X Amount $	0	0
$D$49	Y Amount $	0	0
$D$50	W Amount $	0	12.76314864
$D$51	X Amount $	0	0
$D$52	W Amount $	0	24.4004502
$D$53	X Amount $	0	1.904302199
$D$54	W Amount $	0	0
$D$55	X Amount $	0	0.086758383
$D$56	W Amount $	0	0.708798571

$D$57	X Amount $	0	0.601220568
$D$58	W Amount $	0	14.22729218
$D$59	W Amount $	0	29.67016638
$D$60	W Amount $	0	0
$D$61	P Amount $	0	6.589350876
$D$62	L Amount $	0	0

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
$E$63	Investment/Borrowing Period Ended Week:	-32.9999999	$E$63=$E$64	Not Binding	0
$F$63		25.99999942	$F$63=$F$64	Not Binding	0
$G$63		28.49999956	$G$63=$G$64	Not Binding	0
$H$63		-36.50000005	$H$63=$H$64	Not Binding	0
$I$63		13.49999911	$I$63=$I$64	Not Binding	0
$J$63		13.49999948	$J$63=$J$64	Not Binding	0
$K$63		13.49999985	$K$63=$K$64	Not Binding	0
$L$63		-36.5	$L$63=$L$64	Not Binding	0
$M$63		13.4999998	$M$63=$M$64	Not Binding	0
$N$63		13.49999913	$N$63=$N$64	Not Binding	0
$O$63		13.49999978	$O$63=$O$64	Not Binding	0
$P$63		-36.5	$P$63=$P$64	Not Binding	0
$Q$63		13.49999959	$Q$63=$Q$64	Not Binding	0
$D$7	A Amount $	26.73293337	$D$7>=0	Not Binding	26.73293337
$D$8	B Amount $	5.512687801	$D$8>=0	Not Binding	5.512687801
$D$9	C Amount $	0	$D$9>=0	Binding	0
$D$10	D Amount $	0.754378732	$D$10>=0	Not Binding	0.754378732
$D$11	A Amount $	0	$D$11>=0	Binding	0
$D$12	B Amount $	0.750845012	$D$12>=0	Not Binding	0.750845012
$D$13	C Amount $	0	$D$13>=0	Binding	0
$D$14	A Amount $	0	$D$14>=0	Binding	0
$D$15	B Amount $	0	$D$15>=0	Binding	0
$D$16	C Amount $	0	$D$16>=0	Binding	0
$D$17	A Amount $	7.962902267	$D$17>=0	Not Binding	7.962902267
$D$18	B Amount $	0	$D$18>=0	Binding	0
$D$19	C Amount $	0	$D$19>=0	Binding	0
$D$20	A Amount $	0	$D$20>=0	Binding	0
$D$21	B Amount $	0	$D$21>=0	Binding	0
$D$22	C Amount $	0	$D$22>=0	Binding	0
$D$23	A Amount $	0	$D$23>=0	Binding	0
$D$24	B Amount $	0	$D$24>=0	Binding	0
$D$25	A Amount $	0	$D$25>=0	Binding	0
$D$26	B Amount $	0	$D$26>=0	Binding	0
$D$27	A Amount $	12.18585791	$D$27>=0	Not Binding	12.18585791
$D$28	B Amount $	0	$D$28>=0	Binding	0
$D$29	A Amount $	0	$D$29>=0	Binding	0
$D$30	B Amount $	0	$D$30>=0	Binding	0
$D$31	A Amount $	-1E-06	$D$31>=0	Binding	0
$D$32	A Amount $	0	$D$32>=0	Binding	0
$D$33	A Amount $	6.743075244	$D$33>=0	Not Binding	6.743075244
$D$34	W Amount $	0	$D$34>=0	Binding	0
$D$35	X Amount $	0	$D$35>=0	Binding	0
$D$36	Y Amount $	0	$D$36>=0	Binding	0
$D$37	Z Amount $	0	$D$37>=0	Binding	0
$D$38	W Amount $	0	$D$38>=0	Binding	0
$D$39	X Amount $	0	$D$39>=0	Binding	0
$D$40	Y Amount $	0	$D$40>=0	Binding	0
$D$41	W Amount $	28.53709779	$D$41>=0	Not Binding	28.53709779
$D$42	X Amount $	0	$D$42>=0	Binding	0

$D$43	Y Amount $	0	$D$43>=0	Binding	0
$D$44	W Amount $	0	$D$44>=0	Binding	0
$D$45	X Amount $	0	$D$45>=0	Binding	0
$D$46	Y Amount $	0	$D$46>=0	Binding	0
$D$47	W Amount $	0	$D$47>=0	Binding	0
$D$48	X Amount $	0	$D$48>=0	Binding	0
$D$49	Y Amount $	0	$D$49>=0	Binding	0
$D$50	W Amount $	12.76314864	$D$50>=0	Not Binding	12.76314864
$D$51	X Amount $	0	$D$51>=0	Binding	0
$D$52	W Amount $	24.4004502	$D$52>=0	Not Binding	24.4004502
$D$53	X Amount $	1.904302199	$D$53>=0	Not Binding	1.904302199
$D$54	W Amount $	0	$D$54>=0	Binding	0
$D$55	X Amount $	0.086758383	$D$55>=0	Not Binding	0.086758383
$D$56	W Amount $	0.708798571	$D$56>=0	Not Binding	0.708798571
$D$57	X Amount $	0.601220568	$D$57>=0	Not Binding	0.601220568
$D$58	W Amount $	14.22729218	$D$58>=0	Not Binding	14.22729218
$D$59	W Amount $	29.67016638	$D$59>=0	Not Binding	29.67016638
$D$60	W Amount $	0	$D$60>=0	Binding	0
$D$61	P Amount $	6.589350876	$D$61>=0	Not Binding	6.589350876
$D$62	L Amount $	0	$D$62>=0	Binding	0

Table A6.1/4 Sensitivity Report

Adjustable Cells

Cell	Name	Final Value	Reduced Gradient
$D$7	A Amount $	26.73293337	0
$D$8	B Amount $	5.512687801	0
$D$9	C Amount $	0	0.000268866
$D$10	D Amount $	0.754378732	0
$D$11	A Amount $	0	-0.000145841
$D$12	B Amount $	0.750845012	0
$D$13	C Amount $	0	-0.000370225
$D$14	A Amount $	0	-0.000638222
$D$15	B Amount $	0	-0.000492571
$D$16	C Amount $	0	-0.001500233
$D$17	A Amount $	7.962902267	0
$D$18	B Amount $	0	-0.00049193
$D$19	C Amount $	0	-0.001938041
$D$20	A Amount $	0	0
$D$21	B Amount $	0	-0.000491601
$D$22	C Amount $	0	-0.001936744
$D$23	A Amount $	0	-0.000636539
$D$24	B Amount $	0	-0.001127501
$D$25	A Amount $	0	-0.000635711
$D$26	B Amount $	0	-0.001761276
$D$27	A Amount $	12.18585791	0
$D$28	B Amount $	0	-0.002196899
$D$29	A Amount $	0	-0.00063446
$D$30	B Amount $	0	-0.002195428
$D$31	A Amount $	-1E-06	-0.001267109
$D$32	A Amount $	0	-0.001069108
$D$33	A Amount $	6.743075244	0
$D$34	W Amount $	0	-0.000638741
$D$35	X Amount $	0	-0.00176475
$D$36	Y Amount $	0	-0.003051639

$D$37	Z Amount $	0	-0.003981387
$D$38	W Amount $	0	-0.000492571
$D$39	X Amount $	0	-0.001763568
$D$40	Y Amount $	0	-0.0024155
$D$41	W Amount $	28.53709779	0
$D$42	X Amount $	0	-0.001271261
$D$43	Y Amount $	0	-0.001291852
$D$44	W Amount $	0	-0.000636965
$D$45	X Amount $	0	-0.001269609
$D$46	Y Amount $	0	-0.00085383
$D$47	W Amount $	0	-0.000636539
$D$48	X Amount $	0	-0.001268759
$D$49	Y Amount $	0	-0.000853258
$D$50	W Amount $	12.76314864	0
$D$51	X Amount $	0	-0.000633874
$D$52	W Amount $	24.4004502	0
$D$53	X Amount $	1.904302199	0
$D$54	W Amount $	0	-0.00063446
$D$55	X Amount $	0.086758383	0
$D$56	W Amount $	0.708798571	0
$D$57	X Amount $	0.601220568	0
$D$58	W Amount $	14.22729218	0
$D$59	W Amount $	29.67016638	0
$D$60	W Amount $	0	-0.000630892
$D$61	P Amount $	6.589350876	0
$D$62	L Amount $	0	0

Constraints

Cell	Name	Final Value	Lagrange Multiplier
$E$63	Investment/Borrowing Period Ended Week:	-32.9999999	-1.013120055
$F$63		25.99999942	-1.012441764
$G$63		28.49999956	-1.011618183
$H$63		-36.50000005	-1.010303102
$I$63		13.49999911	-1.009626697
$J$63		13.49999948	-1.008950744
$K$63		13.49999985	-1.007639131
$L$63		-36.5	-1.006329223
$M$63		13.4999998	-1.005655478
$N$63		13.49999913	-1.004348148
$O$63		13.49999978	-1.002409469
$P$63		-36.5	-1.000669956
$Q$63		13.49999959	-1

Table A6.1/6 Limits Report

Cell	Target Name	Value
$D$63	Amount $	-6.589350876

Cell	Adjustable Name	Value	Lower Limit	Target Result	Upper Limit	Target Result
$D$7	A Amount $	26.73293337	26.73293337	-6.589350876	26.73293337	-6.589350876
$D$8	B Amount $	5.512687801	5.512687801	-6.589350876	5.512687801	-6.589350876
$D$9	C Amount $	0	0	-6.589350876	0	-6.589350876

$D$10	D Amount $	0.754378732	0.754378732	-6.589350876	0.754378732	-6.589350876
$D$11	A Amount $	0	0	-6.589350876	0	-6.589350876
$D$12	B Amount $	0.750845012	0.750845012	-6.589350876	0.750845012	-6.589350876
$D$13	C Amount $	0	0	-6.589350876	0	-6.589350876
$D$14	A Amount $	0	0	-6.589350876	0	-6.589350876
$D$15	B Amount $	0	0	-6.589350876	0	-6.589350876
$D$16	C Amount $	0	0	-6.589350876	0	-6.589350876
$D$17	A Amount $	7.962902267	7.962902267	-6.589350876	7.962902267	-6.589350876
$D$18	B Amount $	0	0	-6.589350876	0	-6.589350876
$D$19	C Amount $	0	0	-6.589350876	0	-6.589350876
$D$20	A Amount $	0	0	-6.589350876	0	-6.589350876
$D$21	B Amount $	0	0	-6.589350876	0	-6.589350876
$D$22	C Amount $	0	0	-6.589350876	0	-6.589350876
$D$23	A Amount $	0	0	-6.589350876	0	-6.589350876
$D$24	B Amount $	0	0	-6.589350876	0	-6.589350876
$D$25	A Amount $	0	0	-6.589350876	0	-6.589350876
$D$26	B Amount $	0	0	-6.589350876	0	-6.589350876
$D$27	A Amount $	12.18585791	12.18585791	-6.589350876	12.18585791	-6.589350876
$D$28	B Amount $	0	0	-6.589350876	0	-6.589350876
$D$29	A Amount $	0	0	-6.589350876	0	-6.589350876
$D$30	B Amount $	0	0	-6.589350876	0	-6.589350876
$D$31	A Amount $	-1E-06	#N/A	#N/A	#N/A	#N/A
$D$32	A Amount $	0	0	-6.589350876	0	-6.589350876
$D$33	A Amount $	6.743075244	6.743075244	-6.589350876	6.743075244	-6.589350876
$D$34	W Amount $	0	0	-6.589350876	0	-6.589350876
$D$35	X Amount $	0	0	-6.589350876	0	-6.589350876
$D$36	Y Amount $	0	0	-6.589350876	0	-6.589350876
$D$37	Z Amount $	0	0	-6.589350876	0	-6.589350876
$D$38	W Amount $	0	0	-6.589350876	0	-6.589350876
$D$39	X Amount $	0	0	-6.589350876	0	-6.589350876
$D$40	Y Amount $	0	0	-6.589350876	0	-6.589350876
$D$41	W Amount $	28.53709779	28.53709779	-6.589350876	28.53709779	-6.589350876
$D$42	X Amount $	0	0	-6.589350876	0	-6.589350876
$D$43	Y Amount $	0	0	-6.589350876	0	-6.589350876
$D$44	W Amount $	0	0	-6.589350876	0	-6.589350876
$D$45	X Amount $	0	0	-6.589350876	0	-6.589350876
$D$46	Y Amount $	0	0	-6.589350876	0	-6.589350876
$D$47	W Amount $	0	0	-6.589350876	0	-6.589350876
$D$48	X Amount $	0	0	-6.589350876	0	-6.589350876
$D$49	Y Amount $	0	0	-6.589350876	0	-6.589350876
$D$50	W Amount $	12.76314864	12.76314864	-6.589350876	12.76314864	-6.589350876
$D$51	X Amount $	0	0	-6.589350876	0	-6.589350876
$D$52	W Amount $	24.4004502	24.4004502	-6.589350876	24.4004502	-6.589350876
$D$53	X Amount $	1.904302199	1.904302199	-6.589350876	1.904302199	-6.589350876
$D$54	W Amount $	0	0	-6.589350876	0	-6.589350876
$D$55	X Amount $	0.086758383	0.086758383	-6.589350876	0.086758383	-6.589350876
$D$56	W Amount $	0.708798571	0.708798571	-6.589350876	0.708798571	-6.589350876
$D$57	X Amount $	0.601220568	0.601220568	-6.589350876	0.601220568	-6.589350876
$D$58	W Amount $	14.22729218	14.22729218	-6.589350876	14.22729218	-6.589350876
$D$59	W Amount $	29.67016638	29.67016638	-6.589350876	29.67016638	-6.589350876
$D$60	W Amount $	0	0	-6.589350876	0	-6.589350876
$D$61	P Amount $	6.589350876	6.589350876	-6.589350876	6.589350876	-6.589350876
$D$62	L Amount $	0	0	-6.589350876	0	-6.589350876

Appendix 6.2

Table A6.2/1 Solution of Cash Flow Optimisation Model (Altered Cash Outflow)

				Investment/Borrowing Period Ended Week:												
Variable	*Start Week*	*Mature Week*	*Amount ($)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
A	1	2	16.52212502	-1	1.00067	0	0	0	0	0	0	0	0	0	0	0
B	1	5	0	-1	0	0	0	1.00346	0	0	0	0	0	0	0	0
C	1	9	0	-1	0	0	0	0	0	0	0	1.00769	0	0	0	0
D	1	13	16.477874	-1	0	0	0	0	0	0	0	0	0	0	0	1.01312
A	2	3	0	0	-1	1.00067	0	0	0	0	0	0	0	0	0	0
B	2	6	0	0	-1	0	0	0	1.00346	0	0	0	0	0	0	0
C	2	10	0	0	-1	0	0	0	0	0	0	0	1.00769	0	0	0
A	3	4	0	0	0	-1	1.00067	0	0	0	0	0	0	0	0	0
B	3	7	0	0	0	-1	0	0	0	1.00346	0	0	0	0	0	0
C	3	11	0	0	0	-1	0	0	0	0	0	0	0	1.00769	0	0
A	4	5	13.4909608	0	0	0	-1	1.00067	0	0	0	0	0	0	0	0
B	4	8	0	0	0	0	-1	0	0	0	1.00346	0	0	0	0	0
C	4	12	0	0	0	0	-1	0	0	0	0	0	0	0	1.00769	0
A	5	6	0	0	0	0	0	-1	1.00067	0	0	0	0	0	0	0
B	5	9	0	0	0	0	0	-1	0	0	0	1.00346	0	0	0	0
C	5	13	0	0	0	0	0	-1	0	0	0	0	0	0	0	1.00769
A	6	7	0	0	0	0	0	0	-1	1.00067	0	0	0	0	0	0
B	6	10	0	0	0	0	0	0	-1	0	0	0	1.00346	0	0	0

				Investment/Borrowing Period Ended Week:											
Variable	*Start Week*	*Mature Week*	*Amount ($)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
A	7	8	0	0	0	0	0	0	0	-1	1.00067	0	0	0	0	0
B	7	11	0	0	0	0	0	0	0	-1	0	0	0	1.00346	0	0
A	8	9	9.447258125	0	0	0	0	0	0	0	-1	1.00067	0	0	0	0
B	8	12	0	0	0	0	0	0	0	0	-1	0	0	0	1.00346	0
A	9	10	0	0	0	0	0	0	0	0	0	-1	1.00067	0	0	0
B	9	13	0	0	0	0	0	0	0	0	0	-1	0	0	0	1.00346
A	10	11	-1E-06	0	0	0	0	0	0	0	0	0	-1	1.00067	0	0
A	11	12	0	0	0	0	0	0	0	0	0	0	0	-1	1.00067	0
A	12	13	5.385026085	0	0	0	0	0	0	0	0	0	0	0	-1	1.00067
W	1	2	0	0.99870	-1	0	0	0	0	0	0	0	0	0	0	0
X	1	5	0	0.99481	0	0	0	-1	0	0	0	0	0	0	0	0
Y	1	9	0	0.98962	0	0	0	0	0	0	0	-1	0	0	0	0
Z	1	14	-1E-06	0.98312	0	0	0	0	0	0	0	0	0	0	0	-1
W	2	3	9.479127589	0	0.99870	-1	0	0	0	0	0	0	0	0	0	0
X	2	6	0	0	0.99481	0	0	0	-1	0	0	0	0	0	0	0
Y	2	10	0	0	0.98962	0	0	0	0	0	0	0	-1	0	0	0
W	3	4	23.0090392	0	0	0.99870	-1	0	0	0	0	0	0	0	0	0
X	3	7	0	0	0	0.99481	0	0	0	-1	0	0	0	0	0	0
Y	3	11	0	0	0	0.98962	0	0	0	0	0	0	0	-1	0	0
W	4	5	0	0	0	0	0.99870	-1	0	0	0	0	0	0	0	0
X	4	8	0	0	0	0	0.99481	0	0	0	-1	0	0	0	0	0
Y	4	12	0	0	0	0	0.98962	0	0	0	0	0	0	0	-1	0
W	5	6	0	0	0	0	0	0.99870	-1	0	0	0	0	0	0	0
X	5	9	0	0	0	0	0	0.99481	0	0	0	-1	0	0	0	0

				Investment/Borrowing Period Ended Week:												
Variable	*Start Week*	*Mature Week*	*Amount ($)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
Y	5	13	0	0	0	0	0	0.98962	0	0	0	0	0	0	0	-1
W	6	7	13.51757247	0	0	0	0	0	0.99870	-1	0	0	0	0	0	0
X	6	10	0	0	0	0	0	0	0.99481	0	0	0	-1	0	0	0
W	7	8	27.05274187	0	0	0	0	0	0	0.99870	-1	0	0	0	0	0
X	7	11	-1E-06	0	0	0	0	0	0	0.99481	0	0	0	-1	0	0
W	8	9	0	0	0	0	0	0	0	0	0.99870	-1	0	0	0	0
X	8	12	0	0	0	0	0	0	0	0	0.99481	0	0	0	-1	0
W	9	10	4.051679002	0	0	0	0	0	0	0	0	0.99870	-1	0	0	0
X	9	13	0	0	0	0	0	0	0	0	0	0.99481	0	0	0	-1
W	10	11	17.5745246	0	0	0	0	0	0	0	0	0	0.99870	-1	0	0
W	11	12	31.11497391	0	0	0	0	0	0	0	0	0	0	0.99870	-1	0
W	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0.99870	-1
P		13	0	0	0	0	0	0	0	0	0	0	0	0	0	1
L		13	8.582699434	0	0	0	0	0	0	0	0	0	0	0	0	-1
			8.582699434	-33	26.0	13.5	-36.5	13.5	13.5	13.5	-36.5	13.5	13.5	13.5	-36.5	13.5
Required Investments/Borrowing				-33	26	13.5	-36.5	13.5	13.5	13.5	-36.5	13.5	13.5	13.5	-36.5	13.5

Appendix 6.3

Table A6.3/1 Company A Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e, $)*
Jun-00	S_p	244,919		
Jul-00	S_p	298,625		
Aug-00	S_p	194,390		
Sep-00	S_p	200,749		
Oct-00	S_p	140,126		
Nov-00	S_p	205,243		
Dec-00	S_p	151,460		
Jan-01	S_p	121,592		
Feb-01	S_p	278,954		
Mar-01	S_p	138,671		
Apr-01	S_p	144,009		
May-01	S_p	277,939		
Jun-01	S_c	86,307	-64.76%	280,367
Jul-01	S_c	123,538	-58.63%	291,067
Aug-01	S_c	169,475	-12.82%	286,567
Sep-01	S_c	215,422	7.31%	343,867
Oct-01	S_c	203,003	44.87%	337,267
Nov-01	S_c	154,267	-24.84%	391,789
Dec-01	S_c	166,029	9.62%	383,811
Jan-02	S_c	142,626	17.30%	430,633
Feb-02	S_c	207,620	-25.57%	479,155
Mar-02	S_c	167,970	21.13%	556,278
Apr-02	S_c	237,451	64.89%	541,300
May-02	S_c	282,152	1.52%	577,222

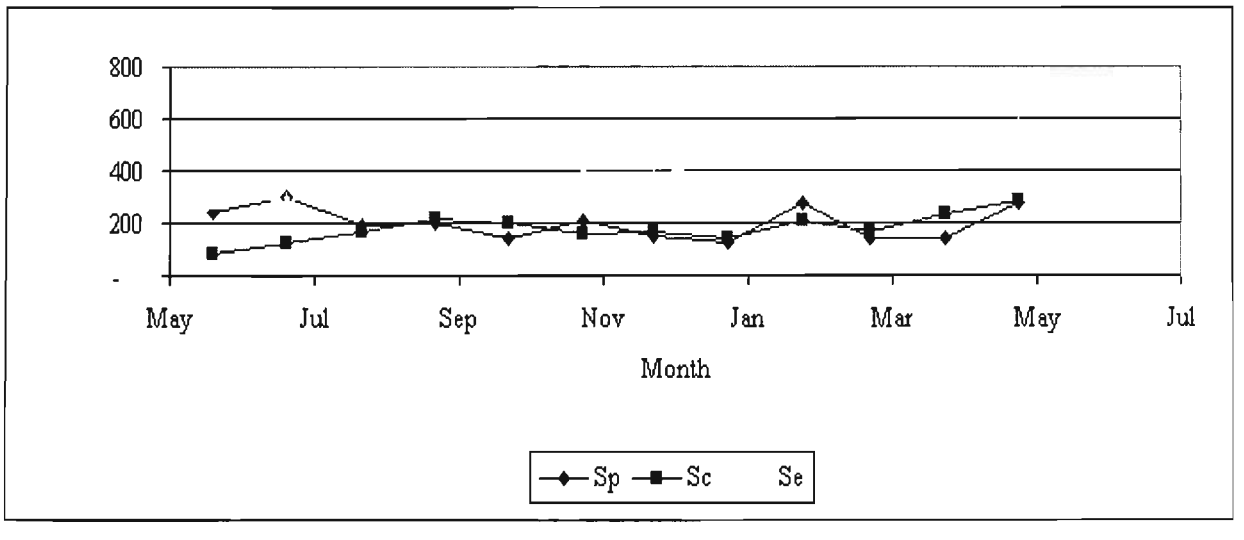


Figure A6.3/1
Company A Sales Graph ($'000)

Table A6.3/2 Company B Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
Aug-00	S_p	176,683		
Sep-00	S_p	125,342		
Oct-00	S_p	124,527		
Nov-00	S_p	146,012		
Dec-00	S_p	82,395		
Jan-01	S_p	32,701		
Feb-01	S_p	69,366		
Mar-01	S_p	63,108		
Apr-01	S_p	87,176		
May-01	S_p	138,723		
Jun-01	S_p	91,461		
Jul-01	S_p	109,099		
Aug-01	S_c	767	-99.57%	194,351
Sep-01	S_c	15,694	-87.48%	137,876
Oct-01	S_c	14,325	-88.50%	136,980
Nov-01	S_c	11,632	-92.03%	160,613
Dec-01	S_c	0	-100.00%	90,634
Jan-02	S_c	0	-100.00%	35,971
Feb-02	S_c	1,678	-97.58%	76,303
Mar-02	S_c	10,057	-84.06%	69,419
Apr-02	S_c	43,744	-49.82%	95,894
May-02	S_c	36,049	-74.01%	152,595
Jun-02	S_c	17,357	-81.02%	100,607
Jul-02	S_c	34,604	-68.28%	120,009

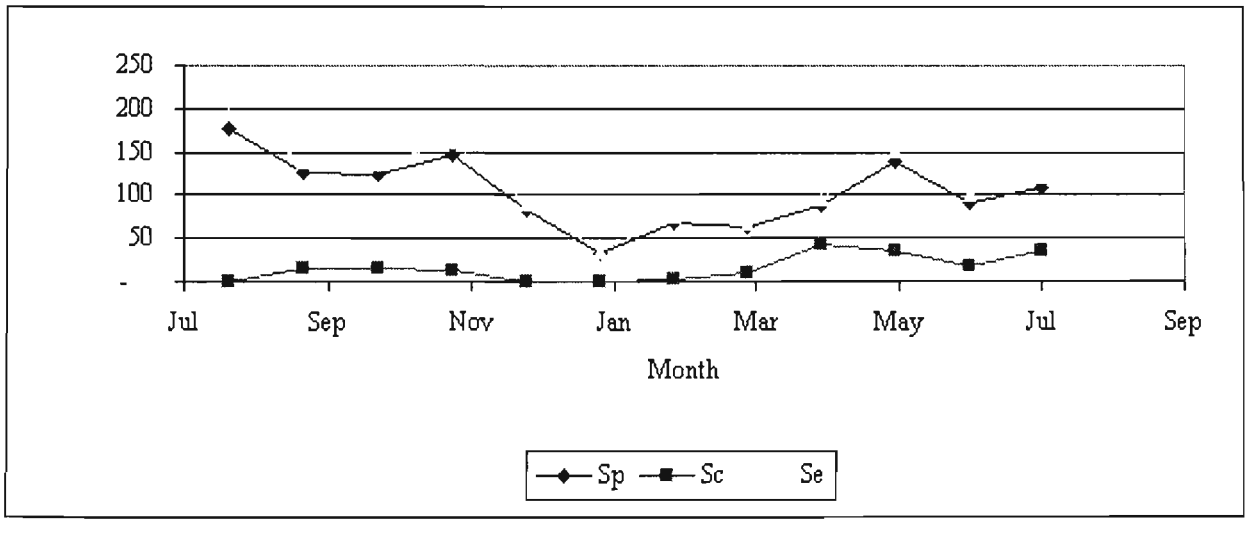


Figure A6.3/2
Company B Sales Graph ($'000)

Table A6.3/3 Company C Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales ($S_e$$)*
Nov-00	S_p	367,196		
Dec-00	S_p	574,580		
Jan-01	S_p	278,161		
Feb-01	S_p	460,473		
Mar-01	S_p	651,939		
Apr-01	S_p	462,090		
May-01	S_p	494,031		
Jun-01	S_p	589,265		
Jul-01	S_p	514,320		
Aug-01	S_p	408,560		
Sep-01	S_p	686,298		
Oct-01	S_p	650,126		
Nov-01	S_c	514,217	40.04%	367,196
Dec-01	S_c	752,693	31.00%	574,580
Jan-02	S_c	270,971	-2.58%	278,161
Feb-02	S_c	521,149	13.18%	460,473
Mar-02	S_c	577,001	-11.49%	651,939
Apr-02	S_c	749,186	62.13%	462,090
May-02	S_c	571,259	15.63%	494,031
Jun-02	S_c	571,836	-2.96%	589,265
Jul-02	S_c	556,909	8.28%	514,320
Aug-02	S_c	705,366	72.65%	408,560
Sep-02	S_c	514,640	-25.01%	686,298
Oct-02	S_c	731,692	12.55%	650,126

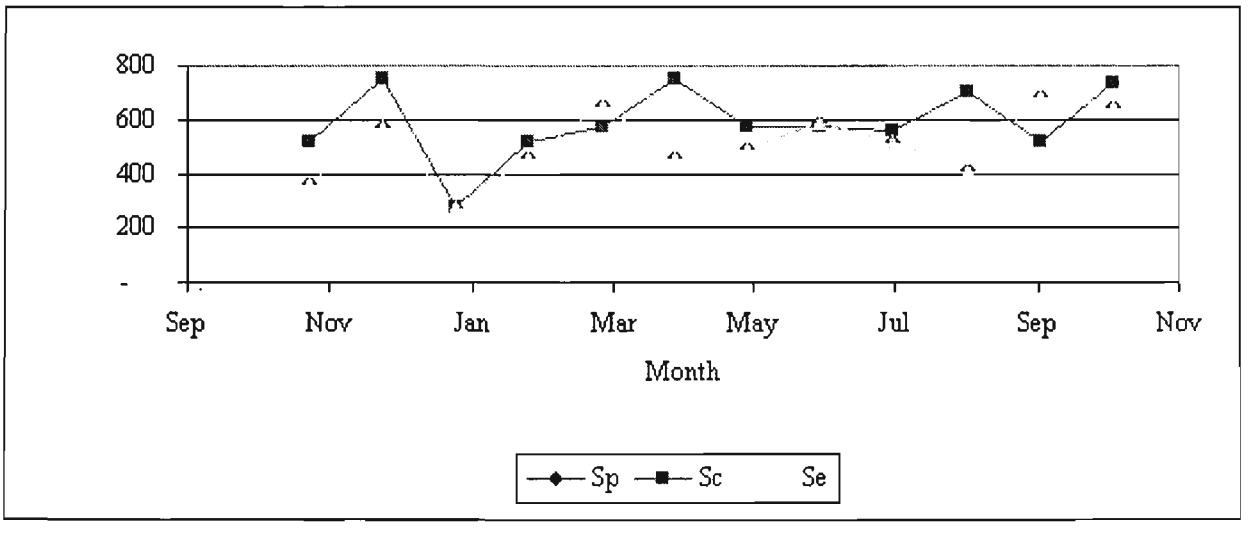


Figure A6.3/3
Company C Sales Graph ($'000)

Table A6.3/4 Company D Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
Oct-00	S_p	14,292		
Nov-00	S_p	13,278		
Dec-00	S_p	23,682		
Jan-01	S_p	31,014		
Feb-01	S_p	23,044		
Mar-01	S_p	9,991		
Apr-01	S_p	14,917		
May-01	S_p	12,635		
Jun-01	S_p	10,655		
Jul-01	S_p	8,957		
Aug-01	S_p	7,211		
Sep-01	S_p	6,697		
Oct-01	S_c	2,500	-82.51%	16,747
Nov-01	S_c	550	-95.86%	15,559
Dec-01	S_c	18,373	-22.42%	27,751
Jan-02	S_c	22,498	-27.46%	36,342
Feb-02	S_c	9,508	-58.74%	27,003
Mar-02	S_c	9,670	-3.21%	11,707
Apr-02	S_c	11,029	-26.06%	17,480
May-02	S_c	10,839	-14.21%	14,806
Jun-02	S_c	5,636	-47.10%	12,486
Jul-02	S_c	6,450	-27.99%	10,496
Aug-02	S_c	5,816	-19.34%	8,450
Sep-02	S_c	7,565	12.96%	7,848

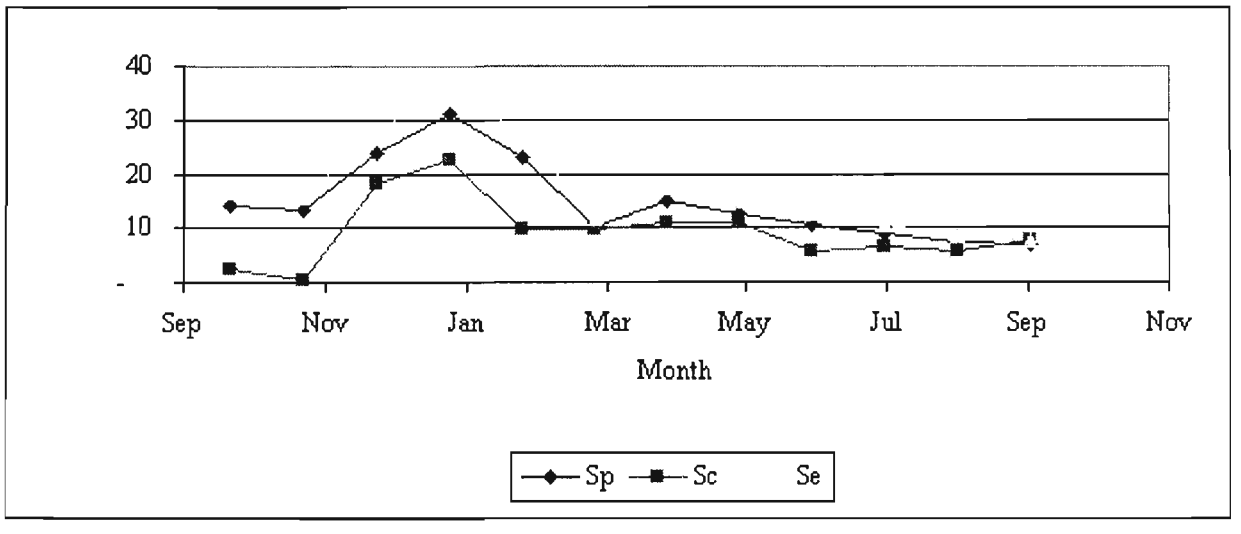


Figure A6.3/4
Company D Sales Graph ($'000)

Table A6.3/5 Company E Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
Jan-01	S_p	158,562		
Feb-01	S_p	141,986		
Mar-01	S_p	255,936		
Apr-01	S_p	100,644		
May-01	S_p	138,706		
Jun-01	S_p	79,300		
Jul-01	S_p	238,692		
Aug-01	S_p	339,281		
Sep-01	S_p	431,276		
Oct-01	S_p	473,860		
Nov-01	S_p	404,005		
Dec-01	S_p	184,397		
Jan-02	S_c	162,896	2.73%	152,999
Feb-02	S_c	266,662	87.81%	258,507
Mar-02	S_c	197,313	-22.91%	196,517
Apr-02	S_c	260,750	159.08%	248,810
May-02	S_c	225,022	62.23%	306,359
Jun-02	S_c	182,760	130.47%	200,015
Jul-02	S_c	232,012	-2.80%	297,909
Aug-02	S_c	428,576	26.32%	521,982
Sep-02	S_c	504,551	16.99%	614,354
Oct-02	S_c	491,441	3.71%	472,449
Nov-02	S_c	438,745	8.60%	402,906
Dec-02	S_c	189,062	2.53%	172,501

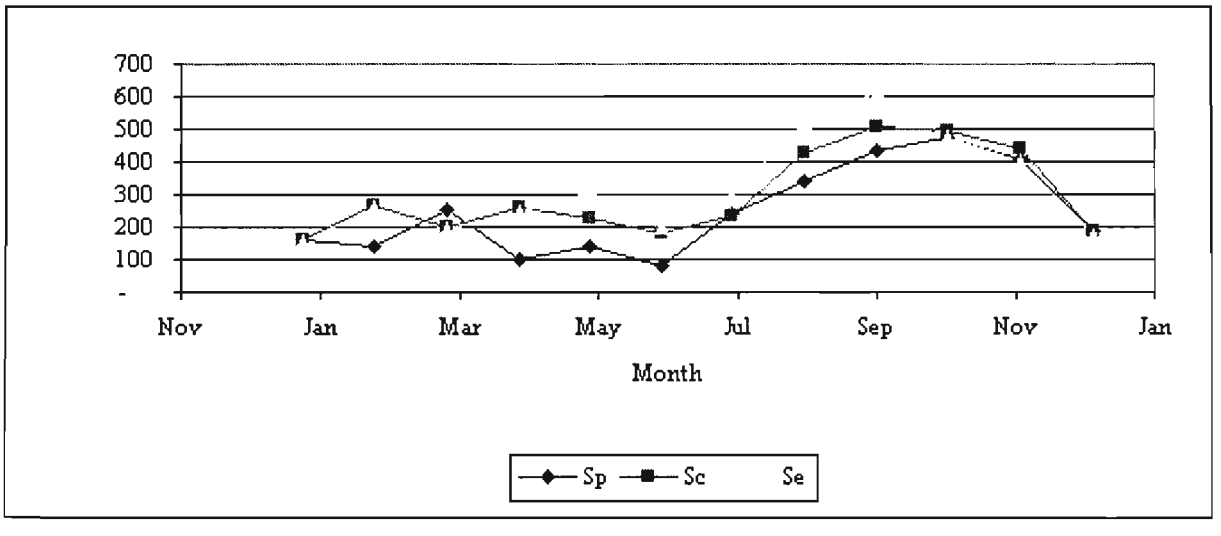


Figure A6.3/5
Company E Sales Graph ($'000)

Table A6.3/6 Company F Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
Nov-00	S_p	86,990		
Dec-00	S_p	192,461		
Jan-01	S_p	112,002		
Feb-01	S_p	83,272		
Mar-01	S_p	99,079		
Apr-01	S_p	65,067		
May-01	S_p	75,129		
Jun-01	S_p	46,818		
Jul-01	S_p	159,421		
Aug-01	S_p	136,506		
Sep-01	S_p	114,614		
Oct-01	S_p	122,906		
Nov-01	S_c	73,943	-15.00%	95,628
Dec-01	S_c	53,113	-72.40%	211,573
Jan-02	S_c	1,085	-99.03%	123,123
Feb-02	S_c	5,482	-93.42%	91,541
Mar-02	S_c	9,802	-90.11%	108,918
Apr-02	S_c	12,312	-81.08%	71,528
May-02	S_c	4,408	-94.13%	82,590
Jun-02	S_c	13,439	-71.30%	51,467
Jul-02	S_c	6,533	-95.90%	175,252
Aug-02	S_c	3,043	-97.77%	150,061
Sep-02	S_c	223,519	95.02%	125,995
Oct-02	S_c	178,246	45.03%	135,111

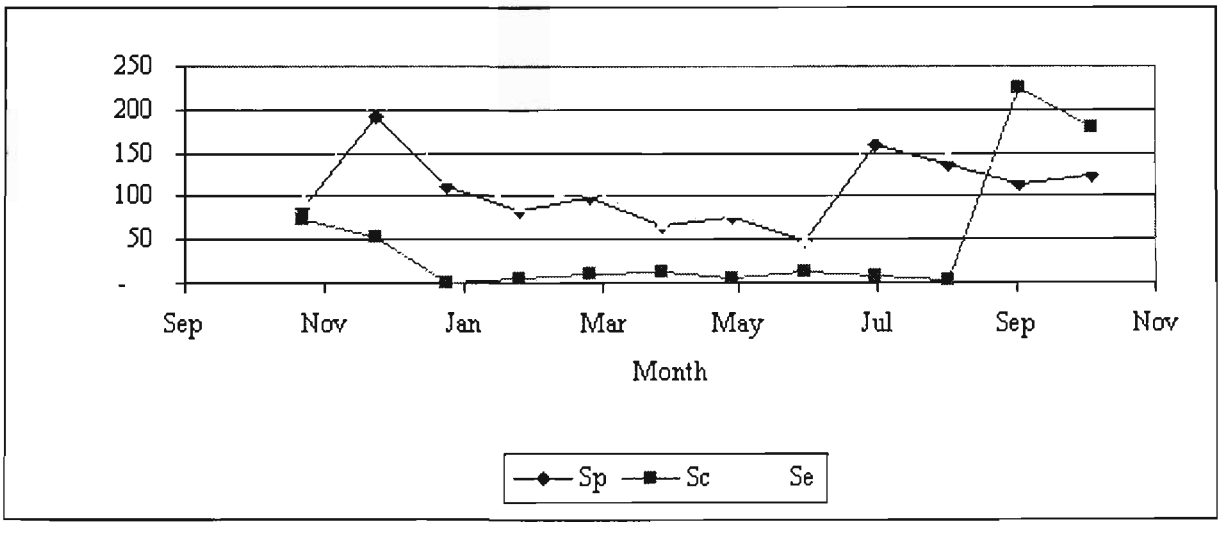


Figure A6.3/6
Company F Sales Graph ($'000)

Table A6.3/7 Company G Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
Aug-01	S_p	1,584,082		
Sep-01	S_p	1,561,649		
Oct-01	S_p	1,662,169		
Nov-01	S_p	1,963,363		
Dec-01	S_p	1,596,083		
Jan-02	S_p	1,206,598		
Feb-02	S_p	1,805,008		
Mar-02	S_p	1,467,041		
Apr-02	S_p	1,428,305		
May-02	S_p	1,362,671		
Jun-02	S_p	690,884		
Jul-02	S_p	1,720,124		
Aug-02	S_c	1,904,508	20.23%	1,929,372
Sep-02	S_c	2,149,888	37.67%	1,917,377
Oct-02	S_c	1,882,535	13.26%	1,603,044
Nov-02	S_c	1,523,967	-22.38%	2,464,646
Dec-02	S_c	1,068,600	-33.05%	2,163,986
Jan-03	S_c	1,753,306	45.31%	1,407,745
Feb-03	S_c	2,176,033	20.56%	2,083,113
Mar-03	S_c	1,612,772	9.93%	1,635,110
Apr-03	S_c	1,516,533	6.18%	1,538,907
May-03	S_c	1,598,706	17.32%	1,607,952
Jun-03	S_c	840,709	21.69%	835,969
Jul-03	S_c	1,896,780	10.27%	1,978,143

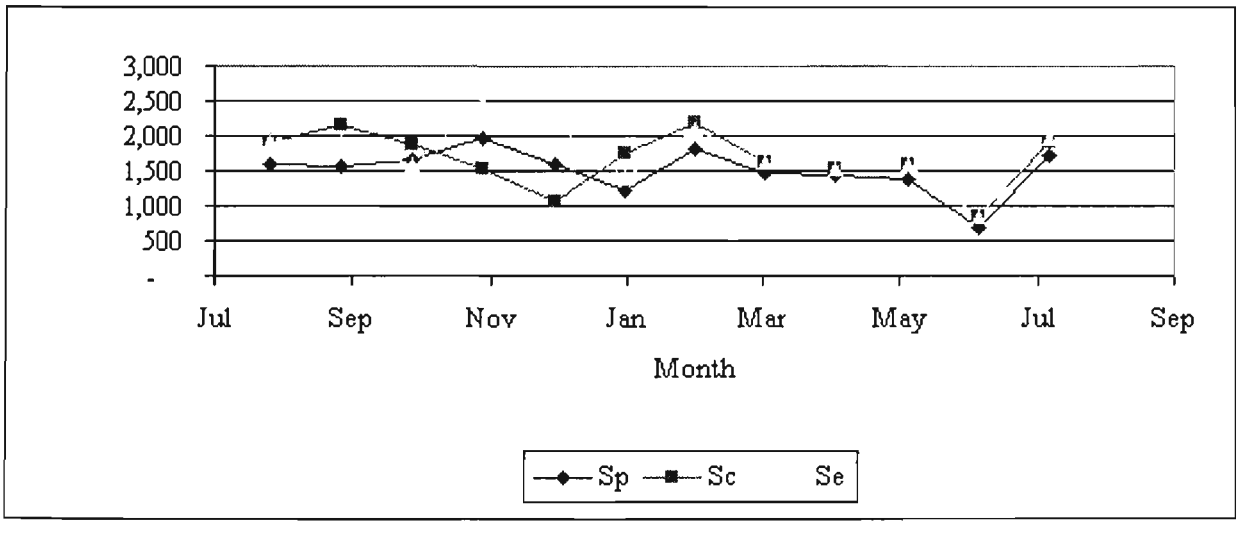


Figure A6.3/7
Company G Sales Graph ($'000)

Table A6.3/8 Company H Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
Mar-00	S_p	885,090		
Apr-00	S_p	1,493,040		
May-00	S_p	854,297		
Jun-00	S_p	748,981		
Jul-00	S_p	169,188		
Aug-00	S_p	551,857		
Sep-00	S_p	343,340		
Oct-00	S_p	535,159		
Nov-00	S_p	650,847		
Dec-00	S_p	121,913		
Jan-01	S_p	177,979		
Feb-01	S_p	117,948		
Mar-01	S_c	239,859	-72.90%	233,240
Apr-01	S_c	155,803	-89.56%	332,575
May-01	S_c	160,414	-81.22%	327,051
Jun-01	S_c	204,110	-72.75%	229,622
Jul-01	S_c	0	-100.00%	0
Aug-01	S_c	271,439	-50.81%	403,959
Sep-01	S_c	181,311	-47.19%	272,872
Oct-01	S_c	226,234	-57.73%	425,322
Nov-01	S_c	155,701	-76.08%	517,266
Dec-01	S_c	201,700	65.45%	89,240
Jan-02	S_c	73,198	-58.87%	130,281
Feb-02	S_c	86,514	-26.65%	86,338

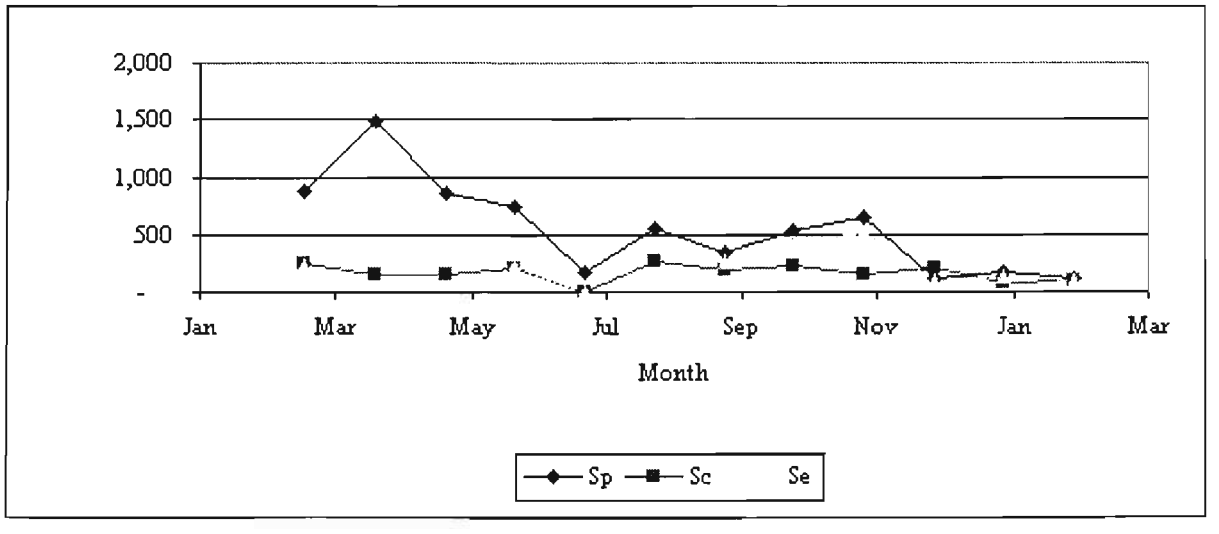


Figure A6.3/8
Company H Sales Graph ($'000)

Table A6.3/9 Company I Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
Aug-00	S_p	9,954		
Sep-00	S_p	7,960		
Oct-00	S_p	10,431		
Nov-00	S_p	10,007		
Dec-00	S_p	8,975		
Jan-01	S_p	8,831		
Feb-01	S_p	8,709		
Mar-01	S_p	10,747		
Apr-01	S_p	9,824		
May-01	S_p	11,429		
Jun-01	S_p	14,734		
Jul-01	S_p	44,324		
Aug-01	S_c	21,462	115.61%	24,813
Sep-01	S_c	39,512	396.40%	48,699
Oct-01	S_c	44,367	325.33%	54,248
Nov-01	S_c	42,657	326.27%	52,164
Dec-01	S_c	43,726	387.19%	53,845
Jan-02	S_c	42,397	380.10%	52,171
Feb-02	S_c	37,892	335.10%	46,390
Mar-02	S_c	42,923	299.41%	52,292
Apr-02	S_c	40,581	313.10%	49,537
May-02	S_c	42,429	271.24%	51,456
Jun-02	S_c	39,785	170.03%	47,079
Jul-02	S_c	38,959	-12.10%	47,090

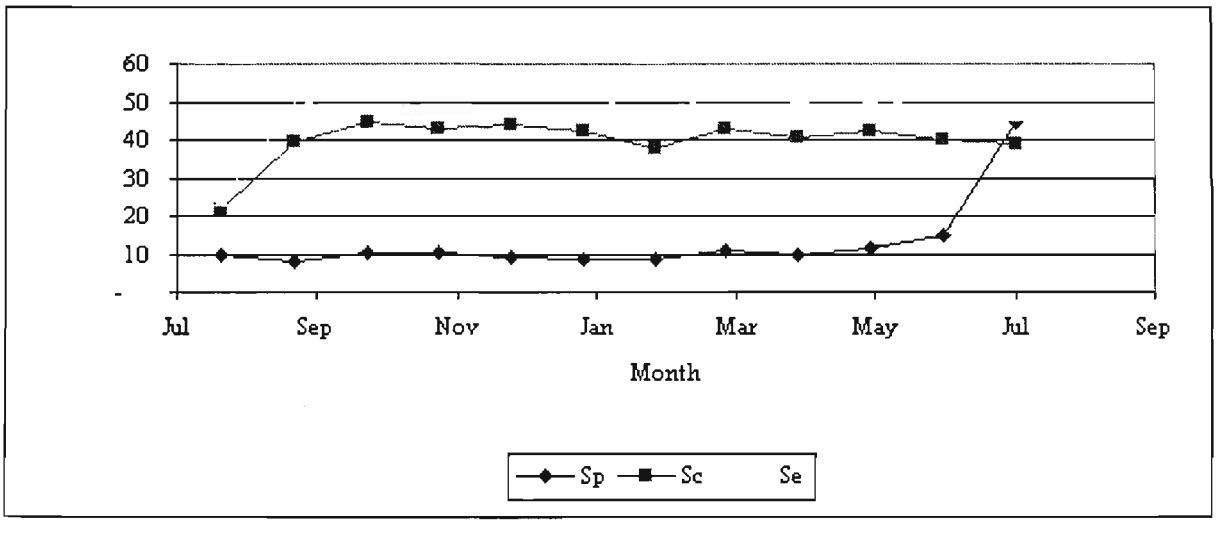


Figure A6.3/9
Company I Sales Graph ($'000)

Table A6.3/10 Company J Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
Aug-00	S_p	24,035		
Sep-00	S_p	23,247		
Oct-00	S_p	21,849		
Nov-00	S_p	25,303		
Dec-00	S_p	21,742		
Jan-01	S_p	21,172		
Feb-01	S_p	20,574		
Mar-01	S_p	21,273		
Apr-01	S_p	15,460		
May-01	S_p	25,642		
Jun-01	S_p	26,378		
Jul-01	S_p	17,293		
Aug-01	S_c	7,000	-70.88%	24,035
Sep-01	S_c	2,500	-89.25%	23,247
Oct-01	S_c	2,500	-88.56%	21,849
Nov-01	S_c	8,113	-67.94%	25,303
Dec-01	S_c	10,115	-53.48%	21,742
Jan-02	S_c	8,229	-61.13%	21,172
Feb-02	S_c	9,183	-55.37%	20,574
Mar-02	S_c	9,579	-54.97%	21,273
Apr-02	S_c	8,168	-47.17%	15,460
May-02	S_c	14,046	-45.22%	25,642
Jun-02	S_c	8,407	-68.13%	26,378
Jul-02	S_c	7,634	-55.85%	17,293

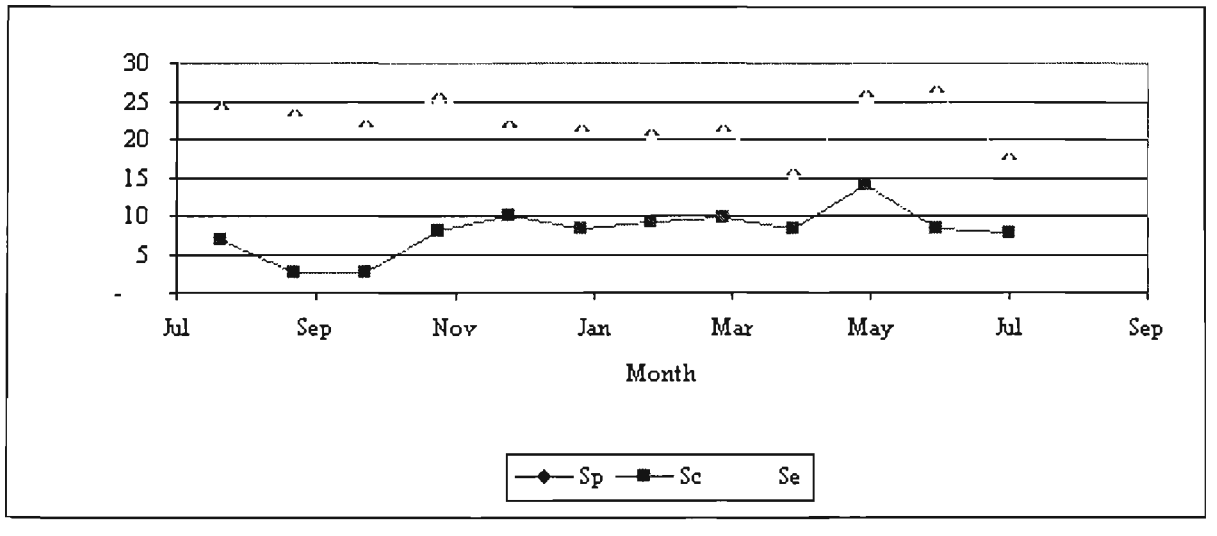


Figure A6.3/10
Company J Sales Graph ($'000)

Table A6.3/11 Company K Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
Jan-02	S_p	455,811		
Feb-02	S_p	255,793		
Mar-02	S_p	415,586		
Apr-02	S_p	426,848		
May-02	S_p	307,755		
Jun-02	S_p	119,765		
Jul-02	S_p	707,648		
Aug-02	S_p	450,622		
Sep-02	S_p	149,807		
Oct-02	S_p	173,569		
Nov-02	S_p	300,564		
Dec-02	S_p	388,812		
Jan-03	S_c	201,166	-55.87%	509,027
Feb-03	S_c	5,495	-97.85%	349,566
Mar-03	S_c	191,031	-54.03%	408,309
Apr-03	S_c	313,728	-26.50%	468,344
May-03	S_c	200,639	-34.81%	288,018
Jun-03	S_c	92,346	-22.89%	295,067
Jul-03	S_c	561,090	-20.71%	792,566
Aug-03	S_c	345,088	-23.42%	495,684
Sep-03	S_c	111,506	-25.57%	172,279
Oct-03	S_c	120,602	-30.52%	187,455
Nov-03	S_c	180,844	-39.83%	345,649
Dec-03	S_c	256,422	-34.05%	447,134

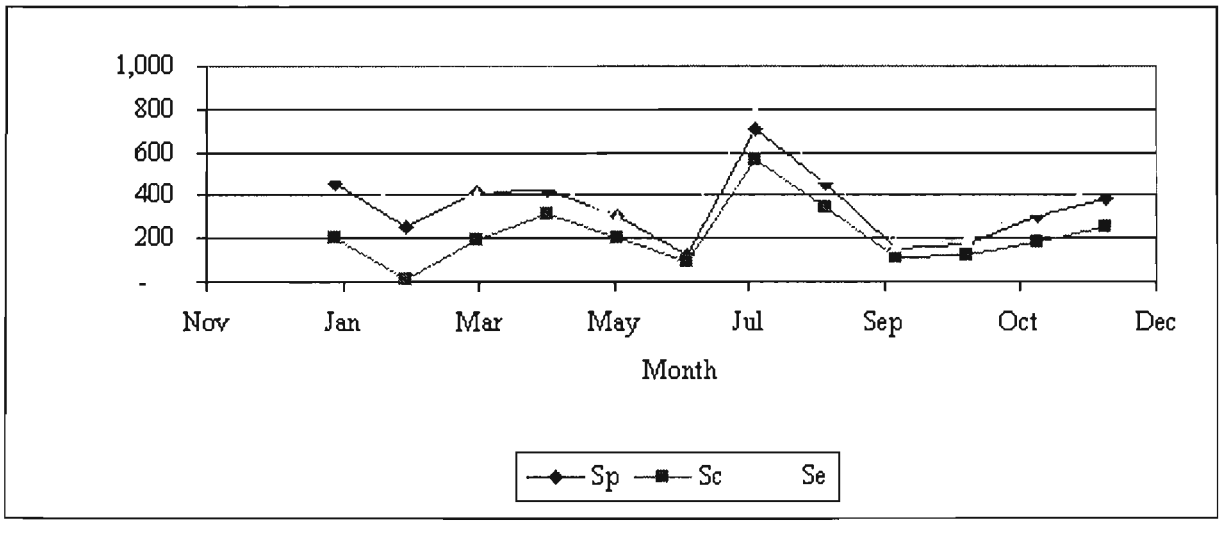


Figure A6.3/11
Company K Sales Graph ($'000)

Table A6.3/12 Company L Sales Analysis

Month	*Sales Period*	*Actual Sales ($)*	*Growth (%)*	*Expected Sales (S_e,$)*
May-01	S_p	54,490		
Jun-01	S_p	64,153		
Jul-01	S_p	62,962		
Aug-01	S_p	67,271		
Sep-01	S_p	61,746		
Oct-01	S_p	56,565		
Nov-01	S_p	59,908		
Dec-01	S_p	66,804		
Jan-02	S_p	66,184		
Feb-02	S_p	59,537		
Mar-02	S_p	58,003		
Apr-02	S_p	59,440		
May-02	S_c	1,986	-96.36%	54,490
Jun-02	S_c	0	-100.00%	64,153
Jul-02	S_c	0	-100.00%	62,962
Aug-02	S_c	37,065	-44.90%	67,271
Sep-02	S_c	37,983	-38.48%	61,746
Oct-02	S_c	48,743	-13.83%	56,565
Nov-02	S_c	42,174	-29.60%	59,908
Dec-02	S_c	62,985	-5.72%	66,804
Jan-03	S_c	61,833	-6.57%	66,184
Feb-03	S_c	72,937	22.51%	59,537
Mar-03	S_c	43,294	-25.36%	58,003
Apr-03	S_c	50,205	-15.54%	59,440

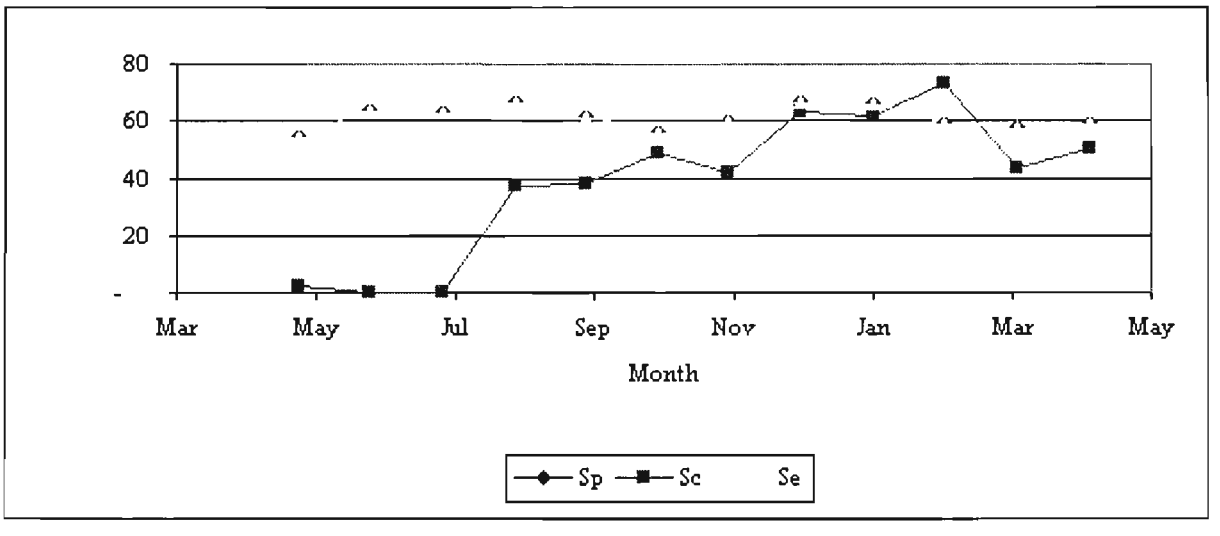


Figure A6.3/12
Company L Sales Graph ($'000)

Appendix 6.4

Table A6.4/1 Company A Calculation of Gross Margin

Details	*Year 2001($)*
Sales	2,238,068
Less - Variable Expenses	
Opening Stock	1,236,417
Purchases	897,537
Factory and Store Supplies	54,178
Commission Paid	3,924
Freight & Cartage	63,138
	2,255,194
Closing Stock	1,491,831
	763,363
Gross Margin	1,474,705
Rate of Gross Margin	65.89%
Rate of Cost of Sales	34.11%

Table A6.4/2 Company B Calculation of Gross Margin

Details	*Year 2001 ($)*
Sales	1,248,956
Less - Variable Expenses	
Opening Stock	147,420
Purchases	384,280
	531,700
Closing Stock	137,730
	393,970
Gross Margin	854,986
Rate of Gross Margin	68.46%
Rate of Cost of Sales	31.54%

Table A6.4/3 Company C Calculation of Gross Margin

Details	***Year 2001 ($)***
Sales	5,384,936
Less - Variable Expenses	
Opening Stock	628,342
Purchases	1,584,498
Variable Manufacturing Cost	2,055,969
	4,268,809
Closing Stock	826,015
	3,442,794
Gross Margin	1,942,142
Rate of Gross Margin	36.07%
Rate of Cost of Sales	63.93%

Table A6.4/4 Company D Calculation of Gross Margin

Details	***Year 2001 ($)***
Sales	762,262
Less - Variable Expenses	
Opening Stock	72,933
Purchases	474,184
	547,117
Closing Stock	132,840
	414,277
Gross Margin	347,985
Rate of Gross Margin	45.65%
Rate of Cost of Sales	54.35%

Table A6.4/5 Company E Calculation of Gross Margin

Details	***Year 2001 ($)***
Sales	3,220,186
Less - Variable Expenses	
Opening Stock	1,255,000
Purchases	1,514,096
Freight & Cartage	131,714
	2,900,810
Closing Stock	1,538,157
	1,362,653
Gross Margin	1,857,533
Rate of Gross Margin	57.68%
Rate of Cost of Sales	42.32%

Table A6.4/6 Company F Calculation of Gross Margin

Details	***Year 2001($)***
Sales	1,150,417
Less - Variable Expenses	
Opening Stock	263,273
Purchases	706,759
Bank Merchant Fees	15580
	985,612
Closing Stock	419,132
	566,480
Gross Margin	583,937
Rate of Gross Margin	50.76%
Rate of Cost of Sales	49.24%

Table A6.4/7 Company G Calculation of Gross Margin

Details	***Year 2002($)***
Sales	18,674,044
Less - Variable Expenses	
Opening Stock	2,062,557
Cost of Manufactured Goods	10,227,641
	12,290,198
Closing Stock	1,717,096
	10,573,102
Gross Margin	8,100,942
Rate of Gross Margin	43.38%
Rate of Cost of Sales	56.62%

Table A6.4/8 Company H Calculation of Gross Margin

Details	***Year 2001 ($)***
Sales	6,002,939
Less - Variable Expenses	
Opening Stock	2,749,300
Purchases	4,055,344
	6,804,644
Closing Stock	2,248,134
	4,556,510
Gross Margin	1,446,429
Rate of Gross Margin	24.10%
Rate of Cost of Sales	75.90%

Table A6.4/9 Company I Calculation of Gross Margin

Details	***Year 2001 ($)***
Sales	548,243
Less - Variable Expenses	
Opening Stock	0
Purchases	399,231
	399,231
Closing Stock	0
	399,231
Gross Margin	149,012
Rate of Gross Margin	27.18%
Rate of Cost of Sales	72.82%

Table A6.4/10 Company J Calculation of Gross Margin

Details	***Year 2001($)***
Sales	257,985
Less - Variable Expenses	
Opening Stock	29,579
Purchases	184,390
Bank Merchant Fees	4,559
	218,528
Closing Stock	43,790
	174,738
Gross Margin	83,247
Rate of Gross Margin	32.27%
Rate of Cost of Sales	67.73%

Table A6.4/11 Company K Calculation of Gross Margin

Details	*Year 2002 ($)*
Sales	3,025,397
Less - Variable Expenses	
Cost of Sales	457,234
	457,234
Closing Stock	
	457,234
Gross Margin	2,568,163
Rate of Gross Margin	84.89%
Rate of Cost of Sales	15.11%

Table A6.4/12 Company L Calculation of Gross Margin

Details	*Year 2001 ($)*
Sales	722,069
Less - Variable Expenses	
Opening Stock	0
Purchases	321,536
	321,536
Closing Stock	21,302
	300,234
Gross Margin	421,835
Rate of Gross Margin	58.42%
Rate of Cost of Sales	41.58%

Appendix 6.5

Table A6.5/1 Company A Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	694,316	57,860
Payroll	1,180,662	98,389
Interest	3,529	294

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.

Source: 2000/01 Financial Statements

Table A6.5/2 Company B Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	284,576	23,715
Payroll	564,040	47,003
Interest	1,694	141

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.

Source: 2000/01 Financial Statements

Table A6.5/3 Company C Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	703,733	58,644
Payroll	943,459	78,622
Interest	50,877	4,240

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.

Source: 2000/01 Financial Statements

Table A6.5/4 Company D Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	54,372	4,531
Payroll	44,895	3,741
Interest	17,593	1,466

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.
3) The estimate for cash outflows is made on the basis of one-third of the whole business given 3 stores of similar sizes.

Source: 2000/01 Financial Statements

Table A6.5/5 Company E Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	562,357	46,863
Payroll	1,054,859	87,905
Interest	247,499	20,625

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.

Source: 2000/01 Financial Statements

Table A6.5/6 Company F Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	107,350	8,946
Payroll	293,255	24,438
Interest	33,884	2,824

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.

Source: 2000/01 Financial Statements

Table A6.5/7 Company G Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	3,139,315	261,610
Payroll	1,543,476	128,623
Interest	Nil	Nil

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.

Source: 2000/01 Financial Statements

Table A6.5/8 Company H Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	109,144	9,095
Payroll	284,327	23,694
Interest	60,617	5,051

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.
3) The calculation of Gross Margin is adjusted for transactions of associated entity.

Source: 2000/01 Financial Statements

Table A6.5/9 Company I Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	96,321	8,027
Payroll	31,282	2,607
Interest	Nil	Nil

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.
3) Calculation of Gross Margin is based on average rate of combined businesses ie. bakery and café.

Source: 2000/01 Financial Statements

Table A6.5/10 Company J Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	8,846	737
Payroll	13,845	1,154
Interest Payment	10,784	899

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.

Source: 2000/01 Financial Statements

Table A6.5/11 Company K Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	495,316	61,914
Payroll	1,210,620	151,328
Interest	136,000	17,000

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.
3) Source of Data is Management Accounts for 8 months to Dec 2002.
4) Interest not included in the above accounts - verbal advice.

Source: April to December 2002 Management Accounts

Table A6.5/12 Company L Estimation of Cash Outflows ($)

Details	*Annual*	*Monthly*
Operating Expenses	369,948	30,829
Payroll	139,658	11,638
Interest	24,000	2,000

Notes:

1) Operating expenses include all expenses other than variable expenses, payroll, depreciation and interest.
2) Payroll includes salary and wages, superannuation, payroll tax and workcover.
3) The accounts reflect previous owner's operations.
4) Interest is based on current owner's business borrowings.

Source: 2000/01 Financial Statements

Appendix 6.6

Table A6.6/1 Company A Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	1,110,812	1,011,432	936,582	892,001	1,110,812
	Add - Cash Inflows					
2	Cash from sales	86,307	123,538	169,475	215,422	594,742
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	86,307	123,538	169,475	215,422	594,742
	Less - Cash Outflows					
5	Cost of Sales	29,439	42,139	57,808	73,480	202,866
6	Operating Expenses	57,860	57,860	57,860	57,860	231,439
7	Payroll	98,389	98,389	98,389	98,389	393,554
8						0
	Sub-total	185,687	198,387	214,056	229,729	827,859
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
	Sub-total	0	0	0	0	0
	Total Cash Outflows	185,687	198,387	214,056	229,729	827,859
	Net Cash Inflows/-Outflows	-99,380	-74,849	-44,581	-14,307	-233,117
	Closing Balance	1,011,432	936,582	892,001	877,695	877,695

Table A6.6/2 Company B Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	19,113	-51,080	-111,054	-171,965	19,113
	Add - Cash Inflows					
2	Cash from sales	767	15,694	14,325	11,632	42,418
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	767	15,694	14,325	11,632	42,418
	Less - Cash Outflows					
5	Cost of Sales	242	4,950	4,518	3,669	13,379
6	Operating Expenses	23,715	23,715	23,715	23,715	94,859
7	Payroll	47,003	47,003	47,003	47,003	188,013
8						0
		70,960	75,668	75,236	74,387	296,250
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	70,960	75,668	75,236	74,387	296,250
	Net Cash Inflows/-Outflows	-70,193	-59,974	-60,911	-62,755	-253,833
	Closing Balance	-51,080	-111,054	-171,965	-234,720	-234,720

Table A6.6/3 Company C Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	-240,858	-192,646	-58,416	-97,942	-240,858
	Add - Cash Inflows					
2	Cash from sales	514,217	752,693	270,971	521,149	2,059,030
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	514,217	752,693	270,971	521,149	2,059,030
	Less - Cash Outflows					
5	Cost of Sales	328,739	481,197	173,232	333,171	1,316,338
6	Operating Expenses	58,644	58,644	58,644	58,644	234,578
7	Payroll	78,622	78,622	78,622	78,622	314,486
8						0
		466,005	618,463	310,498	470,437	1,865,402
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	466,005	618,463	310,498	470,437	1,865,402
	Net Cash Inflows/-Outflows	48,212	134,230	-39,527	50,712	193,628
	Closing Balance	-192,646	-58,416	-97,942	-47,230	-47,230

Table A6.6/4 Company D Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	-48,765	-55,896	-63,917	-63,802	-48,765
	Add - Cash Inflows					
2	Cash from sales	2,500	550	18,373	22,498	43,921
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	2,500	550	18,373	22,498	43,921
	Less - Cash Outflows					
5	Cost of Sales	1,359	299	9,986	12,228	23,871
6	Operating Expenses	4,531	4,531	4,531	4,531	18,124
7	Payroll	3,741	3,741	3,741	3,741	14,965
8						0
		9,631	8,571	18,258	20,500	56,960
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	9,631	8,571	18,258	20,500	56,960
	Net Cash Inflows/-Outflows	-7,131	-8,021	115	1,998	-13,039
	Closing Balance	-55,896	-63,917	-63,802	-61,804	-61,804

Table A6.6/5 Company E Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	8,768	-32,042	-12,999	-33,957	8,768
	Add - Cash Inflows					
2	Cash from sales	162,896	266,662	197,313	260,750	887,621
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	162,896	266,662	197,313	260,750	887,621
	Less - Cash Outflows					
5	Cost of Sales	68,938	112,851	83,503	110,349	375,641
6	Operating Expenses	46,863	46,863	46,863	46,863	187,452
7	Payroll	87,905	87,905	87,905	87,905	351,620
8						0
		203,706	247,619	218,271	245,117	914,713
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	203,706	247,619	218,271	245,117	914,713
	Net Cash Inflows/-Outflows	-40,810	19,043	-20,958	15,633	-27,092
	Closing Balance	-32,042	-12,999	-33,957	-18,324	-18,324

Table A6.6/6 Company F Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	-217,415	-213,265	-219,689	-252,522	-217,415
	Add - Cash Inflows					
2	Cash from sales	73,943	53,113	1,085	5,482	133,623
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	73,943	53,113	1,085	5,482	133,623
	Less - Cash Outflows					
5	Cost of Sales	36,410	26,153	534	2,699	65,796
6	Operating Expenses	8,946	8,946	8,946	8,946	35,783
7	Payroll	24,438	24,438	24,438	24,438	97,752
8						0
		69,793	59,537	33,918	36,083	199,331
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	69,793	59,537	33,918	36,083	199,331
	Net Cash Inflows/-Outflows	4,150	-6,424	-32,833	-30,601	-65,708
	Closing Balance	-213,265	-219,689	-252,522	-283,123	-283,123

Table A6.6/7 Company G Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	2,361,858	2,797,801	3,340,190	3,766,601	2,361,858
	Add - Cash Inflows					
2	Cash from sales	1,904,508	2,149,888	1,882,535	1,523,967	7,460,898
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	1,904,508	2,149,888	1,882,535	1,523,967	7,460,898
	Less - Cash Outflows					
5	Cost of Sales	1,078,333	1,217,267	1,065,891	862,870	4,224,360
6	Operating Expenses	261,610	261,610	261,610	261,610	1,046,438
7	Payroll	128,623	128,623	128,623	128,623	514,492
8						0
		1,468,565	1,607,499	1,456,124	1,253,102	5,785,291
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	1,468,565	1,607,499	1,456,124	1,253,102	5,785,291
	Net Cash Inflows/-Outflows	435,943	542,389	426,411	270,864	1,675,607
	Closing Balance	2,797,801	3,340,190	3,766,601	4,037,465	4,037,465

Table A6.6/8 Company H Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	0	25,017	29,776	35,647	0
	Add - Cash Inflows					
2	Cash from sales	239,859	155,803	160,414	204,110	760,186
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	239,859	155,803	160,414	204,110	760,186
	Less - Cash Outflows					
5	Cost of Sales	182,053	118,254	121,754	154,919	576,981
6	Operating Expenses	9,095	9,095	9,095	9,095	36,381
7	Payroll	23,694	23,694	23,694	23,694	94,776
8						0
		214,842	151,044	154,543	187,709	708,138
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	214,842	151,044	154,543	187,709	708,138
	Net Cash Inflows/-Outflows	25,017	4,759	5,871	16,401	52,048
	Closing Balance	25,017	29,776	35,647	52,048	52,048

Table A6.6/9 Company I Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	8,029	3,229	3,335	4,760	8,029
	Add - Cash Inflows					
2	Cash from sales	21,462	39,512	44,367	42,657	147,998
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	21,462	39,512	44,367	42,657	147,998
	Less - Cash Outflows					
5	Cost of Sales	15,629	28,773	32,308	31,063	107,772
6	Operating Expenses	8,027	8,027	8,027	8,027	32,107
7	Payroll	2,607	2,607	2,607	2,607	10,427
8						0
		26,262	39,406	42,941	41,696	150,306
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	26,262	39,406	42,941	41,696	150,306
	Net Cash Inflows/-Outflows	-4,800	106	1,425	961	-2,309
	Closing Balance	3,229	3,335	4,760	5,720	5,720

Table A6.6/10 Company J Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	360	728	-356	-1,440	360
	Add - Cash Inflows					
2	Cash from sales	7,000	2,500	2,500	8,113	20,113
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	7,000	2,500	2,500	8,113	20,113
	Less - Cash Outflows					
5	Cost of Sales	4,741	1,693	1,693	5,495	13,623
6	Operating Expenses	737	737	737	737	2,949
7	Payroll	1,154	1,154	1,154	1,154	4,615
8						0
		6,632	3,584	3,584	7,386	21,186
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	6,632	3,584	3,584	7,386	21,186
	Net Cash Inflows/-Outflows	368	-1,084	-1,084	727	-1,073
	Closing Balance	728	-356	-1,440	-713	-713

Table A6.6/11 Company K Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	0	-42,473	-251,050	-302,125	0
	Add - Cash Inflows					
2	Cash from sales	201,166	5,495	191,031	313,728	711,420
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	201,166	5,495	191,031	313,728	711,420
	Less - Cash Outflows					
5	Cost of Sales	30,396	830	28,865	47,404	107,496
6	Operating Expenses	61,914	61,914	61,914	61,914	247,658
7	Payroll	151,328	151,328	151,328	151,328	605,310
8						0
		243,638	214,072	242,107	260,646	960,464
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	243,638	214,072	242,107	260,646	960,464
	Net Cash Inflows/-Outflows	-42,473	-208,577	-51,076	53,081	-249,044
	Closing Balance	-42,473	-251,050	-302,125	-249,044	-249,044

Table A6.6/12 Company L Free Cash Flow Projections for Four Months ($)

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*	*Total*
1	Opening Balance	0	-41,307	-83,774	-126,241	0
	Add - Cash Inflows					
2	Cash from sales	1,986	0	0	37,065	39,051
3	Cash from insurance					0
4	Cash from other sources					0
	Total Cash Inflows	1,986	0	0	37,065	39,051
	Less - Cash Outflows					
5	Cost of Sales	826	0	0	15,412	16,237
6	Operating Expenses	30,829	30,829	30,829	30,829	123,316
7	Payroll	11,638	11,638	11,638	11,638	46,553
8						0
		43,293	42,467	42,467	57,879	186,106
	Direct Cost of Crisis					
9	Electrical work					0
10	Forensic Engineering					0
11	Electrical/Mechanical Engineering					0
12						0
13						0
14						0
15						0
		0	0	0	0	0
	Total Cash Outflows	43,293	42,467	42,467	57,879	186,106
	Net Cash Inflows/-Outflows	-41,307	-42,467	-42,467	-20,814	-147,055
	Closing Balance	-41,307	-83,774	-126,241	-147,055	-147,055

Appendix 6.7

Table A6.7/1 Company A Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	74.6	-1	1.00346	0	0
B	1	3	0.0	-1	0	1.00769	
C	1	4	936.8	-1	0	0	1.01312
A	2	3	0.0	0	-1	1.00346	0
B	2	4	0.0	0	-1	0	1.00769
A	3	4	0.0	0	0	-1	1.00346
X	1	2	0.0	0.99481	-1	0	0
Y	1	3	0.0	0.98962	0	-1	
Z	1	4	0.0	0.98312	0	0	-1
X	2	3	0.0	0	0.99481	-1	0
Y	2	4	0.0	0	0.98962	0	-1
X	3	4	44.8	0	0	0.99481	-1
P		4	0.0	0	0	0	1
L		4	890.0	0	0	0	-1
			890.01	-1011	75	45	14
Required Investments/Borrowing				-1011	75	45	14

Table A6.7/2 Company B Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	0	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	0	0	0	-1	1.00346
X	1	2	51	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	112	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	174	0	0	0.99481	-1
P		4	236	0	0	0	1
L		4	0	0	0	0	-1
			-236.5	51	60	61	63
Required Investments/Borrowing				51	60	61	63

Table A6.7/3 Company C Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	0	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	0	0	0	-1	1.00346
X	1	2	194	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	60	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	100	0	0	0.99481	-1
P		4	49	0	0	0	1
L		4	0	0	0	0	-1
			-49.1	193	-134	40	-51
Required Investments/Borrowing				193	-134	40	-51

Table A6.7/4 Company D Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	0	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	0	0	0	-1	1.00346
X	1	2	56	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	65	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	65	0	0	0.99481	-1
P		4	63	0	0	0	1
L		4	0	0	0	0	-1
			-62.8	56	8	0	-2
Required Investments/Borrowing				56	8	0	-2

Table A6.7/5 Company E Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	0	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	0	0	0	-1	1.00346
X	1	2	32	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	13	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	34	0	0	0.99481	-1
P		4	19	0	0	0	1
L		4	0	0	0	0	-1
			-18.7	32	-19	21	-16
Required Investments/Borrowing				32	-19	21	-16

Table A6.7/6 Company F Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	0	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	0	0	0	-1	1.00346
X	1	2	214	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	222	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	256	0	0	0.99481	-1
P		4	287	0	0	0	1
L		4	0	0	0	0	-1
			-286.7	213	6	33	31
Required Investments/Borrowing				213	6	33	31

Table A6.7/7 Company G Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	3337	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	426	0	0	-1	1.00346
X	1	2	542	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	0	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	0	0	0	0.99481	-1
P		4	0	0	0	0	1
L		4	4080	0	0	0	-1
			4079.9	-2798	-542	-426	-271
Required Investments/Borrowing				-2798	-542	-426	-271

Table A6.7/8 Company H Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	30	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	6	0	0	-1	1.00346
X	1	2	5	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	0	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	0	0	0	0.99481	-1
P		4	0	0	0	0	1
L		4	52	0	0	0	-1
			52.4	-25	-5	-6	-16
Required Investments/Borrowing				-25	-5	-6	-16

Table A6.7/9 Company I Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	3	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	1	0	0	-1	1.00346
X	1	2	0	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	0	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	0	0	0	0.99481	-1
P		4	0	0	0	0	1
L		4	6	0	0	0	-1
			5.8	-3	0	-1	-1
Required Investments/Borrowing				-3	0	-1	-1

Table A6.7/10 Company J Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	1	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	0	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	0	0	0	-1	1.00346
X	1	2	0	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	0	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	1	0	0	0.99481	-1
P		4	1	0	0	0	1
L		4	0	0	0	0	-1
			-0.7	-1	1	1	-1
Required Investments/Borrowing				-1	1	1	-1

Table A6.7/11 Company K Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	0	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	0	0	0	-1	1.00346
X	1	2	43	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	253	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	305	0	0	0.99481	-1
P		4	252	0	0	0	1
L		4	0	0	0	0	-1
			-252.2	42	209	51	-53
Required Investments/Borrowing				42	209	51	-53

Table A6.7/12 Company L Cash Flow Optimisation Model

				Investment/Borrowing Period Ended Month:			
Variable	*From Month*	*To Month*	*Amount ($)*	*1*	*2*	*3*	*4*
A	1	2	0	-1	1.00346	0	0
B	1	3	0	-1	0	1.00769	
C	1	4	0	-1	0	0	1.01312
A	2	3	0	0	-1	1.00346	0
B	2	4	0	0	-1	0	1.00769
A	3	4	0	0	0	-1	1.00346
X	1	2	42	0.99481	-1	0	0
Y	1	3	0	0.98962	0	-1	
Z	1	4	0	0.98312	0	0	-1
X	2	3	84	0	0.99481	-1	0
Y	2	4	0	0	0.98962	0	-1
X	3	4	128	0	0	0.99481	-1
P		4	148	0	0	0	1
L		4	0	0	0	0	-1
			-148.4	41	42	42	21
Required Investments/Borrowing				41	42	42	21

Appendix 6.8

Table A6.8/1 Company A Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	244,919	298,625	194,390	200,749
2	Sales scenario (random no.)	0.10	0.57	0.18	0.31
3	Sales decline (%)	50%	50%	15%	15%
4	Expected sales (S_e, $)	122,459	149,313	165,232	170,637
5	Gross margin (%)	65.89%	65.89%	65.89%	65.89%
6	Expected cash from sales ($)	80,688	98,382	108,871	112,432

Notes:
Decline in sales is based on the following assumptions.
1) 70% chance that sales will decline by 40% to 60% during the first two months.
2) 30% chance that sales will decline by 30% to 40% during the first two months.
3) 70% chance that sales will decline by 10% to 20% during Months 3 and 4.
4) 30% chance that sales will decline by 0% to 10% during Months 3 and 4.

Table A6.8/2 Company B Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	176,683	125,342	124,527	146,012
2	Sales scenario (random no.)	0.94	0.43	0.05	0.77
3	Sales decline (%)	0.75	0.90	0.90	0.90
4	Expected sales (S_e, $)	44,171	12,534	12,453	14,601
5	Gross margin (%)	68.46%	68.46%	68.46%	68.46%
6	Expected cash from sales ($)	30,239	8,581	8,525	9,996

Notes:
Decline in sales is based on the following assumptions.
1) 90% chance that sales will decline by 90% to 100% during the first four months.
2) 10% chance that sales will decline by 70% to 80% during the first four months.

Table A6.8/3 Company C Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	367,196	574,580	278,161	460,473
2	Sales scenario (random no.)	0.37	0.61	0.23	0.28
3	Sales decline (%)	0.03	0.03	0.03	0.03
4	Expected sales (S_e, $)	358,016	560,216	271,207	448,961
5	Gross margin (%)	36.07%	36.07%	36.07%	36.07%
6	Expected cash from sales ($)	129,136	202,070	97,824	161,940

Notes:

Decline in sales is based on the following assumptions.

1) 70% chance that sales will decline by 0% to 5% during the first four months.

2) 30% chance that sales will decline by 5% to 10% during the first four months.

Table A6.8/4 Company D Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	14,292	13,278	23,682	31,014
2	Sales scenario (random no.)	0.63	0.84	0.78	0.84
3	Sales decline (%)	0.93	0.93	0.20	0.20
4	Expected sales (S_e, $)	1,072	996	18,946	24,811
5	Gross margin (%)	45.65%	45.65%	45.65%	45.65%
6	Expected cash from sales ($)	489	455	8,649	11,326

Notes:

Decline in sales is based on the following assumption(s).

1) 85% chance that sales will decline by 85% to 100% during the first two months.

2) 15% chance that sales will decline by 50% to 85% during the first two months.

3) 50% chance that sales will decline by 30% to 50% during Month 3 and 4.

4) 50% chance that sales will decline by 10% to 30% during Month 3 and 4.

Table A6.8/5 Company E Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	158,562	141,986	255,936	100,644
2	Sales scenario (random no.)	0.30	0.54	0.55	0.67
3	Sales decline (%)	1.50%	1.50%	1.50%	1.50%
4	Expected sales (S_e, $)	156,184	139,856	252,097	99,134
5	Gross margin (%)	57.68%	57.68%	57.68%	57.68%
6	Expected cash from sales ($)	90,087	80,669	145,410	57,181

Notes:

Decline in sales is based on the following assumptions.

1) 95% chance that sales will decline by 0% to 3% during the first four months.

2) 5% chance that sales will decline by 3% to 5% during the first four months.

Table A6.8/6 Company F Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	86,990	192,461	112,002	83,272
2	Sales scenario (random no.)		0.69	0.63	0.15
3	Sales decline (%)	50.0%	92.0%	92.0%	92.0%
4	Expected sales (S_e, $)	43,495	15,397	8,960	6,662
5	Gross margin (%)	50.76%	50.76%	50.76%	50.76%
6	Expected cash from sales ($)	22,078	7,815	4,548	3,382

Notes:

Decline in sales is based on the following assumptions.

1) The sales for the first is expected to decline by 50%

2) 90% chance that sales will decline by 85% to 99% during Months 2, 3 and 4.

3) 10% chance that sales will decline by 75% to 85% during the first four months.

Table A6.8/7 Company G Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	1,584,082	1,561,649	1,662,169	1,963,363
2	Sales scenario (random no.)				
3	Sales decline (%)				20.0%
4	Expected sales (S_e, $)	1,584,082	1,561,649	1,662,169	1,570,690
5	Gross margin (%)	43.38%	43.38%	43.38%	43.38%
6	Expected cash from sales ($)	687,175	677,444	721,049	681,365

Notes:

Decline in sales is based on the following assumptions.

Sales not expected to decline until Month 4 by approximately 20%.

Table A6.8/8 Company H Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	885,090	1,493,040	854,297	748,981
2	Sales scenario (random no.)	0.97	0.32	0.48	0.82
3	Sales decline (%)	0.40	0.60	0.60	0.40
4	Expected sales (S_e, $)	531,054	597,216	341,719	449,389
5	Gross margin (%)	24.10%	24.10%	24.10%	24.10%
6	Expected cash from sales ($)	127,984	143,929	82,354	108,303

Notes:

Decline in sales is based on the following assumptions.

1) 70% chance that sales will decline by 50% to 70% during the first four months.

2) 30% chance that sales will decline by 30% to 50% during the first four months.

Table A6.8/9 Company I Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	24,813	48,699	54,248	52,164
2	Sales scenario (random no.)	0.31	0.07	0.18	0.56
3	Sales decline (%)	0.18	0.18	0.18	0.18
4	Expected sales (S_e, $)	20,471	40,177	44,755	43,035
5	Gross margin (%)	27.18%	27.18%	27.18%	27.18%
6	Expected cash from sales ($)	5,564	10,920	12,164	11,697

Notes:

Decline in sales is based on the following assumptions.

1) 80% chance that sales will decline by 15% to 20%.

2) 20% chance that sales will decline by 10% to 15%

Table A6.8/10 Company J Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	24,035	23,247	21,849	25,303
2	Sales scenario (random no.)	0.21	0.61	0.53	0.62
3	Sales decline (%)	85.00%	85.00%	85.00%	85.00%
4	Expected sales (S_e, $)	3,605	3,487	3,277	3,795
5	Gross margin (%)	32.27%	32.27%	32.27%	32.27%
6	Expected cash from sales ($)	1,163	1,125	1,058	1,225

Notes:

Decline in sales is based on the following assumptions.

1) 90% chance that sales will decline by 80% to 90% during the first four months.

2) 10% chance that sales will decline by 60% to 80% during the first four months.

Table A6.8/11 Company K Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Actual sales, previous year (S_p, $)	455,811	255,793	415,586	426,848
2	Sales scenario (random no.)			0.90	0.63
3	Sales decline (%)	50.0%	90.0%	40.0%	40.0%
4	Expected sales (S_e, $)	227,906	25,579	249,352	256,109
5	Gross margin (%)	84.89%	84.89%	84.89%	84.89%
6	Expected cash from sales ($)	193,469	21,714	211,675	217,411

Notes:

Decline in sales is based on the following assumptions.

1) The first month is expected to decline by 50%

2) The second month is expected to drop by 90%

3) From the third month onwards, a chance of 60% for sales to drop between 50% and 60%.

4) From the third month onwards, a chance of 40% for sales to drop between 30% and 50%.

Table A6.8/12 Company L Estimation of Free Cash Inflows

Item	*Details*	*Month 1*	*Month 2*	*Month 3*	*Month 4*
1	Sales - Previous Year (LY-1)	54,490	64,153	62,962	67,271
2	Sales Scenario - Random#				
3	Sales Decline in %	100%	100%	100%	50%
4	Sales - Expected LY	-	-	-	33,636
5	Gross Margin	58.42%	58.42%	58.42%	58.42%
6	Cash from sales	-	-	-	19,650

Notes:

Decline in sales is based on the following assumptions.

1) Business closed and no sales is during the first three months

2) The Store to operate from mid August (4th month) - hence 50% sales is expected

Appendix 8.1

Table A8.1/1 Sample of a Disaster/Contingency Plan

1) **Introduction**
   - A) Policy Statement
   - B) Purpose
   - C) Overview
     1. Definitions
     2. Scope
     3. Objectives
     4. Structure of Plan
   - D) Planning Process Description (use of flow chart)
   - E) Organisation Documents
     1. Organisation Description
     2. Security/backup Systems
     3. Floor Plan of Electrical, Water, Exits
     4. Insurance Documents
     5. Resource Lists/Contracts
        - a. Equipment Vendors
        - b. Water-related Recovery
        - c. Supply/Forms/Bank Cheques
        - d. Storage Companies
     6. Organisation Inventory
     7. Vital Record Listing
     8. Location of Operating Procedures
     9. Distribution of the Plan
     10. Maintenance of the Plan
   - F) Testing/Training
     1. Program Description
     2. Types of Tests
     3. Testing Frequency/Schedules

2) **Risk Assessment**
   - A) Description
   - B) Detailed Risk Assessment
   - C) Rescues

3) **Event Descriptions/Procedures**
   - A) Level One/Category One
   - B) Level Two
   - C) Level Three
   - D) Level Four
   - E) Level Five

4) **Team Responsibilities/Organisation**
   - A) General
   - B) Management
   - C) Logistics
   - D) Users
   - E) Records and Information Systems (computers)

5) **Restoration Procedures**
   - A) Specific Procedures for Handling Each Type of Probable Disaster
   - B) Equipment and Supply Lists with Phone Number

6) **Auditing Procedure**

Source: Rike (2003)

Appendix 8.2

Table A8.2/1 Types of Insurance Covers (Relevant to SME's and their Owners)

1) Workcover
2) Public Liability
3) Material Damage (property cover including buildings, contents, stock)
4) Business Interruption (consequential loss or loss of Profit)
5) Product Liability
6) Professional Indemnity
7) Comprehensive Motor Vehicle
8) Burglary or Theft
9) Keyman
10) Glass
11) Goods in Transit
12) Cash
13) Accounts Receivable
14) Business Travel
15) Temporary and Permanent Disablement

Appendix 8.3

Table 8.3/1 Calculation Worksheet for Business Interruption ($)

Details	*Parameters*	*Amount*	Note
1) Gross Profit			
Turnover/Sales/Revenue/Fees			A
Less - Uninsured Working Expenses/Cost of Sales			
Opening Stock			
Purchases (raw materials, stock etc.)			
Freight and Cartage			
Wages and Salaries			
Employee Entitlements (Super, Payroll Tax, Workcover, AL, AS)			
Discounts Allowed			
Utilities: Power, Gas and Water (check variability)			
Repairs and Maintenance (check extent of variability)			
Commissions and Royalties			
Sub-total		0	
Less - Closing Stock			
Uninsured Working Expenses/Cost of Sales		0	B
Unadjusted Insurable Gross Profit		0	C
Rate of Gross Profit (excluding direct payroll)		#DIV/0!	D=C/A
Add - Growth Trend			
1) to start of Insurance Year for months @	0.00%	0	(example)
		0	
2) for Insurance Year (12 months) @	3.50%	0	(example)
		0	
3) for the first 12 months of Indemnity Period	2.50%	0	(example)
Adjusted Insurable Gross Profit	12 Months	0	E
Adjusted Insurable Gross Profit	24 Months	0	2 x
Gross Profit at Risk/Sum Insured		0	F
2) Payroll based on Dual Wages (if not covered above)			
Wages and Salaries			
Employee Entitlements (Super, Payroll Tax, Workcover, AL, AS)			
Total Labour Cost		0	G
Rate of Payroll		#DIV/0!	H=G/A
Sum Insured Selected			
xx weeks @	100%		(example)
yy weeks @	50%		(example)
		0	
Plus Estimated growth in Payroll	5%	0	(example)
Payroll at Risk/Sum Insured		0	I
Value at Risk (Gross Profit and Payroll)		0	J=I+F
3) Additional Increase in Cost of Working (AICOW)			
Recommended AICOW			K
4) Claim Preparation Fees (CPF)			
Recommended CPF			L
Total Value at Risk (Sum Insured)		0	M=J+K+L

Appendix 8.4

Table A8.4/1 Guide to Business Impact Analysis

The major steps in conducting a Business Impact Analysis ("BIA") are:

1) Define the assumption and scope of the planning project for which the BIA is being conducted.

2) Develop a survey or questionnaire to gather the needed information.

3) Identify the survey recipients.

4) Notify survey recipients.

5) Distribute the survey and collect responses.

6) Review survey responses.

7) Conduct follow-up interviews with respondents.

8) Modify survey responses based on interviews.

9) Analyse survey data.

10) Verify results with business unit management.

11) Prepare a report and present findings.

Source: BIA Professional (1994)

Appendix 8.5

Table A8.5/1 Small Organisation Responses to Preventative Management Action

Preventative Management Action	*Yes*	*No*	*% Use*	*Conf Int*
Written crisis management policy or pre-arranged outside advisory assistance	18	23	0.44	.348, .532
Regular staff training on most likely crises	19	22	0.46	.368, .552
Audits of hazards (beyond OSH requirements)	21	20	0.51	.418, .602
Employee programs to assist in stressful times	11	30	0.27	.188, .352
Pre-positioned equipment and checklists for likely crises	18	23	0.44	.348, .532
Plan for resuming business if place of work was unavailable	14	27	0.34	.252, .428
Disaster insurance	30	11	0.73	.648, .812

Source: Ewing-Jarvie (2001)

Appendix 8.6

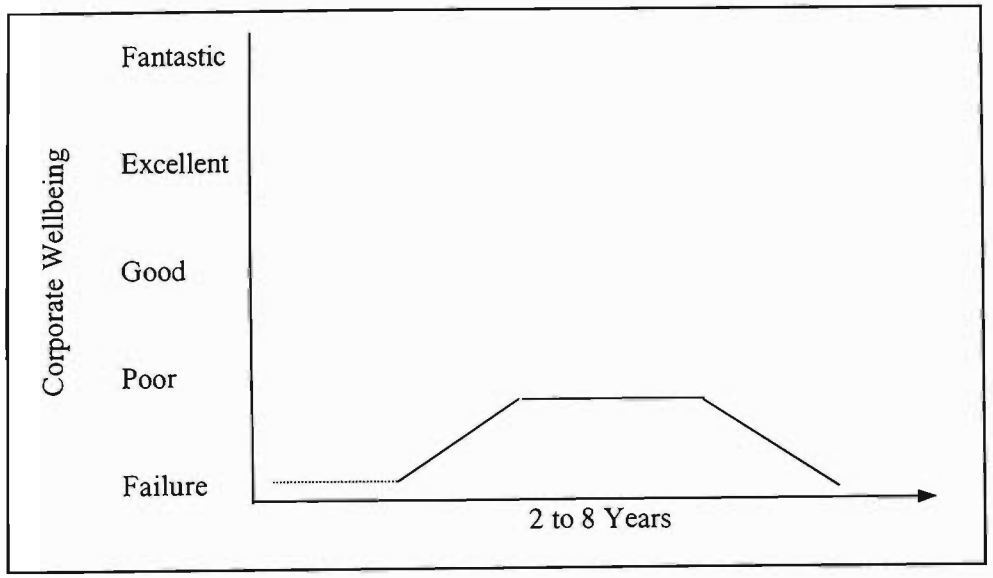


Figure A8.6/1
Trajectory of Failure: Type One

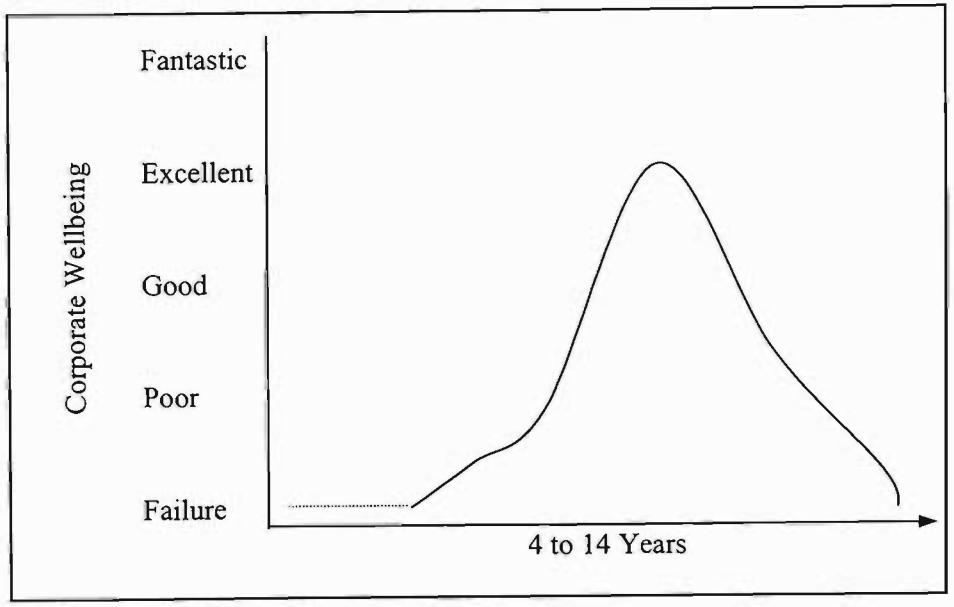


Figure A8.6/2
Trajectory of Failure:Type Two

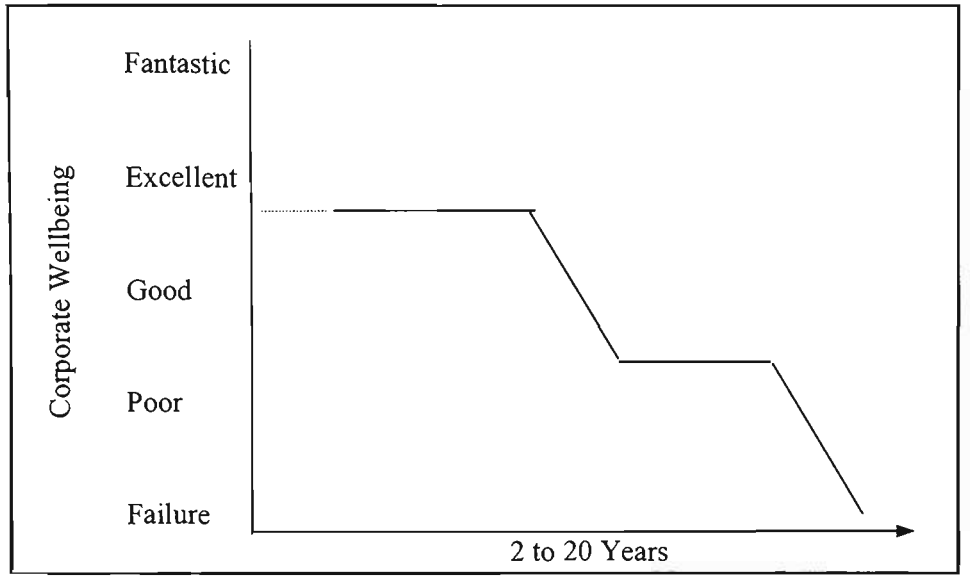


Figure A8.6/3
Trajectory of Failure:Type Three

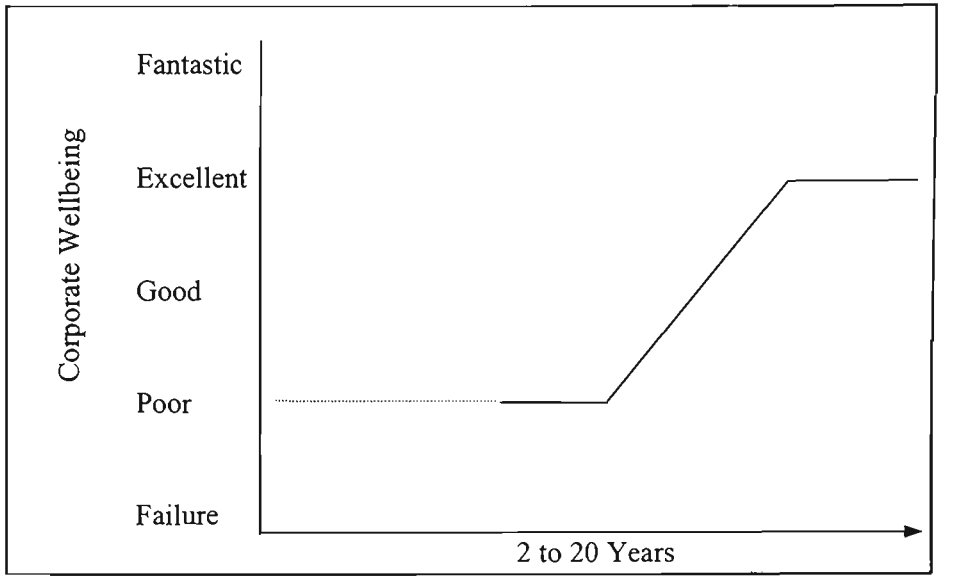


Figure A8.6/4
Trajectory of Success

Appendix 8.7

Table A8.7/1 Company A Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	-17%	-14%	Not Affected by the Crisis
2	Net profit after tax/total assets	-11%	-9%	Not Affected by the Crisis
3	Net profit after tax/shareholders funds	-13%	-13%	Not Affected by the Crisis
4	EBIT/sales	-16%	-14%	Not Affected by the Crisis
5	EBIT/total assets	-10%	-9%	Not Affected by the Crisis
6	EBIT/shareholders funds	-13%	-13%	Affected by the Crisis
7	EBIT/interest	-133.5262158	-95.65098634	Not Affected by the Crisis
8	Total liabilities/total assets	0.200505111	0.276206244	Not Affected by the Crisis
9	Shareholders funds/total assets	0.799494889	0.723793756	Affected by the Crisis
10	Current assets/total assets	0.898484814	0.901880209	Not Affected by the Crisis
11	Current assets/current liabilities	4.799339918	3.539977321	Affected by the Crisis
12	Quick assets/current liabilities	2.167321857	1.241588294	Affected by the Crisis
13	Sales/stock	2.499975987	4.331441295	Not Affected by the Crisis
14	Sales/receivables	7.787234963	3.455393534	Affected by the Crisis
15	Sales/total assets	0.631399336	0.655650659	Not Affected by the Crisis

Source: Table A8.7/1

Table A8.7/2 Company B Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	-1%	91%	Not Affected by the Crisis
2	Net profit after tax/total assets	-3%	108%	Not Affected by the Crisis
3	Net profit after tax/shareholders funds	29%	244069%	Not Affected by the Crisis
4	EBIT/sales	-1%	91%	Not Affected by the Crisis
5	EBIT/total assets	-3%	108%	Not Affected by the Crisis
6	EBIT/shareholders funds	29%	244069%	Not Affected by the Crisis
7	EBIT/interest	-6.246753247	244069	Not Affected by the Crisis
8	Total liabilities/total assets	1.120055426	0.99955838	Affected by the Crisis
9	Shareholders funds/total assets	-0.120055426	0.00044162	Not Affected by the Crisis
10	Current assets/total assets	0.828805982	0.855493091	Not Affected by the Crisis
11	Current assets/current liabilities	2.044005996	1.989800216	Affected by the Crisis
12	Quick assets/current liabilities	0.92343279	1.655200041	Not Affected by the Crisis
13	Sales/stock	9.012491671	3.186769231	Affected by the Crisis
14	Sales/receivables	13.46053362	5.247116134	Affected by the Crisis
15	Sales/total assets	4.1993124	1.189203273	Affected by the Crisis

Source: Table A8.7/1

Table A8.7/3 Company C Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	2%	5%	Not Affected by the Crisis
2	Net profit after tax/total assets	5%	11%	Not Affected by the Crisis
3	Net profit after tax/shareholders funds	13%	26%	Not Affected by the Crisis
4	EBIT/sales	4%	7%	Not Affected by the Crisis
5	EBIT/total assets	8%	16%	Not Affected by the Crisis
6	EBIT/shareholders funds	19%	37%	Not Affected by the Crisis
7	EBIT/interest	4.001061383	7.931128657	Not Affected by the Crisis
8	Total liabilities/total assets	0.614017334	0.580862162	Affected by the Crisis
9	Shareholders funds/total assets	0.385982666	0.419137838	Not Affected by the Crisis
10	Current assets/total assets	0.685461397	0.730822519	Not Affected by the Crisis
11	Current assets/current liabilities	1.752798809	1.889080728	Not Affected by the Crisis
12	Quick assets/current liabilities	0.873480613	0.813417727	Affected by the Crisis
13	Sales/stock	6.091935584	8.217273294	Not Affected by the Crisis
14	Sales/receivables	5.24328856	5.848895855	Not Affected by the Crisis
15	Sales/total assets	1.98951107	2.322609267	Not Affected by the Crisis

Source: Table A8.7/1

Table A8.7/4 Company D Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	4%	7%	Not Affected by the Crisis
2	Net profit after tax/total assets	8%	13%	Not Affected by the Crisis
3	Net profit after tax/shareholders funds	165165%	287875%	Not Affected by the Crisis
4	EBIT/sales	4%	7%	Not Affected by the Crisis
5	EBIT/total assets	8%	13%	Not Affected by the Crisis
6	EBIT/shareholders funds	165165%	287875%	Not Affected by the Crisis
7	EBIT/interest	1.877621781	18.85232482	Not Affected by the Crisis
8	Total liabilities/total assets	0.999952162	0.999955071	Not Affected by the Crisis
9	Shareholders funds/total assets	4.78376E-05	4.49295E-05	Affected by the Crisis
10	Current assets/total assets	0.342376238	0.180908564	Affected by the Crisis
11	Current assets/current liabilities	0.342392617	0.180916693	Affected by the Crisis
12	Quick assets/current liabilities	-0.116645657	-0.126524863	Affected by the Crisis
13	Sales/stock	7.40876597	8.093889413	Not Affected by the Crisis
14	Sales/receivables	N/A	N/A	N/A
15	Sales/total assets	1.823239994	1.870764835	Not Affected by the Crisis

Source: Table A8.7/1

Table A8.7/5 Company E Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	1%	-1%	Affected by the Crisis
2	Net profit after tax/total assets	2%	-2%	Affected by the Crisis
3	Net profit after tax/shareholders funds	9%	-10%	Affected by the Crisis
4	EBIT/sales	1%	-1%	Affected by the Crisis
5	EBIT/total assets	2%	-2%	Affected by the Crisis
6	EBIT/shareholders funds	9%	-10%	Affected by the Crisis
7	EBIT/interest	0.345259272	-0.187422979	Affected by the Crisis
8	Total liabilities/total assets	0.813464656	0.823147863	Not Affected by the Crisis
9	Shareholders funds/total assets	0.186535344	0.176852137	Affected by the Crisis
10	Current assets/total assets	0.730551974	0.665129393	Affected by the Crisis
11	Current assets/current liabilities	1.351153948	1.246848025	Affected by the Crisis
12	Quick assets/current liabilities	0.326212194	0.160754407	Affected by the Crisis
13	Sales/stock	2.198686441	2.093535315	Affected by the Crisis
14	Sales/receivables	7.135058497	14.64839514	Not Affected by the Crisis
15	Sales/total assets	1.21640401	1.20798137	Affected by the Crisis

Source: Table A8.7/1

Table A8.7/6 Company F Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	21%	9%	Affected by the Crisis
2	Net profit after tax/total assets	11%	3%	Affected by the Crisis
3	Net profit after tax/shareholders funds	19%	5%	Affected by the Crisis
4	EBIT/sales	21%	9%	Affected by the Crisis
5	EBIT/total assets	11%	3%	Affected by the Crisis
6	EBIT/shareholders funds	19%	5%	Affected by the Crisis
7	EBIT/interest	7.201599575	2.788123012	Affected by the Crisis
8	Total liabilities/total assets	0.413614965	0.311931738	Affected by the Crisis
9	Shareholders funds/total assets	0.586385035	0.688068262	Not Affected by the Crisis
10	Current assets/total assets	0.219909578	0.139049481	Affected by the Crisis
11	Current assets/current liabilities	0.827004934	0.759125748	Affected by the Crisis
12	Quick assets/current liabilities	0.009408305	0.525719089	Not Affected by the Crisis
13	Sales/stock	4.58095807	1.687878759	Affected by the Crisis
14	Sales/receivables	209.2806986	4.980246392	Affected by the Crisis
15	Sales/total assets	0.523572257	0.359462253	Affected by the Crisis

Source: Table A8.7/1

Table A8.7/7 Company G Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	16%	15%	Affected by the Crisis
2	Net profit after tax/total assets	14%	12%	Affected by the Crisis
3	Net profit after tax/shareholders funds	20%	15%	Affected by the Crisis
4	EBIT/sales	21%	22%	Not Affected by the Crisis
5	EBIT/total assets	19%	17%	Affected by the Crisis
6	EBIT/shareholders funds	27%	22%	Affected by the Crisis
7	EBIT/interest			Not Affected by the Crisis
8	Total liabilities/total assets	0.27967695	0.236425545	Affected by the Crisis
9	Shareholders funds/total assets	0.72032305	0.763574455	Not Affected by the Crisis
10	Current assets/total assets	0.398588631	0.282225818	Affected by the Crisis
11	Current assets/current liabilities	2.290010583	2.033895125	Affected by the Crisis
12	Quick assets/current liabilities	1.450289941	0.991046042	Affected by the Crisis
13	Sales/stock	7.035725797	6.974385171	Affected by the Crisis
14	Sales/receivables	6.678317157	8.222645696	Not Affected by the Crisis
15	Sales/total assets	0.913887475	0.76648099	Affected by the Crisis

Source: Table A8.7/1

Table A8.7/8 Company H Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	0%	-25%	Affected by the Crisis
2	Net profit after tax/total assets	-1%	-20%	Affected by the Crisis
3	Net profit after tax/shareholders funds	-160%	103%	Not Affected by the Crisis
4	EBIT/sales	0%	-25%	Affected by the Crisis
5	EBIT/total assets	-1%	-20%	Affected by the Crisis
6	EBIT/shareholders funds	-160%	103%	Not Affected by the Crisis
7	EBIT/interest	-0.200950228	-6.248208142	Affected by the Crisis
8	Total liabilities/total assets	0.995802741	1.19790586	Not Affected by the Crisis
9	Shareholders funds/total assets	0.004197259	-0.19790586	Affected by the Crisis
10	Current assets/total assets	0.814794428	0.801578944	Affected by the Crisis
11	Current assets/current liabilities	0.856789737	0.680170659	Affected by the Crisis
12	Quick assets/current liabilities	0.856789737	0.680170659	Affected by the Crisis
13	Sales/stock			No sufficient info
14	Sales/receivables			No sufficient info
15	Sales/total assets	1.456317619	0.807776875	Affected by the Crisis

Source: Table A8.7/1

Table A8.7/9 Company I Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	-8%	-4%	Not Affected by the Crisis
2	Net profit after tax/total assets	-21%	-9%	Not Affected by the Crisis
3	Net profit after tax/shareholders funds	12%	16%	Not Affected by the Crisis
4	EBIT/sales	-8%	-4%	Not Affected by the Crisis
5	EBIT/total assets	-21%	-9%	Not Affected by the Crisis
6	EBIT/shareholders funds	12%	16%	Not Affected by the Crisis
7	EBIT/interest	N/A	N/A	N/A
8	Total liabilities/total assets	2.822280466	1.574848202	Affected by the Crisis
9	Shareholders funds/total assets	-1.822280466	-0.574848202	Not Affected by the Crisis
10	Current assets/total assets	0.25100573	0.096417738	Affected by the Crisis
11	Current assets/current liabilities	0.088937203	0.125757171	Not Affected by the Crisis
12	Quick assets/current liabilities	0.057801263	0.08674968	Not Affected by the Crisis
13	Sales/stock	51.61272879	104.4912319	Not Affected by the Crisis
14	Sales/receivables	N/A	N/A	N/A
15	Sales/total assets	2.520967939	2.568242919	Not Affected by the Crisis

Source: Table A8.7/1

Table A8.7/10 Company J Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	16%	3%	Affected by the Crisis
2	Net profit after tax/total assets	10%	2%	Affected by the Crisis
3	Net profit after tax/shareholders funds	35%	7%	Affected by the Crisis
4	EBIT/sales	16%	3%	Affected by the Crisis
5	EBIT/total assets	10%	2%	Affected by the Crisis
6	EBIT/shareholders funds	35%	7%	Affected by the Crisis
7	EBIT/interest	3.930637982	0.517414912	Affected by the Crisis
8	Total liabilities/total assets	0.70524758	0.708992016	Not Affected by the Crisis
9	Shareholders funds/total assets	0.29475242	0.291007984	Affected by the Crisis
10	Current assets/total assets	0.133776235	0.110549585	Affected by the Crisis
11	Current assets/current liabilities	0.200970398	0.159717748	Affected by the Crisis
12	Quick assets/current liabilities	0.03893389	0.028733016	Affected by the Crisis
13	Sales/stock	7.032534177	10.91954573	Not Affected by the Crisis
14	Sales/receivables	25.29264706	33.39744059	Not Affected by the Crisis
15	Sales/total assets	0.633147959	0.664199183	Not Affected by the Crisis

Source: Table A8.7/1

Table A8.7/11 Company K Financial Ratios

No.	*Details*	*Previous Year*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	New ownership/no sufficient data available		
2	Net profit after tax/total assets	New ownership/no sufficient data available		
3	Net profit after tax/shareholders funds	New ownership/no sufficient data available		
4	EBIT/sales	New ownership/no sufficient data available		
5	EBIT/total assets	New ownership/no sufficient data available		
6	EBIT/shareholders funds	New ownership/no sufficient data available		
7	EBIT/interest	New ownership/no sufficient data available		
8	Total liabilities/total assets	New ownership/no sufficient data available		
9	Shareholders funds/total assets	New ownership/no sufficient data available		
10	Current assets/total assets	New ownership/no sufficient data available		
11	Current assets/current liabilities	New ownership/no sufficient data available		
12	Quick assets/current liabilities	New ownership/no sufficient data available		
13	Sales/stock	New ownership/no sufficient data available		
14	Sales/receivables	New ownership/no sufficient data available		
15	Sales/total assets	New ownership/no sufficient data available		

Table A8.7/12 Company L Financial Ratios

No.	*Details*	*Loss Year*	*Comments*
1	Net Profit after tax/sales	9%	New ownership/data unavailable re previous year
2	Net profit after tax/total assets	3%	New ownership/data unavailable re previous year
3	Net profit after tax/shareholders funds	-8%	New ownership/data unavailable re previous year
4	EBIT/sales	9%	New ownership/data unavailable re previous year
5	EBIT/total assets	3%	New ownership/data unavailable re previous year
6	EBIT/shareholders funds	-8%	New ownership/data unavailable re previous year
7	EBIT/interest	1.73220339	New ownership/data unavailable re previous year
8	Total liabilities/total assets	1.36558688	New ownership/data unavailable re previous year
9	Shareholders funds/total assets	-0.36558688	New ownership/data unavailable re previous year
10	Current assets/total assets	0.342570062	New ownership/data unavailable re previous year
11	Current assets/current liabilities	0.431297241	New ownership/data unavailable re previous year
12	Quick assets/current liabilities	-0.040585632	New ownership/data unavailable re previous year
13	Sales/stock	1.097544129	New ownership/data unavailable re previous year
14	Sales/receivables	N/A	New ownership/data unavailable re previous year
15	Sales/total assets	0.341721791	New ownership/data unavailable re previous year

Source: Table A8.7/1

Table A8.7/13 Financial Ratios Input Data ($)

Elements of Financial Statements	*Company A*		*Company B*		*Company C*		*Company D*		*Company E*	
	Previous Year	*Loss Year*	*Previous Year*	*Loss Year*	*Previous Year*	*Loss Year*	*Previous Year*	*Loss Year*	*Previous Year*	*Loss Year*
Sales	2,160,288	2,192,385	1,284,956	269,282	5,384,936	6,787,591	762,262	832,756	3,376,802	3,220,186
Interest	2,632	3,295	1,694	1	50,877	57,121	17,593	3,054	134,357	247,499
Tax	9,645	0	0	0	70,586	137,870	0	0	0	0
Net profit after tax	-361,086	-315,170	-10,582	244,069	132,976	315,164	33,033	57,575	46,388	-46,387
EBIT	-351,441	-315,170	-10,582	244,069	203,562	453,034	33,033	57,575	46,388	-46,387
Cash	1,110,812	423,237	19,113	109,822	-102,448	-240,858	-48,765	-56,319	16,368	8,768
Receivables	277,414	634,482	95,461	51,320	1,027,015	1,160,491	0	0	473,269	219,832
Quick assets	1,388,226	1,057,719	114,574	161,142	924,567	919,633	-48,765	-56,319	489,637	228,600
Stock	864,124	506,156	142,575	84,500	826,015	883,945	102,887	102,887	1,535,827	1,538,157
Current assets	3,074,102	3,015,735	253,608	193,717	1,855,313	2,135,755	143,141	80,530	2,028,051	1,773,074
Total assets	3,421,429	3,343,831	305,992	226,439	2,706,663	2,922,399	418,081	445,142	2,776,053	2,665,758
Current liabilities	640,526	851,908	124,074	97,355	1,058,486	1,130,579	418,061	445,122	1,500,977	1,422,045
Total liabilities	686,014	923,587	342,728	226,339	1,661,938	1,697,511	418,061	445,122	2,258,221	2,194,313
Shareholders fund	2,735,415	2,420,244	-36,736	100	1,044,725	1,224,888	20	20	517,832	471,445

Source: Financial Statements

Table A8.7/13 Financial Ratios Input Data ($) - Continued

Elements of Financial Statements	*Company F*		*Company G*		*Company H*		*Company I*		*Company J*	
	Previous Year	*Loss Year*	*Previous Year*	*Loss Year*	*Previous Year*	*Loss Year*	*Previous Year*	*Loss Year*	*Previous Year*	*Loss Year*
Sales	1,150,416	707,444	18,674,044	17,134,530	2,640,432	1,036,385	124,077	476,689	257,985	274,026
Interest	33,884	23,575	0	0	60,617	41,856	0	0	10,784	15,102
Tax	0	0	958,704	1,215,496	0	0	0	0	0	0
Net profit after tax	244,019	65,730	2,957,600	2,600,736	-12,181	-261,525	-10,521	-17,008	42,388	7,814
EBIT	244,019	65,730	3,916,304	3,816,232	-12,181	-261,525	-10,521	-17,008	42,388	7,814
Cash	0	47,467	2,361,858	990,383	1,477,294	1,028,433	8,029	12,345	360	0
Receivables	5,497	142,050	2,796,220	2,083,822	0	0			10,200	8,205
Quick assets	5,497	189,517	5,158,078	3,074,205	1,477,294	1,028,433	8,029	12,345	10,560	8,205
Stock	251,130	419,132	2,654,175	2,456,780	2,248,134	880,927	2,404	4,562	36,685	25,095
Current assets	483,195	273,658	8,144,615	6,309,102	1,477,294	1,028,433	12,354	17,896	54,509	45,609
Total assets	2,197,244	1,968,062	20,433,636	22,354,801	1,813,088	1,283,009	49,218	185,609	407,464	412,566
Current liabilities	584,271	360,491	3,556,584	3,101,980	1,724,220	1,512,022	138,907	142,306	271,229	285,560
Total liabilities	908,813	613,901	5,714,817	5,285,246	1,805,478	1,536,924	138,907	292,306	287,363	292,506
Shareholders fund	1,288,431	1,354,161	14,718,819	17,069,555	7,610	-253,915	-89,689	-106,697	120,101	120,060

Source: Financial Statements

Table A8.7/13 Financial Ratios Input Data ($) - Continued

Elements of Financial Statements	*Company K*		*Company L*	
	Previous Year	*Loss Year*	*Previous Year*	*Loss Year*
Sales	4,152,581	2,579,957	722,068	171,612
Interest			18,428	8,850
Tax				0
Net profit after tax			30,912	15,330
EBIT			30,912	15,330
Cash				-16,189
Receivables				
Quick assets				-16,189
Stock				156,360
Current assets				172,038
Total assets				502,198
Current liabilities				398,885
Total liabilities				685,795
Shareholders fund				-183,597

Source: Financial Statements

Appendix 8.8

Table A8.8/1 Major Accounting Activities during a Crisis

Phases	*Accounting/Finance Activities*	*Likely Users*
Phase 1	1) Assess physical loss	Owners, Insurers, Financiers
	2) Assess other direct costs of crisis	Owners, Insurers, Financiers
	3) Assess consequential loss	Owners, Insurers, Financiers
	4) Prepare cash flow projections	Owners, Insurers, Financiers
Phase 2	5) Assess payroll, labour requirements	Owners, Insurers, Financiers
	6) Assess cost of temporary location	Owners, Insurers, Financiers
	7) Assess cost of outsourcing	Owners, Insurers, Financiers
	8) Assess cost of machine hire	Owners, Insurers, Financiers
Phase 3	9) Capture, record and classify items 5 to 8	Owners
	10) Evaluate and report financial performance – P&L, Balance Sheet, etc.	Owners
	11) Revise cash flow projections	Owners
	12) Revise/prepare consequential loss	Owners, Insurers
Phase 4	13) Prepare input for post loss replacement decisions	Owners
	14) Revise cash flow projections	Owners
Phase 5	15) Assess cost of marketing plans, etc.	Owners, Insurers
	16) Revise consequential loss	Owners, Insurers
	17) Revise cash flow projections	Owners
Phase 6	18) Evaluate and report financial performance – P&L, Balance Sheet, etc.	Owners
	19) Determine physical loss	Owners, Insurers, Financiers
	20) Determine replacement/repair cost	Owners, Insurers, Financiers
	21) Determine consequential loss	Owners, Insurers, Financiers
	22) Prepare new cash flow projections	Owners, Insurers, Financiers

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