A PROCESS APPROACH FOR MANAGING CREDIT ASSET PORTFOLIOS IN A SOUTH AFRICAN BANK

PIETER GABRIEëL VOSLOO
B.COMM., MBA

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Promoter: Prof. P. Styger
Co-promoter: Prof. G. van der Westhuizen

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DEDICATION

To my wife, who motivated and supported me. Without her unstinting support, this would not have been possible.

To my children Johann, Wion and Tharina: "We are never to old to learn"

To the Lord Almighty Who gave me the ability, strength and grace to accomplish this task. To Him alone belong my gratitude and His glory.

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ENGLISH ABSTRACT

A PROCESS APPROACH FOR MANAGING CREDIT ASSET PORTFOLIOS IN A SOUTH AFRICAN BANK

The operating environment in which banks conduct their business, especially the credit risk environment, underwent significant changes since the latter half of the previous decade. Developments have resulted in a bombardment of quantitative and qualitative credit risk information and data on the one hand, and on the other an absence of a clear focus and management approach and philosophy to effectively manage credit risk.

The primary objective of the research was the formulation of a process approach that could be applied in the management of credit risk of credit asset portfolios. Part of the objective was an implicit requirement that it should form the foundation from where the management of credit risk can be leveraged to exploit all the dimensions of credit risk while focussing on the maximisation of shareholder wealth.

A literature study was undertaken to determine the theoretical aspects regarding the management of credit asset portfolios, credit risk management, the credit portfolio risk management approach and its principles. An empirical study aimed to establish the credit risk management practices being applied in the South African Banking Industry.

The process approach developed for managing credit asset portfolios incorporate the account life cycle as point of departure. This was necessary to facilitate the various processes that need to be considered for effective credit portfolio risk management. The specific data requirements, as it culminate in a credit portfolio risk management functionality, enable the credit portfolio risk management approach and principles to be applied to credit asset portfolios within the context of two perspectives to credit portfolio risk management, namely:

- The economic value perspective (also referred to as the shareholder wealth perspective) which has an *ex post* focus (after default has occurred) and which calculates the impact of credit risk on Credit RAROC or shareholder value; and
- The earnings perspective which has an *ex ante* focus (before default occurs) and which addresses the bank's loss in income as a result of, and associated with, deterioration in credit standing (the cash flow implication to be considered when credit standing deteriorates).

Applying the developed process approach to credit asset portfolios, two distinctive but dependent dimensions with underlying sub-dimensions to portfolio risk management is identified namely, micro portfolio risk management and macro portfolio risk management. The former focuses on the credit asset portfolio and the latter on the group portfolio in the context of all risks impacting the organisation. The final stage in the process approach is to establish a Business Health Forum that reports to the Board appointed committees. The forum ensures an independent view of all the risks and activities of the business, including credit risk.

Adopting and applying the developed framework regarding the process approach to managing credit asset portfolios in a South African bank will assist executive management to ensure that the requirements (processes, systems, data) for effective credit portfolio risk management are met. It would also broaden the understanding regarding the interdependency between profit, sustainable growth and effective credit portfolio risk management.

OPSOMMING

'N PROSES BENADERING VIR DIE BESTUUR VAN KREDIETBATEPORTEFEULJES IN 'N SUID AFRIKAANSE BANK

Die bedryfsomgewing waarbinne banke moet funksioneer en veral die kredietrisiko-bestuursomgewing het sedert die tweede helfde van die vorige dekade verreikende veranderinge ondergaan. Voortspruitende ontwikkeling het nie net `n magdom kwalitatiewe en kwantitatiewe kredietrisiko inligting en -data tot gevolg gehad nie, maar het ook die gebrek aan `n duidelike fokus, bestuursbenadering en filosofie wat noodsaaklik is vir doeltreffende kredietrisikobestuur, uitgelig.

Die primêre doelwit van hierdie navorsing is gerig op die daarstel van 'n prosesbenadering vir die bestuur van kredietrisikos, eiesoortig aan kredietbate-portefeuljes. As deel van die doelwit is die vereiste gestel dat sodanige prosesbenadering die basis moet vorm vir die bestuur van kredietrisiko met inagneming van alle aspekte en dimensies van toepassing op kredietrisiko in die maksimering van aandeelhouers-welfaart.

'n Literatuurstudie is uitgevoer om insig te kry oor die teorie onderliggend aan die bestuur van kredietbateportefeuljes, kredietrisikobestuur, die kredietportefeulje-bestuursbenadering en gepaardgaande beginsels. Die literatuurstudie is opgevolg met 'n empiriese ondersoek om vas te stel watter kredietrisikobestuurspraktyke in die Suid Afrikaanse Bankwese toegepas word.

Die prosesbenadering tot die bestuur van kredietbateportefeuljes is vervat in die rekeninglewensiklus en dien as vertrekpunt vir die verskillende prosesse noodsaaklik vir doeltreffende kredietportefeuljerisikobestuur. Die samevoeging van spesifieke data behoeftes in 'n funksionaliteit vir kredietportefeuljerisikobestuur, fasiliteer die toepassing

van die benadering tot en beginsels van kredietrisikoportefeuljebestuur op kredietbateportefeuljes binne die konteks van twee perspektiewe tot kredietportefeuljerisikobestuur, te wete:

- Die ekonomiese waarde perspektief (ook bekend as die aandeelhouerswelfaart perspektief) met 'n *ex post* focus (na wanbetaling plaasgevind het) en die berekening van die impak van kredietrisiko op kredietrisiko aangepaste opbrengs op kapitaal of aandeelhouerswelfaart; en
- Die verdienste perspektief met 'n *ex ante* fokus (voordat wanbetaling plaasgevind het), voortspruitend uit die bank se verlies aan inkomste as gevolg van, en gepaardgaande met die verswakking in kliënte se finansiële vermoë (aftakeling van/verswakking in kredietkwaliteit). Meer eenvoudig gestel, die kontantvloei implikasies voorspruitend uit die verswakking in kredietbatekwaliteit.

Die toepassing van die ontwikkelde prosesbenadering op kredietbateportefeuljes identifiseer twee afhanklike dimensies met onderliggende sub-dimensies, te wete: mikro portefeuljerisikobestuur en makro portefeuljerisikobestuur. Eersgenoemde dimensie fokus op die kredietbateportefeulje terwyl laasgenoemde meer klem plaas op die groep portefeulje met inagneming van die impak van alle risiko's op die organisasie. Die daarstelling van 'n Forum vir Besigheidswelstand, (wat verantwoording doen aan 'n komitee aangestel deur die Raad van Direkteure), verteenwoordig die finale fase in die prosesbenadering aangesien sodanige forum 'n onafhanklike blik op all risikos en aktiwiteite, insluitend kredietrisiko verseker.

Die aanvaarding en gebruik van die ontwikkelde raamwerk betreffende die prosesbenadering vir die bestuur van kredietbateportefeuljes in 'n Suid Afrikaanse bank, kan uitvoerende bestuur in staat stel om te verseker dat die vereistes (prosesse, stelsels, data, ens.) vir doeltreffende kredietportefeuljerisikobestuur nagekom word. Sodanige prosesbenadering sal ook 'n beter begrip heens die algemene wisselwerking tussen wins, volhoubare ontwikkeling en effektiewe kredietportefeuljerisikobestuur bevorder.

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KEYWORDS / SLEUTELWOORDE

KEYWORDS	SLEUTELWOORDE
Credit	Krediet
Risk	Risiko
Process	Proses
Portfolios	Portefeuljes
Credit risk	Kredietrisiko
Credit asset	Kredietbates
Credit asset portfolios	Kredietbateportefeuljes
Process approach	Prosesbenadering
Credit risk management	Kredietrisikobestuur
Credit portfolio risk management	Kredietportefeuljerisikobestuur
Risk quantification models	Kwantitatiewerisikomodelle
Risk mitigation	Risiko verskansing
Credit risk mitigation	Kredietrisiko verskansing
Credit management	Kredietbestuur
Credit strategy	Krediet strategie
Financial risk	Finansiële risiko

CHAPTER 1

INTRODUCTION AND RESEARCH FRAMEWORK

1.1 Background and importance of the research

Traditionally, needs of clients, their financial strength, future commitments and possible financial stress were considered known facts to the client's banker since a very close relationship existed between bank and client, even to the extent where past and future generations were concerned. Managerial skills focused on relationship management and the assessment of a transaction, based on affordability and price (Absa, 2000a:6).

An ever-increasing customer base forced banks to adopt new ways of servicing their customers more effectively, while at the same time minimising their risks in doing so (Absa, 2001a:1). Having a relationship with a client became increasingly difficult as client's needs became more comprehensive and sophisticated. This led to the development of new banking products and an increased investment in technology to manage risk. It soon became clear that banks could not be all things to all people (Absa, 2001a:3).

The traditional approach of relationship banking and management of third party risks (discussed further in chapter three) inevitably lead to concentrations of exposures rather than on a holistic portfolio view. Managing bad debt as a result focused on timely provisions (Van der Walt, 2003). The portfolio theory, as applied in portfolio risk management (Absa, 2001f), however, focuses on a broader spectrum of issues, all of which strive to create and increase shareholder wealth. The adoption of the portfolio approach to credit risk (also discussed in chapter three) presents a number of opportunities and challenges. Central to realising the objective of shareholder wealth creation, is the management of the approach and opportunities and challenges it presents (Absa, 2001f:35).

Technological innovation, specifically information technology, allowed banks to address the opportunities (risk-based pricing, risk quantification, and risk mitigation techniques) created by the need and consequent risk revolution (Absa, 2001f:20). A movement towards standardisation, centralisation and automation occurred whereby economies of scale and operational diversification (providing a portfolio of different services) are now being utilised. Speed, accuracy and risk were constantly competing to become the primary focus area (Absa, 2001a:3). The development of credit scoring systems and tools enabled banks to determine their individual client's risk rating (grading) based on different predetermined parameters (Van der Walt, 2003). These innovations lead to a renewed focus on managerial skills since new requirements had to be met.

Since banking is about lending money to third parties, it will always be exposed to credit risk (Absa, 2000a:1). The most popular way to mitigate credit risk on a transactional level is to ensure that the amount lent is secured and that the possibility of a loss is minimised (Coetzee, 2003). Depending on the collateral taken and the rate of recovery, this can well be achieved with only minimum losses, if any, to the bank. Although it may be sound from a risk perspective, this practice removes the very essence of banking, which is to create maximum shareholder value and to provide solutions to customers by providing credit based on affordability, cash flow and merit of the proposal, rather than on security or collateral alone (Absa, 2002a:12).

Granting credit with this approach does not imply that all transactions should be valued only on merit with no regard to risk mitigation, security or affordability. The biggest challenge in managing credit risk is changing the way losses are viewed (Absa, 2000a:2). A key principle is to accept that a bank can expect to lose money when it conducts business. Given this, the bank should then take cognisance and price its transactions adequately to offset expected losses with additional revenue (return). The risk/return relationship is further discussed in chapter three. The portfolio risk perspective suggests that the focus of raising timely provisions will be directed to manage recovery risk. This incorporates expected and unexpected loss probabilities in the event of ultimate default rather than active bad debt management. The concept of ultimate default is explained in chapters six and seven.

Another challenge of portfolio risk management is the way in which a bank ensures an adequate pricing policy. Banks need to consider customers' different needs, knowledge and preferences. Inevitably, this means that various customers have different risk profiles and for the same reason can be charged and managed according to their level of sophistication. The loss amount and the amount of capital at credit risk influence risk-based pricing at both the individual contract and portfolio levels (Absa, 2001f).

New regulatory guidelines and proposals by the Basel Committee (Basel, 2003a), (whose proposals are always implemented by the South African Reserve Bank's Bank Supervision Department) advocate that stricter regulatory requirements be adopted and enforced to avoid or minimise the effects that world catastrophes such as the Asian crisis in 1998 and the 11th September 2001 disaster had on the world financial systems. In terms of these proposed new regulations (Basel, 2003b), credit risk arising from large exposures and group lending will have to be covered by additional capital. In an increasingly competitive environment, the effective use of bank capital becomes a crucial issue. By adopting a portfolio risk management approach, the capital requirement can be reduced as the quantification of risk, its origin and concentration are predetermined and can be monitored closely. Quantifying credit risk will result in moving away from an arbitrary risk allocation process to a scientific basis of risk weighted capital allocation. This will inevitably result in a better utilisation of scarce capital, but also a greater demand on management skills to manage credit effectively. The techniques and models used for quantifying credit risk are discussed in more detail in chapter four.

Depending on the portfolio, existing levels of concentrations or concentration trends can be identified, which proactively ensure making strategic choices in terms of reduction, risk and pricing strategies (Absa, 2001c). Opportunities can be explored to improve the portfolio mix thereby enhancing earnings quality and placing a cap on exposures in those segments or industries with characteristics that indicates high failure rates. Large exposures and risk concentrations can thus be avoided by diversifying exposures across a large number of borrowers whilst hedging techniques can further be explored to mitigate the existing credit risk (further discussed in chapter five).

However, successful portfolio risk management involves much more than simple diversification across a large number of borrowers. In a competitive environment, success lies in strategic diversification (Absa, 2001f). The possibility of diversifying risk within a portfolio enhances the portfolio's earnings potential. The value of each transaction therefore not only becomes important in its own right, but also in the portfolio as a whole. The additional advantage of the ability to quantify a bank's credit risk is the potential to price more effectively and to utilise scarce capital resources optimally. It provides a basis whereby portfolios consisting of different risk profiles can be compiled and packaged for securitisation, insurance and derivative trading purposes (Absa, 2002c:1). These hedging techniques are discussed in chapter five. Depending on the strategic appetite for risk and a bank's risk propensity, a bank might even decide to buy risk into the portfolio. The management process can clarify the approach to be used in hedging as well as offensive risk strategies, ensuring that the optimum asset portfolio is created and maintained while addressing the creation of shareholder value.

Furthermore, a portfolio risk management approach forces a paradigm shift from the way credit risk is understood, enforced and managed. It entails a shift towards a new credit culture, a new management ethos and approach to establish business drivers, viewing credit risk and utilising information derived from various credit risk processes. This necessitates a transition from the "old" to the "new", thereby embracing best-of-breed methodologies in the management of credit risk (Absa, 2001f:59). This transition requires a re-engineered management process. A question of planning, organising, monitoring and control, to embrace and adopt the new quantitative tools and models to interpret the deliverables, and to utilise the information in the strategic decision making process to provide strategic direction. All of which leads to additional requirements in the range (or scope) of managerial skills.

Recent developments in the field of credit risk management (Crouhy *et al.* (2001:31) i.e. the strategic nature of the credit risk decision, the application of the portfolio theory to credit risk, Basel II Capital Accord requirements and proposals (Basel, 2003a and 2003b), the development of various quantification models and techniques and the acknowledgement of credit hedging strategies (Basel (2003b:61) have all led to a paradigm shift in the way in which credit risk management is viewed. This applies to the risk itself, the process, the underlying management philosophy and the approach to credit risk.

This research aims to propose a management approach to credit risk, taking the above into consideration and accommodating the new paradigm in which banks have to conduct their business. This is deemed necessary as new risk quantification techniques and models are developed and refined, thereby creating a new playing field in credit risk management. It not only needs to be understood by management in terms of its outcomes but also be incorporated in the management process and associated decision-making framework.

Credit risk management is considered a core competency in banks (Absa,2001f:26). It is an increasingly important discipline when operating in global markets, which requires not only specific specialised skills, but also a management approach and a process from which benefits can be leveraged. Strong credit risk management requires a technological solution far more complex and time consuming than any risk solution implemented to date. Those who master the principles, invest in the technology, and adopt a formal approach in the management thereof, will be much better positioned for the future than those that do not.

Portfolio management incorporates a comprehensive strategy to successfully balance the goals of creating valuable loan assets, shareholder value and avoiding excessive risk concentration through strategic diversification, the measurement of portfolio risk concentrations and the management of such concentrations (Absa, 2001f:62). The process approach will provide a methodology for the effective management of credit risk in all its facets. This includes the allocation of capital, diversification of opportunities, risk mitigating strategies and ensuring the maximisation of shareholder value with each transaction.

It is not the aim of this research to express a view on the adequacy, construct or statistical relevance of the different quantification techniques and models being used in the market. These different quantification techniques and models and its outcomes in context of this research is regarded as a given. The focus will be on using the outcomes in the credit asset management process.

1.2 Problem definition and basic hypothesis

The basic hypothesis or central theoretical argument can be summarised as follows:

The operating environment in which banks conduct their business changed significantly since the latter half of the previous decade. This is especially relevant in the credit risk environment, the tools and techniques used as well as the application of the portfolio theory in the quantification of credit risk. Development of these aspects of credit risk received considerable attention, focus and resources, while the management approach associated with managing the credit risk in a portfolio context has not developed at the same pace as these developments and enhancements. The requirements of the Basel II Capital Accord assisted banks in adopting best of breed credit risk management practices as it not only provided a benchmark for credit risk management, but also provides the building blocks for portfolio management.

The developments resulted in a bombardment of quantitative and qualitative credit risk information and data on the one hand, and on the other the absence of a clear focus and management approach and philosophy to effectively manage credit risk. The changes in the credit risk management environment dictate a need for a new management philosophy, a paradigm shift to apply the data and related information to the strategic decision making process. In this context, it is believed that the contribution is in the formulation of a process approach for managing credit asset portfolios. This begs the question: Given the outcomes of quantification models and techniques, how are these outcomes used in credit risk management?

Given the scenario stated previously the South African financial industry is confronted with the following dilemmas in managing credit asset portfolios:

- How are the different outcomes of quantification techniques and models incorporated in the credit management process?
- How should the transition be managed from relationship banking and transactional analysis to a portfolio approach in credit risk management?
- How does the portfolio risk manager ensure shareholder value is created and maximised while having to deal with an optimum portfolio composition?
- International best practices as outlined in the Basel II Capital Accord proposals (Basel, 2003b), as well as the King Report (Ernst & Young 2003 Module 1-3 and Myburg 2003) on corporate governance, demand that the portfolio approach to credit risk be adopted by all banks that want to conduct business in the global arena. It therefore becomes an imperative.
- An universally accepted, current and documented management process is absent in the South African context.

As a point of reference, the term 'organisation' can be substituted with either 'financial institution' or 'bank'. These terminologies, including the term 'institution', are used interchangeably throughout this document.

1.3 Research Objectives

The research is closely linked to the dilemma facing the financial services industry in South Africa. It is becoming increasingly important in the immediate operating environment where performance is driven by the value generated for shareholders in context of the requirements and constraints as determined by the regulatory, statutory and accounting standards bodies.

The research will endeavour to formulate a process approach to be applied in the management of credit risk (ultimate default) of credit asset portfolios, which should be the foundation from where the management of credit risk can be leveraged to exploit all the dimensions of credit risk while focussing on the maximisation of shareholder wealth. In this regard, defining the terms 'credit' and 'asset' becomes essential as these terms are core to the rest of the discussion. Defining these terms are required to ensure a clear understanding of what needs to be managed.

Allen (1992:64) defines an asset as "... (a) property and possessions, especially regarded as having value in meeting debts, commitments, etc. (b) any possession having value." Procter (1996:72) defines an asset as "... a part of the usually valuable property of a person or organization which can be used for the payment of debts." PIC Solutions (2003) defines an asset as a tangible or intangible item of commercial value, always representing a value to the owner.

Allen (1992:272) defines credit as "... (a) a person's financial standing; the sum of money at a person's disposal in a bank etc. (b) the power to obtain goods etc. before payment (based on the trust that payment will be made)..." Procter (1996:322) defines credit as "...a method of paying for goods or services at a later time, usually paying interest ... as well as the original money..." PIC Solutions (2003) defines credit and credit risk respectively as the right granted by a creditor to an applicant to defer payment of a debt, incur debt and defer its payment, or purchase property or services and defer payment thereof. Credit risk is defined as the risk that a counterparty to a financial transaction will fail to perform according to the terms and conditions of the contract, this causing the asset holder to suffer a financial loss.

Based on the definitions provided, credit assets in context of this research refer to banking loans and/or advances made to borrowers in the course of conducting the bank's business. These loans and/or advances are regarded as assets on the balance sheet of the banking institution and constitute value in either interest income or fee generation or both. Credit thus not only refers to the loan or facility granted, but also to the processes, systems, associated credit and credit risk management practices, and derived credit risk information in the end-to-end life cycle of the account.

The primary objective of the research is to formulate a management approach to apply the portfolio approach in the management of credit risk in credit asset portfolios.

Other objectives are:

- To determine to what extend South African financial institutions have evolved to follow a portfolio approach to credit risk management.
- To determine the management techniques, processes and approaches being used by South African financial institutions in the management of credit risk.
- To determine international best practice methodologies in the management processes as it relates to credit risk and incorporate them in a proposed management approach.
- To develop a thorough knowledge of the portfolio approach to credit risk management.

It should clearly be noted that the most fundamental assumption regarding this thesis is that the knowledge and application, including the advantages, disadvantages, model assumptions, model shortcomings and applied methodologies concerning the quantification models, is expected as a given.

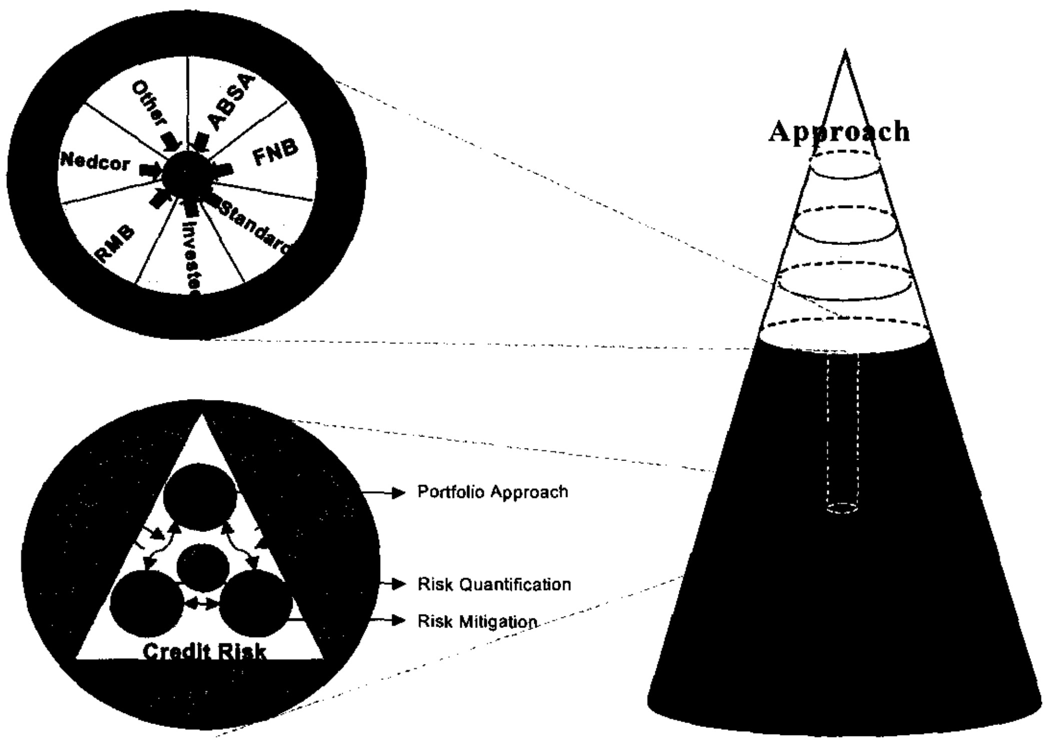
1.4 Framework and layout of the thesis

The thesis consists of three main components. A literature study that constitutes the foundation of the thesis, an empirical study regarding the applied practices in the South African industry, and the process approach in managing credit asset portfolios. These three components are illustrated in Figure 1.1 below, illustrating that the literature study is further divided into four components, culminating into an inner core ("shaft") that reaches into the process approach.

A chapter is dedicated to each of the four components: Management, Strategic Management and Credit Risk (Chapter 2), the Portfolio Approach (Chapter 3), Risk Quantification techniques (Chapter 4), and Risk Mitigation (Chapter 5). A chapter is dedicated to the empirical study focussing on the applied credit management practices in the South African industry, where the results of structured interviews with the largest banks are documented as well as the approach followed in obtaining the results (Chapter 6). Participating banks include Absa Bank Ltd. (Corporate, Commercial and Retail), Standard Bank of South Africa Ltd., First National Bank including Rand Merchant Bank, Investec Bank and Nedcor Ltd.

The framework of the thesis can best be described using Figure 1.1.

Figure 1.1. Framework and Thesis layout



Source: Author (1993)

Leading to the conclusion, the process approach to managing credit asset portfolios in a South African bank is discussed (Chapter 7) followed by a Conclusion (Chapter 8) regarding the way in which the initial problem statement together with objectives as defined in Chapter 1, have been met. Chapter 8 is followed by a bibliography with the relevant annexures.

CHAPTER 2

MANAGEMENT, STRATEGIC MANAGEMENT AND CREDIT RISK

2.1 Introduction

Chapter 1 consisted of a research framework and a short introduction. A brief introductory background about the importance of the research was also provided with a defined problem statement as it relates to the dilemma facing South African financial institutions. Furthermore, the objectives of the research were formulated with a broad framework regarding its layout.

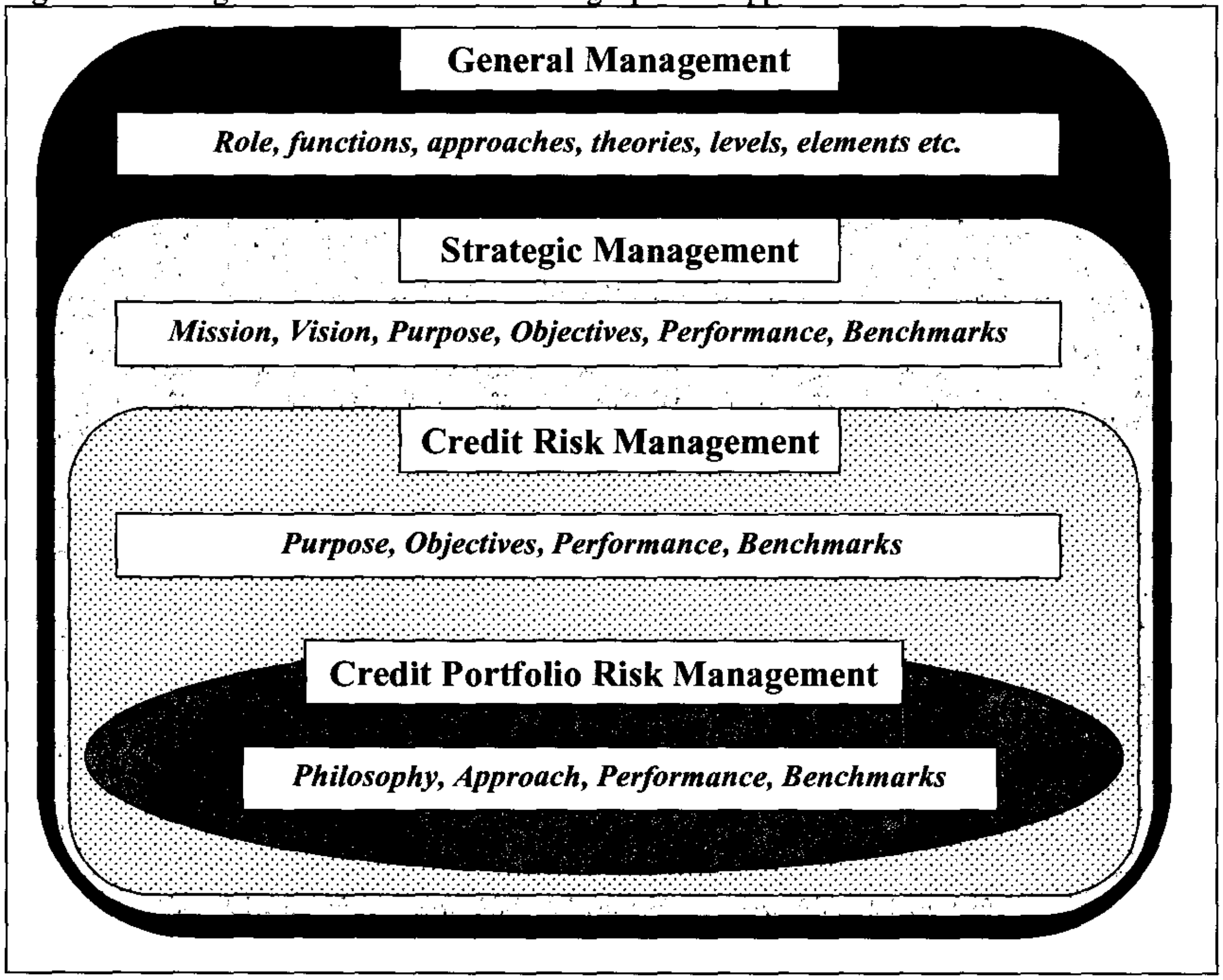
Chapter 2 aims to highlight that the credit decision, and therefore the portfolio risk management function, is strategic in nature as it supports both business and corporate strategy. To provide an evaluation mechanism to value existing credit risk management practices, a framework or approach for managing credit portfolios from a management perspective is provided.

It was stated in Chapter 1 that credit management skills focussed traditionally on relationship banking. It was further mentioned that one of the strategic imperatives, which need to be fulfilled, is to maximise shareholder wealth. The objective of shareholder wealth creation and the associated management approach require deliberate management involvement. A structure and frame of mind should be provided from which a management approach can be valued and evaluated. This evaluation framework is provided using the strategic management process, discussed in the remainder of this Chapter. The importance of this discussion reflects on the role and tasks of management, in the context of both credit strategy and wealth maximisation, to implement and execute a management approach to credit risk management.

The framework (illustrated in figure 2.1) is divided into three sections. In the first section an overview is provided about the role of management. The overview includes discussions regarding the definition of management, management's role in institution context, the different management approaches and theories, the functional activities of management, levels of decision-making, and the nature of the decision required by management in context of the institution's purpose.

In the second section, the purpose of the institution, as it relates to subsequent strategic imperatives, is discussed with the concepts of strategy and strategic management. This is followed by a brief discussion of the strategic management process.

Figure 2.1 Management Framework for valuing a process approach

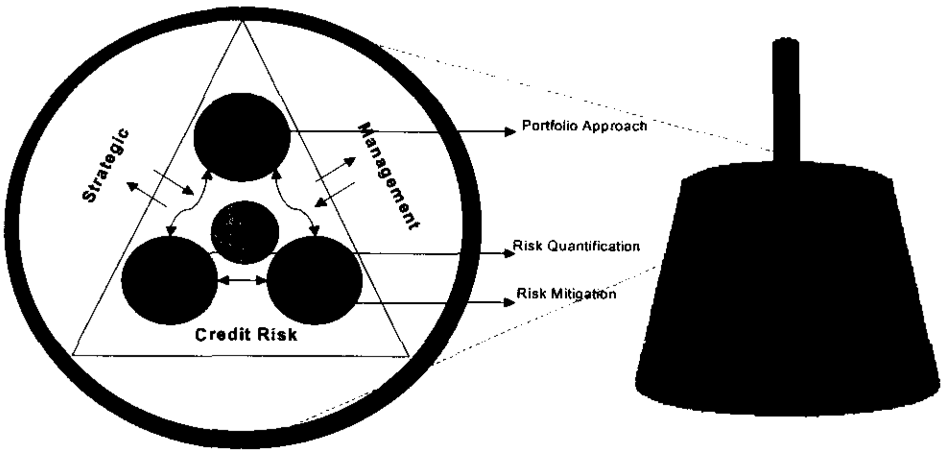


Source: Author

The discussion addresses the formulation of objectives and goals, performance measurement (control and evaluation), and ultimately, the balanced scorecard approach to bring objectives, goals, performance and corrective actions together. To a large extend the second section forms the foundation of the proposed approach in chapter seven as it provides the philosophical framework for such an approach.

In the final section, the relationship between the strategic decision, the credit risk decision and the portfolio risk management philosophy, in the context of portfolio risk management's role in conceptualising, quantifying and influencing the resulting credit decisions, strategy, and benchmark performance monitoring are discussed. The role of an Asset and Liability Management Committee (ALCO) acting as intermediary between the Board of Directors and the operating units, to execute strategy is briefly discussed. The section is concluded with a discussion on the placement of the portfolio risk management function within the credit risk management decision framework to provide the required support and influence in the strategic management process.

Figure 2.2. Literature study: Chapter 2 – Management, Strategic Management and Credit Risk



Source: Author

Chapter 2 provides such a management framework against which a process approach for managing credit asset portfolios in a South African financial institution or bank can be valued. Referring to the thesis framework provided in Chapter 1, Figure 2.2 provides the reader with a graphic illustration of the specific component being discussed (the white area in the left-hand circle).

2.2 The role of Management

A discussion regarding management, its role and functions should start with a definition of the term 'management'. The discussion of the different management approaches provides insight into the different management philosophies and allows the reader to place the proposed process approach (chapter seven) in perspective. The discussion also facilitates the modern trend of combining various approaches in practice. A brief discussion on the functional activities of management, as it relates to the manager's main purpose or task (to manage), provides a deeper understanding of management's role. The different functions have certain implied elements, which cannot be separated from the management function. In this regard specific focus is directed towards decision-making, the different levels of decisions, and the nature of the required decision in context of the institution's purpose.

2.2.1 Management defined

Marx (1981:65) defines management as the process where people in command of human activities ensure that human and other resources are utilised to achieve specified objectives in the most efficient manner.

Weihrich and Koontz (1993:5) define management as the process of designing and maintaining an environment in which individuals, working together in groups, efficiently accomplish selected aims.

Kast and Rosenzweig (1985:5) state that management involves the coordination of human and material resources towards objective accomplishment and identify four basic elements namely: towards objectives, through people, via techniques and in the organisation.

It becomes clear that the management activity (to manage) involves a process within the organisation, involving people and other resources, to attain certain specified objectives, in the most effective and efficient manner. The definition implies that specific tasks are assigned to the manager in order to fulfil his/her role and function, which again is driven by organisational goals and objectives.

2.2.2 Management approaches and theories

The management process as is known today, can in many instances, not be ascribed to or considered to originate in/from only one approach (Absa 2001a). It is a collective result of all approaches and theories, in a greater or lesser extent. In order to understand the contributions made to the theories and approaches used in management today, an overview of the different approaches is required.

Marx (1981:23) identifies eight different management approaches or theories. These are:

- The scientific management movement
- The classical approach
- The human relations approach
- The decision making approach
- The quantitative method approach
- Management by custom approach
- The systems approach
- Situational or contingency approach

2.2.2.1 The scientific management approach

According to Marx (1981:23), Marx *et al.* (1991:276), and Kast and Rosenzweig (1985:59), the scientific management approach was formulated by F.W. Taylor (end of 19^{th} century) who tried to define the role of management (especially lower level management) more scientifically by differentiating between preparation of work and actually doing the work (Weihrich and Koontz, 1993:31,32). He further developed an organisational structure and improved productivity by studying the time it took for tasks to be completed. Others who followed this approach and provided additional valuable contributions were Gantt, the Gilbreths and Emerson (Marx *et al.* (1991:276), Weihrich and Koontz (1993:32-35) and Kast and Rosenzweig (1985:61)).

2.2.2.2 The classical approach

The classical approach is also known as the traditional approach, the functional approach or process approach. According to Marx (1981:24), Marx *et al.* (1991:276), and Kast and Rosenzweig (1985:63), this approach follows from efforts of a French industrialist, Henri Fayol, who early in the 20th century published his ideas regarding the role of management. In the same vain as Taylor, Fayol (Fayol 1949:7) endeavoured to analyse the role of management scientifically. However, in contrast with Taylor, Fayol's interest was directed towards top management (Marx, 1981:24).

Fayol differentiated the activities of an institution in six groups and also defined the most prominent managerial tasks (Weihrich and Koontz, 1993:36). These are discussed in paragraph three in this Chapter. Further contribution stems from his formulation of the characteristics and skill requirements of a manager and the identification of fourteen principles of management. The approach as described by Fayol was followed by many academics and resulted in a vast collection of literature focussing on the management process (management is a process which encompass a variety of activities) (Marx, 1981:24). The popularity of this approach and the contribution, which Fayol made to the managerial sciences, is reflected in the many textbooks and literature that follow the process approach.

2.2.2.3 The human relations approach

The human relations approach is also known as the behavioural sciences approach and concentrates on the human aspects especially the human relationships in an organisational context. The approach (Marx, 1981:25) is founded in the belief that maximum productivity can be achieved through the management of staff and the establishment of optimal relationships between management and subordinates. This view is shared by Marx *et al.* (1991:276).

Major contributors to this approach were Münsterberg (Weihrich and Koontz, 1993:32,40) and later Mayo and Roethlisberger (Weihrich and Koontz, 1993:32,42), Kast and Rosenzweig, 1985:82-84), and Marx *et al.,* 1991:276) who determined, using Hawtorne experiments, that the performance of employees are not only influenced by physical factors but also influenced through human factors (the interpersonal relationships between managers and their subordinates and between members of a group itself). The popularity of the Hawthorne experiments were manifested in the extensive use by other disciplines e.g. psychologists and sociologists. It resulted in an over accentuation of human relations before and after World War II (Marx, 1981:25,26).

However, many behavioural scientists have since the early days, followed a more scientific approach in their investigations and developed motivation theories and methods and principles for good personnel management. These efforts resulted in a transformation from the conventional human relations management focus (dealing with people) to human resources management (effective utilisation of people).

Many of these scientists focussed on the individual and others focussed on the social interaction within groups internal and external to the institution or organisation. This resulted in specific views, which in many instances can be regarded as a different management approach, the so-called social system school.

2.2.2.4 The decision making approach

Advocates of this approach, according to Marx (1981:27), are of the opinion that making decisions is the most important managerial activity. The manager needs to decide which objectives are to be reached and what approach needs to be followed in order for the objectives to be met. As a result of the management role, the manager is continuously confronted with situations where decisions of different levels of importance and complexity are required. (Also see Marx *et al.,* 1991:277).

This approach resulted from the work done by Barnard (1968:261), Weihrich and Koontz (1993:43), Kast and Rosenzweig (1985:84), and Simon (1960), who not only stressed the importance of the decision-making process but also studied who, why and how decisions are taken. Their analyses and definition of decision-making identifies a process with subsequent steps where different variables and alternatives are taken into account in order to get to a solution.

2.2.2.5 The quantitative method or management science approach

According to Marx (1981:27), the quantitative method approach (or quantitative management approach) is to a large extent a continuation of the decision-making approach as the approach focuses predominantly on decision-making. However, supporters of this approach place more emphasis on the techniques, methods and tools used in the decision-making process compared to the process itself.

The followers of this approach are more interested in complex and difficult decisions where quantitative methods are required to determine a solution (Weihrich and Koontz, 1993:47 and Marx, 1981:28). Operations research, initially developed for military use during the Second World War, constituted the main component of the approach (Kast and Rosenzweig, 1985:90). Later it was broadened to encompass linear programming, simulations, decision trees and other techniques. As a result, the approach is also known as the management science theory.

Initially the use and application of the approach was limited to a selected view due to its strong quantitative fundamentals (Marx, 1981:28). The areas of application are restricted to the exact sciences. The value of this approach should however not be discarded. Significant to note is that the approach can be used to solve complex problems effectively and quickly. In this regard it supports the scientific management theory that managerial problems require a scientific solution. It forces management and staff to formulate objectives, problems, variables, constraints and opportunities carefully and to seek guidance and solutions in a scientific, logical, well thought through and systematic manner.

Early contributors to this management approach include Morse, Kimball, McCloskey, Trefetken, Churchman, Ackoff, Arnoff, Miller, Starr, Buffa and Wagner (Marx, 1981:29, Thierauf *et al.,* 1977:24 and Kast and Rosenzweig, 1985:91,94).

2.2.2.6 Management by custom approach

Also known as the empirical management approach, Marx (1981:29) states that the supporters of this theory believe that the experience, mannerisms and practices of other managers and of management themselves should be the basis of the way they manage. When confronted with a problem, they tend to resolve the issue at hand by drawing from their own and other manager's experience, practices, mannerisms, and how similar problems were resolved historically.

The followers of this approach according to Marx (1981:29) and Weihrich and Koontz (1993:47) study successful leaders/managers as well as successful and forward-looking companies using case studies. In this manner problems and solutions are evaluated. It can however be argued that the approach inhibits initiative and creative thought and that management are restricted in their thinking. Notwithstanding, practice proved this to be a popular approach as managers regard it as simple and effective. It allows managers to gain confidence as they learn from past experiences. It also contributes to stability and consequent decisions (Terry, 1974:31,58,61,66).

2.2.2.7 The systems approach

Supporters of the systems approach (such as Bertalanffy, Kast and Rosenzweig) see an institution as a system and not merely as the sum of fragmented components (Kast and Rosenzweig, 1985:103 and Marx, 1991:277). According to Marx (1981:30), they believe in an interdependent presence, a relationship between components, with common objective within an institution. They view the organisation as a system (the institution in its entirety), with subsystems or interdependent components. It is believed that optimal results are achieved through inputs, processes and outputs. Vosloo (1987:9) defines a system as a set, arrangement or collection of different components, arranged purposefully in such a manner that it forms a meaningful entirety or whole, in order to achieve a specific objective. The entirety or whole formed in this manner is larger than the different components combined (2+2=5=synergy).

Marx (1981:31) elaborates further and comments that in some instances, the functional approach is replaced by a project approach where different functional areas are abolished and replaced with a project manager who rather uses experts from the different functional areas to complete a project. When this approach is used, the organisational structure changes because the functional areas become smaller. The systems approach can be regarded as the result of the other approaches as it tries to address the shortcomings inherent in the previous approaches. Contributors who took the lead in developing the systems approach include Von Bertalanffy, Boulding, Johnson, Kast, Rosenzweig, Churchman and Beer (Kast and Rosenzweig, 1985:103-113; Thierauf *et al.,* 1977:25,26; Terry, 1974:69).

2.2.2.8 Situational or contingency approach

The situational or contingency approach according to Marx (1981:32) (regarded as the approach of the seventies) follows the view that the application and use of principles in management, methods and techniques will depend on the situation that prevails at the time of requirement. Depending on the prevailing situation, the functional approach, the quantitative approach, the behavioural sciences approach, the systems approach or a combination of the different approaches will be applied.

In the same vain as the systems approach, this approach attempts to address the shortcomings of the previous approaches. Contributors of the situational approach are Kast and Rosenzweig (both initially involved in the system approach) and Joan Woodward, Fiedler, Lorsch and Lawrence (Kast and Rosenzweig, 1985:115-119; Marx, 1991:277; and Marx *et al.,* 1981:32).

2.2.3 Other approach classifications

Variations of the classification of approaches, as depicted in the previous discussion, are evident in the different sources. For example, Marx *et al.* (1991:277) classifies the systems approach and the situational approach in a separate category called the modern approaches to management science. Other managerial approaches based on the approaches already mentioned but with different focus areas, include management by objectives, management by results, empowerment, and participative management.

Weihrich and Koontz (1993:45-48) classify the above approaches (some already discussed in broader context above), in greater detail. These approaches are: empirical or case approach, interpersonal behaviour approach, group behaviour approach, McKinsey's 7-S framework, cooperative social systems approach, socio-technical systems approach, decision theory approach, systems approach, mathematical or management science approach, contingency or situational approach, managerial roles approach, and the operational approach.

The question flowing from the above analyses is which approach is the best and most appropriate to follow. A combination of approaches should be adopted, depending on the situation that prevails. Weihrich and Koontz (1993:10) states, "the effective manager is a situational manager who evaluates each approach in light of the circumstances and selects the one that most effectively and efficiently achieves individual and organisational goals."

The focus of this research will be directed towards the process approach for the following reasons:

- The process approach provides a broad framework which is easily understood;
- The process approach simplifies the role and function of management;
- Other contributions from management theories and approaches are possible;
- The process approach stresses the setting and achieving of targets and objectives;

- The process approach can be used by practitioners as well as academics;
- The process approach is universal, flexible and can accommodate enhancement, innovation and changes;
- The process approach acknowledges that management is a science, an art as well as a profession;
- The process approach makes provision for the formulation of specific management principles; and
- The process approach stimulates the development and enhancement of a management philosophy.

It was mentioned that the aim of the chapter is to provide an evaluation mechanism to value existing credit risk management practices, a framework or approach for managing credit portfolios from a management perspective. The previous discussion provided a definition of management and an overview of the different management approaches. In order to broaden the management perspective, it is required to describe the activities of management as it provides insight into the activities management needs to focus on.

2.3 Functional activities of management

Fayol (1969:3) states that "all activities to which industrial undertakings give rise can be divided into six groups, namely: technical activities (production, manufacture, adaptation), commercial activities (buying, selling, exchange), financial activities (search for and optimum use of capital), security activities (protection of property and persons), accounting activities (stocktaking, balance sheet, costs, statistics) and managerial activities (planning, organisation, command, coordination, control)." He further mentions that irrespective of the size of the undertaking, big or small, simple or complex, these six groups of activities or essential functions are always present.

For purposes of this discussion, the focus would be on the managerial activities as it provides the fundamental building blocks in the approach to be followed. In the same vain as Fayol, additional managerial activities have been identified by other authors.

However, apart from slight deviations from the original elements as defined by Fayol, five elements (planning, organising, command, coordination, control) stood the test of time. (See Weihrich and Koontz, 1993:4, Koontz and O'Donnell, 1972:1, Marx *et al.*, 1991:278). The majority of authors today however, use only four of these elements, namely: planning, organising, command and control (Marx, 1981:87).

2.3.1 Planning

The planning function, identified as the first function or task of management, is an integral part of the managerial task. It involves developing strategies and designing ways of implementing them. Planning thus provides the framework for integrated decision-making throughout the organisation. Kast and Rosenzweig (1985:478) define planning as the process of deciding in advance what is to be done and how. Comprehensive planning is an integrative activity that seeks to maximise the total effectiveness of an organisation as a systems in accordance with its goals.

Weihrich and Koontz (1993:20) define planning as the selection of missions and objectives and the actions to achieve them. They further state that planning requires decision-making, choosing future courses of action from a range of alternatives. In this regard, Kast and Rosenzweig (1985:479) state that planning is anticipatory decision-making. Even Marx (1981:95) is of the opinion that planning is a predetermined course of action regarding future activities in order to achieve specified objectives.

2.3.2 Organising

Organising, the second task of management, involves the logic assignment of activities between functional areas and/or between individuals. It includes the arrangement of relationships between people and areas as well as providing the requirements to allow activities to take place. Weihrich and Koontz (1993:20) define organising as a part of managing, which involves establishing an intentional structure of roles for people to fill in an organisation. It is intentional in the sense that it ensures that all the tasks necessary to accomplish goals are assigned to those people who can best fulfil them.

2.3.3 Command

Marx (1981:96) states that command refers to the element in management where the manager directs, leads and manages the execution of the work or task at hand. This is done through communication, instructions, motivation and supervision. The manager is in a supervisory capacity to ensure that the execution of work is started at the correct time, and effectively and efficiently executed. Some authors refer to leading, others to directing. Weihrich and Koontz (1993:21) define leading as the process of influencing people so that they will contribute to organisation and group goals. They argue that leadership implies fellowship, which involves motivation, leadership styles and approaches, and communication.

2.3.4 Control

Through control the manager ensures that the task at hand is executed in accordance with the initial plan and that the specified objectives are met. This is done through performance measurement where corrective steps are taken in the event of deviations. Weihrich and Koontz (1993:21) define control as measuring and correcting individual and organisational performance to ensure that events conform to plans. They elaborate further by stating that it involves the measurement of performance against goals, objectives and plans, showing where deviations from standards exist, and helping to correct them. Kast and Rosenzweig (1985:508) state that the concept of control has several meanings. They identify three relatively distinct lines of thought namely that control implies curbing or restraining, directing or commanding, and regulating.

2.3.5 Management activities as integrated and combined philosophy

Significant to note from the discussion regarding the functions of management is that not one single function can be isolated or separated from the other. For example, in order to be able to plan a manager would be required to manage. In the same vein, one could come to the conclusion that you cannot control something if you are not managing it, because you must have the ability to change, enhance, take corrective steps. Furthermore, the different functions of management are closely related, even interrelated where the execution of the one leads to or implies the execution of the other. The previous discussion shows that the functional responsibility carried by managers can influence the purpose and future existence of an organisation. The importance of management and its role becomes significant in achieving and executing the organisational goals.

Not only does the different managerial activities provide insight into the managerial perspective regarding the role of management, but the level of management together with the associated level of decision-making limits this role as a clear distinction is made regarding the decision required at the different management levels.

2.4 Levels of management

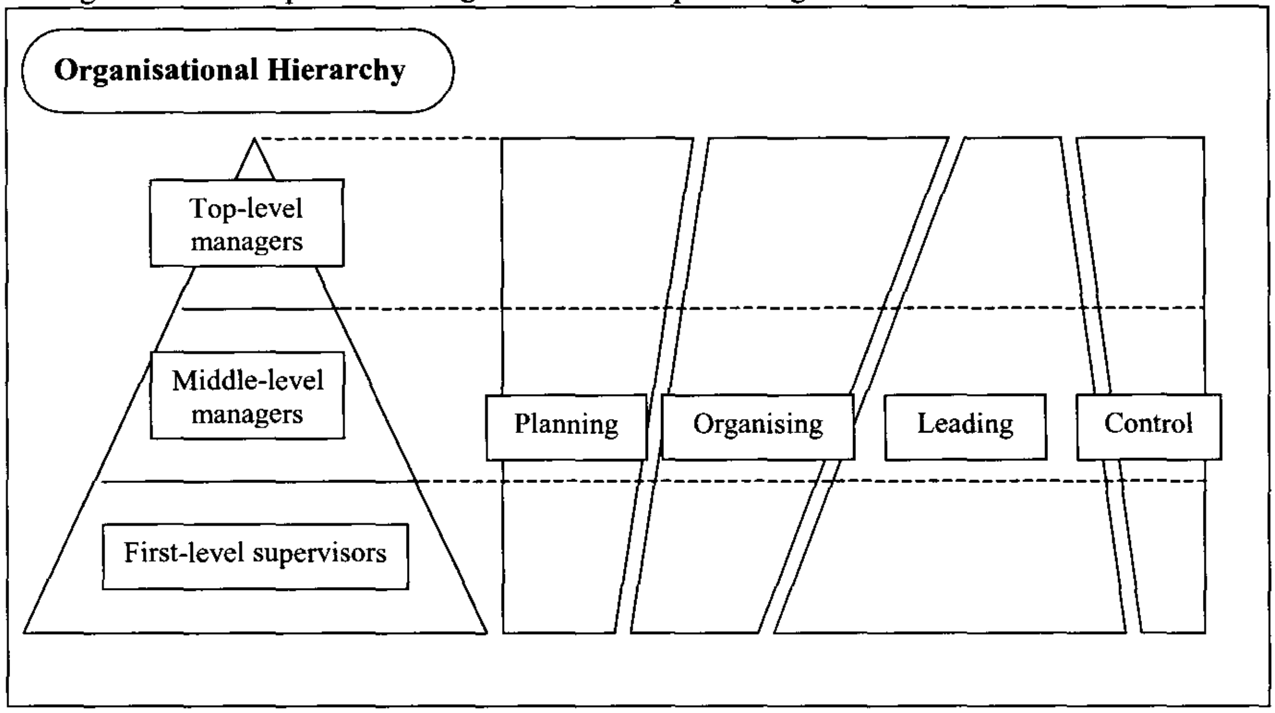
Depending on the level of management, the time spent on the different management activities in the achievement and attainment of organisational goals becomes increasingly important.

Marx (1981:104) identifies three levels of management being, lower, supervisory, operative or first-level management, middle management and top management. Weihrich and Koontz (1993:6) support this view and suggest that different levels of management spend varied time on the management functions as illustrated in Figure 2.3.

It is evident that top-level managers spend more time on planning and organising than lower-level managers. Leading demands a great deal of time for first-line supervisors. Time spent on controlling varies only slightly for managers at various levels.

The levels as shown can also be divided between operational management (dealing with the day to day activities of the organisation), tactical management (dealing with tactical issues impacting on the direction and goals of the organisation), and strategic management (dealing with the direction and future existence of the institution).

Figure 2.3 Time Spent on Managerial Activities per management level



Source: Weihrich and Koontz (1993:6)

Having established that different decisions are required at different levels of management and that the time spent on managerial activities differs depending on the level of management, it is necessary to elaborate on a key element of management, namely the decision itself.

2.4.1 Decisions – an essential element of management

Deciding, is one phase of an overall process in problem solving, that includes the recognition of the need for a decision, analysis of the situation, choice of a particular alternative, the implementation of action steps, and review of the decision. Marx (1981:123) states that making decisions is predominantly associated with the planning stage (refer to planning as a management function discussed in the previous section), however, not exclusively as decisions also form part of the other functional activities. Terry (1974:115) states: "Decisions are expected of a manager. To make management meaningful, decisions must be made. Decision making exists in every part of an enterprise, and deals with every possible subject."

To decide means one is making up your mind, by choosing between two or more alternatives. The decision always has a consequence. The consequence may be implicit or explicit. The decision not to choose between alternatives would in itself constitute a choice. Decision-making is fundamental to an organism and organisational behaviour as it provides the means for control and allows coherence in systems.

2.4.1.1 Decisions and levels of management

Different decisions are taken at the various levels in the organisation based on the type of the decision required, the nature of the decision, its impact on the organisation, and the level where the decision is taken (Absa 2001a). In this regard complex, difficult, and time consuming decisions where limited information is available, and where the decision will impact the organisation in totality, are taken at top-management level. The opposite is true for low-supervisory level decisions.

Terry (1974:121) states that different methods exist to classify decisions. One such method is to follow a functional approach where decisions reflecting on a particular function are grouped together, e.g. marketing decisions, financial decisions, production decisions, credit-related or credit risk decisions.

According to Marx (1981:131), another method entails the classification of decisions in four groups: High certainty-low risk decisions, medium certainty-and medium risk decisions, medium uncertainty or above average risk decisions, and high uncertainty or high-risk decisions. Another method is to differentiate between programmed or routine decisions and non-programmed or *ad hoc* decisions. Programmed decisions are repetitive and based on standard information, typically of an operational environment. The consequences of these decisions are known in advance and the associated risk is very low. Non-programmed decisions on the other hand, are typically unusual in nature and taken on an *ad hoc* basis. Limited information is available in this case with significant associated risk. This type of decision requires insight, experience, common sense and business acumen, which is associated with higher levels of management. This type of decision is generally made by top-level management and would be the end of the complexity and consequence continuum.

The final classification method according to Thierauf *et al.* (1977:123) is to use the managerial level at which decisions is normally taken. Three levels are identified: Operational or executive decisions, middle management or administrative decisions and top management decisions also referred to as strategic or policy decisions. Operational decisions focus on the short term and would predominantly be influenced by decisions at middle and top management level. It is internal in nature and associated with the day-to-day operational activities of the organisation. Normally these decisions are associated with very low risk and routine actions and information required to assist the decision is at hand.

Administrative or middle-level management decisions focus on the medium term and would be impacted by decisions made by top management. This implies that decisions made by top management are translated into more detail to enable the execution (Marx, 1981:133). Although focus is directed towards the internal issues in the organisation, external factors are also taken into account. These decisions are associated with relative low risk and certainty and additional information to assist the decision is required. Important decisions are taken which affect functional areas in the organisation. Middle-level management requires practical experience and knowledge as well as common sense, since they are responsible for achieving and executing pre-determined goals and objectives utilising the best and most appropriate methods. The focus would be on organisational issues and the procurement and utilisation of resources.

Top-level management decisions focus on the long term and are concerned with the strategy and policy of the organisation (Marx 1981:132). Decisions pertaining to the goals and objectives of the organisation, taking the external environment into account and how the objectives should be achieved. These decisions have a high level of uncertainty, very high risk pertaining to the future existence of the organisation, and require significantly more information. However, in many instances, information is not readily available. These decisions require knowledge of the internal and external environment, vision, common sense and business acumen.

2.4.1.2 The nature of the decision required

The purpose of the organisation is to obtain a positive return on the investment. However, non-profit organisations e.g. section 21 companies and government parastatals, do not have a profit motive, but would nevertheless wish to minimise costs while still maintaining an acceptable service level (cost-benefit analyses are paramount).

Companies belong to shareholders, who expect a return on their investment. The return required should take the risk into account and a certain portion of the return should reflect the risk premium. This expectation places a responsibility on management, as they need to ensure that sufficient profit is generated to compensate the company's shareholders over the short, medium and long term. In this regard, three aspects can be identified (Absa 2001f): The company firstly needs to be profitable. Secondly, the company needs to make a year-on-year profit, which implies that the profit should be sustainable. Thirdly, although indirectly implied in the previous aspects, the company needs to grow. The purpose of a profit organisation, based on the discussion is threefold: Profitability, growth and sustainability.

Weihrich and Koontz (1993:8) share the view that the aim of business managers is to make a profit. However, they state further that an important purpose or goal is the long-term increase in the value of a company's common stock or share price. Rappaport (1986:1) acknowledges that managers' primary aim is to maximise shareholders' total returns.

Pearce and Robinson (1995:35) define the purpose of an organisation as survival, growth and profitability. Their view is that an institution that is unable to survive will be incapable of satisfying the aims of any of its stakeholders. Long-term profits are the clearest indication of an institution's ability to satisfy the principal claims and desires of employees and shareholders. Growth in market share correlates with profitability, while growth in markets leads to improvements in an institution's competitive ability. Proactive change is essential in a dynamic business environment.

Having discussed the role of management with specific reference to management's primary activities including the evolution of management approaches as well as the decision component as key element to management, a deeper insight has been created regarding the role management is required to play in any organisation. A clear distinction has been made between the different levels of management and the associated decisions required as to where credit risk should be positioned in terms of attention and importance.

Due to the importance of the credit decision on the one hand and the nature of the decision required on the other, a mechanism needs to be implemented to evaluate credit risk management practices, and to provide a framework or approach for managing credit portfolios from a management perspective. As the credit decision is viewed to be made by top management, a discussion on strategy and strategic management becomes imperative. Such a discussion facilitates an evaluation mechanism, especially when it is based on the strategic management process. However, to provide context to the location of the process, the discussion includes an overview of certain strategic imperatives, concept definitions, tasks, levels and benefits of strategic management.

2.5 Strategy and Strategic Management

2.5.1 Strategic imperatives and the financial institution's purpose

A range of strategic imperatives can be found in the organisation 'jungle', which depends on top management's views on where the organisation needs to strategically focus and direct its efforts. The significance of strategic imperatives lies in its accepted importance to act as pivot points for the organisation to ensure success in achieving its ultimate goal of profitability and sustainable growth.

Given the purpose of the financial institution described above (profitability, sustainability and growth), strategic managers are confronted with specific strategic imperatives. Some of these imperatives (Absa 2001c) are *inter alia* the creation of a sustainable competitive advantage with the ability to accommodate changes in the dynamic competitive environment where various challenges are imposed by the internal and external environment, creating and maintaining a customer centric focus, creating a balance between technological capital and intellectual capital, corporate governance and shareholder wealth creation and maximisation.

In the next section, four of the above strategic imperatives are selected for further discussion due to their impact and influence on the overall credit strategy in the context of the importance of credit decisions. Those selected are: The creation of a sustainable competitive advantage and ability to accommodate changes in the dynamic competitive environment where various challenges are imposed by the internal and external environment, creating and maintaining a customer centric focus, corporate governance and shareholder wealth creation and maximisation.

2.5.1.1 Competitive advantage in a dynamic competitive environment

Explicitly or implicitly, sustainable competitive advantage has long occupied a central place in strategic thinking (Absa 2001c). In many instances, it is argued that a set of actions produces a sustainable advantage over competitors. However, what is a sustainable competitive advantage?

Thompson and Strickland (1989:181) provide some insight into this phenomenon. It is argued that sustainable competitive advantage has three main elements. Firstly, the differentiation in important attributes should be present. This differentiation encompasses three elements: The differentiation must be reflected in some product or delivery attribute that is a key criterion for the market. The product or service must command the attention and loyalty of a substantial customer base (it must have a footprint in the market). Secondly, the advantage must be durable. Durability can only be achieved if competitors are unable to readily imitate the superior product or delivery's attributes. This means that a gap exist in the capability underlying the differentiation separates the producer from his competitors. In this regard capability gaps are divided in four categories: Business system gaps (ability to perform individual functions more effectively), position gaps (prior decisions, actions and circumstances – reputation), regulatory/legal gaps (limitations imposed by government) and organisation or managerial quality gaps (ability to consistently innovate and adapt more quickly and effectively). Finally, the competitive advantage should be sustainable. In this respect, the challenge facing management is how to maintain the advantage once created.

One way to maintain advantage and a key element in a financial institution's long-term survival is sustainable service levels. It was previously stated that the internal and external environments impose challenges. Maintaining competitive advantage and ensuring long-term survival depends on an institution's ability to pro-actively and rapidly change but also being able to accommodate change. This can be achieved utilising scenario-planning theory as discussed by Sunter (1992:11) as it becomes a key component in an institution's ability to accommodate change.

Scenario-planning theory requires a process to be followed where different alternatives are always present to allow for quick change. Through scenario setting, different alternatives can be determined in anticipation of a certain event occurring. The approach allows for a rapid movement between alternatives, depending on the requirements and challenges posed by the environment. It also allows for mistakes to be identified and corrected as they occur, as well as dynamism within the organisation to meet the change head-on. A financial institution's ability to absorb setbacks over the short term also contributes to its survival.

Meisenholl (2003) is of the opinion that purpose statements of financial institutions are, to a large extent similar. Purpose statements do not differentiate one financial institution from the other. From a credit risk perspective, differentiation is achieved through the diversification of the asset portfolio and the manner in which techniques and risk mitigation are accommodated. The ability to sacrifice profits over the short term to ensure long-term profitability should form part of the portfolio risk management approach to ensure success and growth. The importance for credit risk management of being able to change rapidly lies in the principles of scenario building.

2.5.1.2 Customer centricity

Another strategic imperative, which will contribute to sustainable growth and profitability, is the concept of total quality management (TQM) (Crosby, 1979 and Deming, 1986). Refined by Edward Deming (Deming, 1986) and applied predominantly to the manufacturing environment. The value of this management method is also applied in many service organisations. The popularity of TQM can be ascribed to an intense focus on customer satisfaction, on accurate measurement of every critical variable in a business's operation, on continuous improvement of products, services and processes, and on relationships such as trust and teamwork. It reflects on a new organisational culture and way of thinking.

Pearce & Robinson (1995:398) suggest ten essential elements of implementing total quality management (also known as Deming's 10 TQM-principles):

- Quality should be defined from a customer perspective and communicated as a written policy to ensure mutual understanding throughout the organisation.
- A customer orientation should be developed where the customer determines what quality is and not secondary sources.
- Focus should be directed at the organisation's business processes to seek improvement opportunities and not only at the finished product or service.
- Customer and supplier partnerships should be developed suggesting that suppliers are partners in meeting customer needs, and customers are partners by providing input so the organisation and suppliers can meet and exceed expectations.
- Adopt a preventative approach where management are rewarded for being prevention-oriented and seeking to eliminate nonvalue-added work.
- Adopt an error-free attitude where error-free becomes the performance standard and management taking every opportunity to demonstrate and communicate the importance of this imperative.
- Ensure that decisions are based on facts (accurate information and measurements) and not opinions.
- Encourage participation from all employees, managers as well as subordinates. Employee participation, empowerment, participative

decision-making, extensive training in quality techniques, statistical techniques, and in measurement tools support and instil a commitment to quality.

- An atmosphere of total involvement must be created to ensure that all areas apply quality concepts simultaneously.
- Continuously strive for improvement.

Pearce & Robinson (1995:400) confirm that "the quality initiative and strategic control are two sides of the same 'coin' – attention to factors that, in themselves, or because of change impacting them, influence the long-term success and survival of an organisation." The quality imperative has become a prominent factor with strategic managers in recent years, especially in the face of increasing global competition. Many organisations, including financial institutions, have adopted the principles of total quality management and continuous improvement. This was not necessarily in a similar way that manufacturing organisations have done but in a customised way. Important to note is that similar goals should be achieved with TQM.

Glass (1996:303) stresses this importance of customer centricity (adding value for the customer) where the concept of the customer is extended from outside to within the organisation. Different areas within the organisation act as suppliers for other areas within the organisation. It not only becomes an external focus issue but and internal and external customer focus. In this regard, service level analysis as well as customer interviews is required to ensure that the needs of the customer (what the customer wants) are qualified.

From a financial institutions perspective, customer centricity entails specific components, all directed to the question of how the needs of the customer are being met (Van der Walt 2003). It firstly concerns the customer experience. It reflects on the emotional and physical experience from the moment the customer interacts with the financial institution, be it electronic Internet banking or the branch infrastructure. It encompasses standing in queues, the layout of the branch or webpage, time it takes to being served, and friendliness. Secondly, it concerns the quality of service rendered. Quality implies the correct product offering at the right price, professionalism and knowledge of staff, and turn around times for credit applications. Thirdly, customer centricity entails communication regarding service offerings, declines of applications, and changes in terms for example. It entails the total customer experience, actually and perceived (brand, image and recognition), the 'feeling' with which a customer 'leaves' the banking portal.

2.5.1.3 Corporate governance

Corporate governance became a more pronounced focus point and strategic imperative for financial institutions (Ernst & Young 2003a). The primary reason is the appointment of certain investigative committees e.g. the King-commission established in 1993 with the first King I Report in 1994, the second King II Report in 2002 (King, 2002), the Listing Standards Report in 2003 (Myburg, 2003:1), the Myburg-commission into the decline of the rand in 2002 (Myburg, 2003:1), the General Report on corporate governance aspects in the five major banking groups in South Africa chaired by Advocate John Myburg SC. in 2003 (Myburg, 2003:1) and the Higgs Report in 2003 (Myburg, 2003:1).

The establishment of the King Commission came about in part as a result of the UK based Cadbury Report (King, 2003:7). Although the Cadbury Report was the result of large corporate scandals like the BCCI and Robert Maxwell cases, and related borrowing from the company's pension fund, the scandals of Enron, WorldCom and Saambou Bank provided impetus for companies to focus on corporate governance as a strategic imperative. It is generally agreed that good management includes good corporate governance.

Corporate governance according to King (2003:7) of governance adopted by companies who wish to send a signal to the market that the information provided to the market are above question, that care is taken to ensure independent decision-making through the appointment of sufficient non-executive directors to the board, that statutory and regulatory requirements are met and that everything is done to ensure that the company acts in a responsible manner. Rossouw *et al.* (2003:3) defines corporate governance as the system by which companies are directed and controlled. The King II Report on corporate governance identifies four pillars

(King, 2002). These are fairness, accountability, responsibility and transparency. The report explicitly addresses risk management in its own right as a core element of corporate governance.

The importance of corporate governance from a risk management perspective stems from the recommendation that the responsibility for risk management (including credit risk) resides in the Board of Directors who needs to oversee the total process and at the end, form their own opinion regarding its effectiveness. The code acknowledges the accountability of management towards the Board for designing, implementing and monitoring the process of risk management. In this regard, the risk management process will be effective only if it is integrated into the day-to-day activities of the company. Furthermore, statutory (Bank Act) and regulatory (Basel II) requirements as well as accounting standard requirements (AC133) advocate greater transparency and openness into the operational issues of companies.

King (2003:7) states that " the practice of good governance today is not a nice to have, it is absolutely essential."

2.5.1.4 Shareholder wealth maximisation

It was stated in previous sections that the purpose of an organisation is to make a profit and ensure sustainable growth. It was further stated that the organisation belong to its shareholders and that they expect a return on their investment inclusive of a premium for the risk involved. It was further mentioned that management are the 'custodians' and 'facilitators' who, in line with specified objectives and goals per management level, must manage the process and ensure that the purpose of the organisation is fulfilled. They need to ensure that the owners of the organisation are satisfied in their expectations of the organisation. This process of achieving the organisational objectives and goals, can from a financial perspective, be summarised as shareholder wealth creation and maximisation.

The ultimate goal of every manager should be to contribute to the value chain with the end goal of increased shareholder wealth in mind. It means that every action, income generating, cost reduction, and operating initiative be evaluated against the objective of whether value is being added for the shareholder. The focus is directed to five explicit measurement concepts, namely asset growth, Return on Investment (ROI), Return on Equity (ROE), Return on Assets (ROA) and the level of operating expenditure as reflected in the cost-to-income ratio (Hodnett, 1998:1).

From a risk management perspective, the creation of shareholder value is manifested predominantly in the concepts Risk Adjusted Return on Capital (RAROC), Return on Risk Adjusted Capital (RORAC) and Value at Risk (VAR) (Absa 2001f). In the first concept, the return is adjusted for risk. The second concept refers to the capital adjusted for risk. From a credit risk management perspective, the same measurements apply. However, from a credit risk perspective, adjustments are made for credit risk only and Credit VAR is calculated. The latter concepts are discussed in much more detail in Chapter 3.

The above discussion on selected strategic imperatives proves that strategic imperatives in general, and those discussed especially, act as pivot points for the organisation to survive in the organisation 'jungle'. Without a selection of strategic imperatives an organisation lacks direction to achieve and execute its purpose (profitability, sustainability and growth). The strategic imperatives as discussed, are internally and externally focused. Creating a sustainable competitive advantage and having a customer centric focus, provides external impetus while corporate governance and shareholder wealth creation and maximisation add the internal dimension to the challenge and opportunity of survival.

As stated earlier, strategic imperatives play an important role in acting as pivot points for survival. In this respect, the remainder of the discussion should be viewed in context of these strategic imperatives acting as contributors and enablers for profitability and sustainable growth. In the quest to provide a mechanism to evaluate credit risk management practices and managing credit portfolios from a management perspective, the discussion is continued with an overview on certain concept definitions, tasks, levels and benefits of strategic management.

2.5.2 Strategy and strategic management defined

Strategy, according to Collins and Devanna (1990:292), is defined as "the pattern of objectives, purposes, or goals and major policies and plans for achieving those goals, stated in such a way as to define what business the company is in, or should be in and the kind of company it is or is to be." It strives to create a fit between opportunities, challenges, strengths, weaknesses, personal values and the broad societal expectations through strategy formulation and strategy implementation.

Weihrich and Koontz (1993:169) distinguish between strategy and policy. They define strategy as "the determination of the purpose (or mission) and the basic long-term objectives of an enterprise, and the adoption of courses of action and allocation of resources necessary to achieve these aims." Policies are regarded as "general statements or understandings that guide managers' thinking in decision-making."

Thompson & Strickland (1989:3) state that an organisation's strategy consists of the pattern of moves and approaches devised by management to produce successful organisational performance. Wheelen and Hunger (1984:3) define strategic management as a "set of managerial decisions and actions that determine the long-run performance of a corporation."

Robson (1994:3) defines strategic management as: "the correct reading of signs and portents of the future and placing the correct interpretation upon them in order to choose an appropriate direction for the future development of the organisation."

Pearce & Robinson (1995:3) provide a summary of all the above in their definition: "Strategic management is defined as the set of decisions and actions that result in the formulation and implementation of plans designed to achieve a company's objectives."

Strategy can therefore be defined as a managerial game plan to be used in the environmental playing field of an institution. It is the plan for making war, for surviving in a jungle where dying and loosing are the norms. It is a plan to ensure success, to win, and above all, to keep on winning. It is not a plan devised by soldiers, it is a plan devised by a general together with his senior officers, each a specialist in his own field of warfare. It requires effort in formulation, but above all, it needs to be executed on the battleground. The war and the battle have to be won. As a metaphor, this paragraph captures the essence of strategy and strategic management.

2.5.2.1 Tasks of strategic management

Thompson and Strickland (1989:5) identify five distinguishable tasks in formulating and implementing a strategy. Firstly, management needs to develop a concept of the business and form a vision of where the organisation should be heading (infusing a sense of purpose and giving it a mission). Secondly, the mission needs to be translated into specific long-range and short-range performance objectives. In the third instance, a strategy that fits the organisation's circumstances and will deliver the required outcome needs to be developed. Fourthly, the strategy must be implemented in an effective and efficient manner. Finally, the performance must be evaluated, revision of the circumstances needs to take place and where required, corrective actions and adjustments should be made.

Pearce & Robinson (1995:3) broaden these tasks and add four additional tasks. The first task is expanded into the development of a company profile, accessing the external and internal environments, analysing and identifying options and alternatives and selecting a set of objectives that will achieve the most desirable options or alternatives.

2.5.2.2 Levels of Strategy

Several authors are in agreement that three levels of strategy can be identified. These are corporate level strategies, business level strategies (doing the right things) and functional level strategies (doing things right). See for example Pearce & Robinson (1995:5). However, Thompson & Strickland (1989:14) identify a fourth level strategy, which is the operational level strategy.

2.5.2.3 Benefits of strategic management

Pearce & Robinson (1995:11) list five benefits of using the strategic management approach. They state that strategic management enhances an organisation's ability to prevent problems, as managers at all levels are aware of the needs of strategic planning. Furthermore, they believe that better decisions are made through group interaction while at the same time, creating better understanding with all employees due to their involvement. Differences in roles are clarified through participation in strategy formulation while resistance to change is reduced as a result of a better understanding of the big picture. According to Hitt *et al.* (1997:197), the strategic management process allows organisations to identify what they intend to achieve and how they will accomplish valued outcomes.

Having discussed and defined the strategic imperatives and certain concepts relating to strategy and strategic management, a mechanism to evaluate credit risk management practices and the management of credit portfolios from a management perspective can be provided. The strategic management process and framework provide such a mechanism, as it is not only follows a basic structure, but addresses the total activity sphere of the strategic manager.

2.5.3 The strategic management process and framework

The previous discussion on strategy and strategic management, specifically the critical tasks in strategic management, provides the framework for strategic management. The intention is not to discuss the framework in detail, but to provide an overview of what each component entails. Important is to realise that depending on the level of strategy, the specific activities will differ as they take on a supportive character to the corporate strategy.

The intention of providing a corporate strategy perspective is that it highlights the strategic management process from a top management view. Lower level strategies are derived from the corporate strategy. The lower the level of strategy, the more operational the strategy becomes.

Focus would be directed later in the study to the business level strategy, which can be attributed to the role of credit risk management as strategic business unit, or group specialised function. In this regard, the strategic management discussion can be utilised to make comparisons. The origination and purpose of certain actions can furthermore be easily explained.

In Figure 2.4 below, the strategic management model, according to Pearce & Robinson (1995:18), is used to facilitate this discussion.

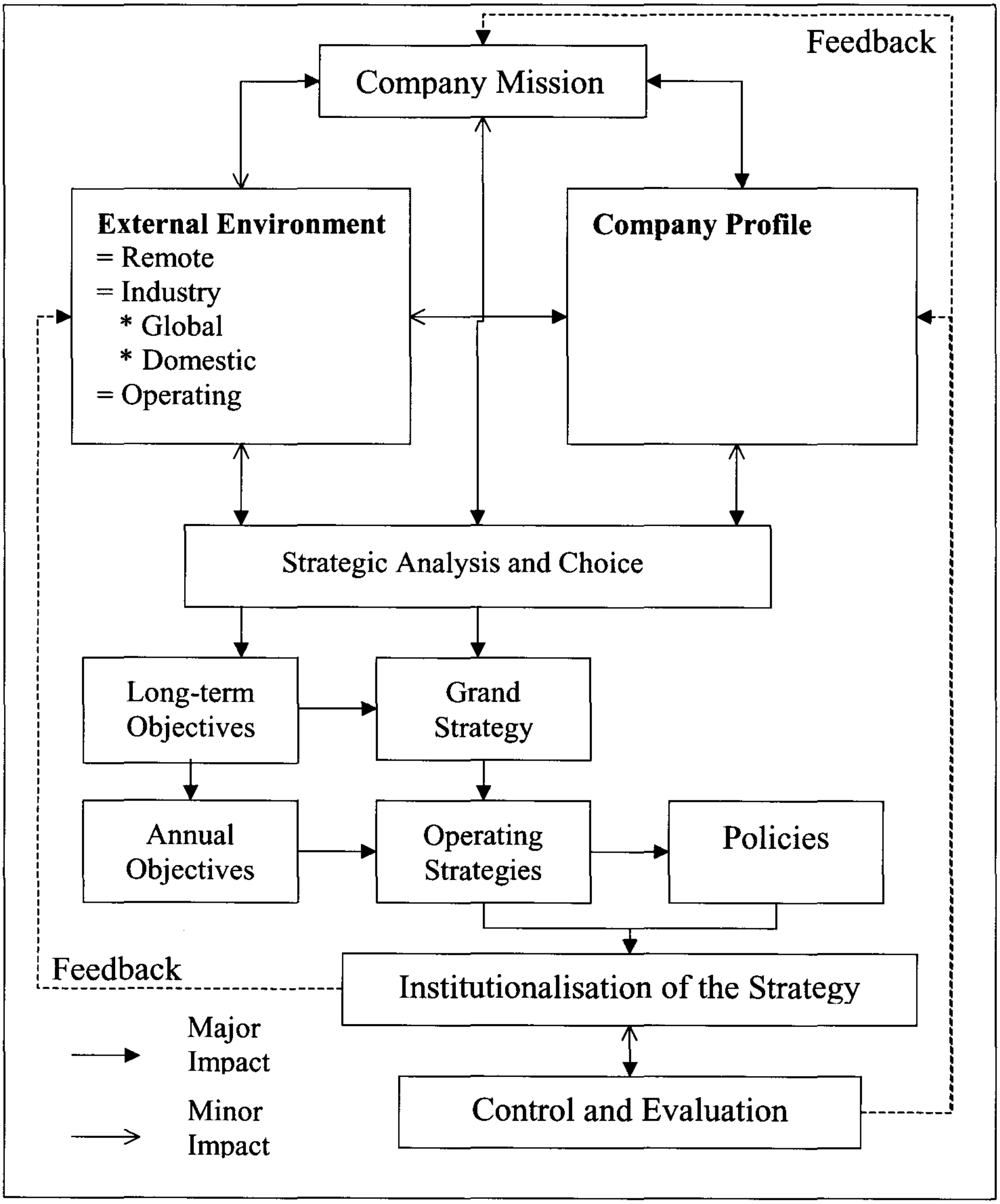
2.5.3.1 Mission

Thompson & Strickland (1989:27) state that a mission statement should be precisely worded as it has real managerial value. They are of the opinion that a clear mission statement crystallises top management's own view about the organisation's long-term direction and makeup. It provides guidance to lower-level managers in terms of what kind of direction-related action are required. A mission statement communicates an organisational identity and gives employees a sense of purpose in their work.

Pearce and Robinson (1995:31) argues that a company's mission is the unique purpose that sets it apart from other companies and identifies the scope of its operations. The mission presents an attitude, an outlook and an orientation. The objective of a mission ensures unanimity of purpose within the organisation. It provides a basis for motivating and allocating the use of organisational resources. It provides and establishes a general tone or climate.

Wheelen and Hunger (1984:9) differentiates between a narrow and a broad vision. They state that the mission determines the parameters of the specific objectives top management chooses to achieve.

Figure 2.4 Strategic Management Model/ Process



Source: Pearce & Robinson (1995:18)

2.5.3.2 Company Profile

Weihrich and Koontz (1993:170) state that the company profile is the point of departure to determining where the company is and where it should go. The company profile depicts the quality and quantity of the company's financial, human and physical resources. Pearce and Robinson (1995:174) are of the opinion that compiling a company profile involves a process where the strengths and weaknesses of the company's management and organisational structure are accessed. A popular technique applied to determine a company's profile is a SWOT analysis where internal strengths and weaknesses, and environmental opportunities and threats are systematically identified. The role of financial analysis in this regard should however not be discarded.

Effective strategies capitalise on an institution's strengths and environmental opportunities and minimise weaknesses and threats. In determining the company's profile, managers are required to first identify strategic internal factors – those internal capabilities that are most critical for success in a particular competitive area (Pearce and Robinson, 1995:180). Secondly, managers should evaluate the organisation's status on these identified factors. Managers should lastly determine whether the strategic internal factors are competitive advantages, basic business requirements or key vulnerabilities.

2.5.3.3 External environment

According to Thompson & Strickland (1989:69), "the biggest situational considerations underlying the choice of strategy are industry and competitive conditions and a company's own internal situation and competitive position." An organisation's external environment consists of all the conditions and forces that affect its strategic options and define its competitive strategy. Three interactive segments are present: operating, industry and remote environments.

Pearce & Robinson (1995:62) are of the opinion that the remote environment comprises factors that originate beyond an organisation's operating situation.

These factors are: Economic (concerning the nature and direction of the economy in which the organisation operates), social (factors like beliefs, values, attitudes, and opinions), political (factors defining the legal and regulatory parameters within which organisations need to operate), technological (technological changes that might influence the industry) and ecological factors (the relationship among humans and other living things and the air, soil, and water that support them).

The industry is analysed in terms of threat of entry, suppliers, buyers, substitute products and rivalry. Thompson & Strickland (1989:76) identify similar factors, called driving forces, which explain these factors in greater detail. These driving forces affect industry attractiveness. These are changes in the long-term industry growth rate, changes in who buys the product and how they use it, product innovation, process innovation, marketing innovation, entry or exit of major institutions, diffusion of proprietary knowledge, changes in cost and efficiency, emerging buyer preferences, regulatory influences, changing societal priorities and lifestyles and reductions in uncertainty and business risk. Other issues that require attention are concentration, economies of scale, product differentiation and barriers to entry.

From an operating environment also called the competitive or task environment in Pearce & Robinson (1995:89), the following factors, which affect an organisation's success in acquiring needed resources or in profitably marketing its goods and services, require attention: the organisation's competitive position, the composition of the organisation's customers or customer profiles, the organisation's reputation amongst it's suppliers and creditors and the nature of the labour market (ability to attract capable employees).

2.5.3.4 Strategic Analysis and Choice

Simultaneous assessment of the external environment and the company profile enables the organisation to identify a range of possible attractive interactive opportunities. This process allows for a screening process to take place to evaluate all possible options. However, a decision on the most desirable option still needs to be made. The process provides a combination of long-term objectives and a grand strategy that will optimally position the organisation in its external environment to achieve the organisation's mission. The complexity of the business involvements of the overall institution impacts the analysis and choice of a corporate strategy.

2.5.3.5 Long-term Objectives

An organisation specifies a mission only to provide the broad aims of the organisation. The goals of the organisation are stated without specific targets or time frames and are always to be pursued but can never be fully attained since they provide a sense of direction. These goals are not intended to provide specific benchmarks for evaluating an organisation's progress in achieving its aims. Pearce & Robinson (1995:217) believe that the provision of benchmarks is the function of objectives.

The long-term objectives of an organisation are the results that the organisation seeks over a multi-year period. It involves areas such as profitability, employee development, technological leadership, employee relations, return on investment, competitive position, and productivity. Long-term objectives should be acceptable, flexible, measurable over time, suitable, understandable and achievable.

2.5.3.6 Grand Strategy

The comprehensive general plan of major actions through which an institution intends to achieve its long-term objectives in a dynamic environment is called the grand strategy. It is a statement of means indicating how the objectives are to be achieved. Pearce & Robinson (1995:15) identify fourteen approaches: Concentration, market development, product development, innovation, horizontal integration, vertical integration, joint ventures, strategic alliances, consortia, concentric diversification, conglomerate diversification, turnaround, divesture, and liquidation.

Certain techniques can be employed in the process to select the most appropriate business strategy. The Directional Policy Matrix, Porter's competitive strategy matrix, the Boston Consulting Group matrix, and Porter's value chain model can assist to choose amongst alternatives (Absa 2001a).

2.5.3.7 Annual Objectives

The results that an organisation seeks to achieve within one year-period are referred to as annual objectives or short-term objectives. These objectives have greater specificity compared to long-term objectives. Pearce & Robinson (1995:305) identify three ways in which annual objectives differ from long-term objectives. These are time frame (shorter – one year or less), specificity (specific and linked to a unit, function or project), and measurement (stated in absolute terms – not broad). Benefits of annual objectives are to provide clarity of purpose. They provide a valid basis for addressing and accommodating conflicting concerns, they provide a basis for strategic control, and they have motivational payoffs.

2.5.3.8 Functional Objectives

Within the general framework of the grand strategy, each business function or strategic business unit needs a specific and integrated plan of action. This can also be seen as an operating strategy for each set of annual objectives. Functional objectives are the short-term activities that each functional area within an institution must undertake in order to implement the grand strategy.

2.5.3.9 Policies

Policies, broad precedent-setting decisions, guide or substitute repetitive managerial decision-making. It increases managerial effectiveness by standardising routine decisions and limits the discretion of manager and subordinates in implementing operational strategies.

2.5.3.10 Institutionalising the Strategy

Annual objectives, functional strategies and specific policies provide important topics of communicating what needs to be done to implement the organisations overall strategy. The overall strategy needs to be institutionalised, embedded in the day-to-day operations of the organisation, and in its management philosophy. In this regard, Pearce & Robinson (1995:16) identify four elements that provide the fundamental long-term means of institutionalisation: Structure, leadership, culture and rewards.

2.5.3.11 Control and Evaluation

An implemented strategy must be monitored and performance evaluated to determine the extent to which its objectives are achieved. According to Pearce & Robinson (1995:16), managers are required to provide methods to monitor and control the implementation of the strategic plan. A critical element of control and evaluation is feedback. Management need to evaluate the strategy to ensure that environmental changes are accommodated and corrective actions are implemented timeously. The manner in which performance is controlled will vary depending on the management approach followed and the performance area to be measured.

Traditionally, performance measurements tend to focus on two aspects: The control of the organisation and the reporting of results to shareholders (Van der Walt, 2003). Top management decided on the strategy, set targets, and measured the organisation against the relevant targets. Recently however, the role of measurement started to change. This aspect is highlighted by Glass (1996:27) who states that the role of measurement is changing from control to support, where a continuous feed of information becomes critical to allow for changes in the marketplace (operational, competitors, economic, and market change) to be incorporated in the organisations strategy.

The most common performance measure of corporate performance (in terms of profits) is ROI (Wheelen & Hunger, 1984:207). Due to certain limitations in measuring ROI, academics and practitioners advocate the use of a broader range of performance measures. In this regard, Hofer as in Hofer and Schendel (1978:20) recommends that value added measures should be incorporated in performance measurement (see also Wheelen & Hunger, 1984:207). Three measures are identified, namely: Growth, efficiency and asset utilisation.

- Growth is defined as: Value added equal to sales less cost of raw materials and purchased parts;
- Efficiency is defined as: Return on value added (ROVA) equal to net profits before tax divided by value as a percentage; and
- Asset utilisation is defined as: ROVA divided by ROI.

In order to measure performance however, key performance areas need to be identified. General Electric (Wheelen & Hunger, 1984:211) identified eight key performance areas: Profitability, market position, productivity, product leadership, personnel development, employee attitudes, public responsibility and balance between short-term and long-term goals.

It is important to realise that specific business areas are responsible to contribute to the overall corporate performance. In this regard, business areas' performance measures can differ from the corporate performance measurements. The key for business heads is to ensure that the performance measures being used support and contribute to the performance at corporate level.

Techniques (e.g. Pearce & Robinson, 1995; Glass, 1996; Wheelen & Hunger, 1984; Hodnett, 1998; Weihrich and Koontz, 1993 and Abell & Hammond, 1979) that can assist managers to establish performance measurements, control and benchmarks are budgets, scheduling, statistical data, time-event network analysis like Gantt, PERT, milestone budgeting, adopting frameworks such as management by objectives (MBO), management of results (MOR), Delphi techniques, quantitative statistics, executive or strategic dashboards (selected indicators to summarise the key aspects of business), and a more popular technique recently, the balanced scorecard approach.

2.5.4 Balanced Scorecard

The balanced scorecard was developed by Kaplan and Norton in 1992 and provides a mechanism to balance classical financial and strategically important measures.

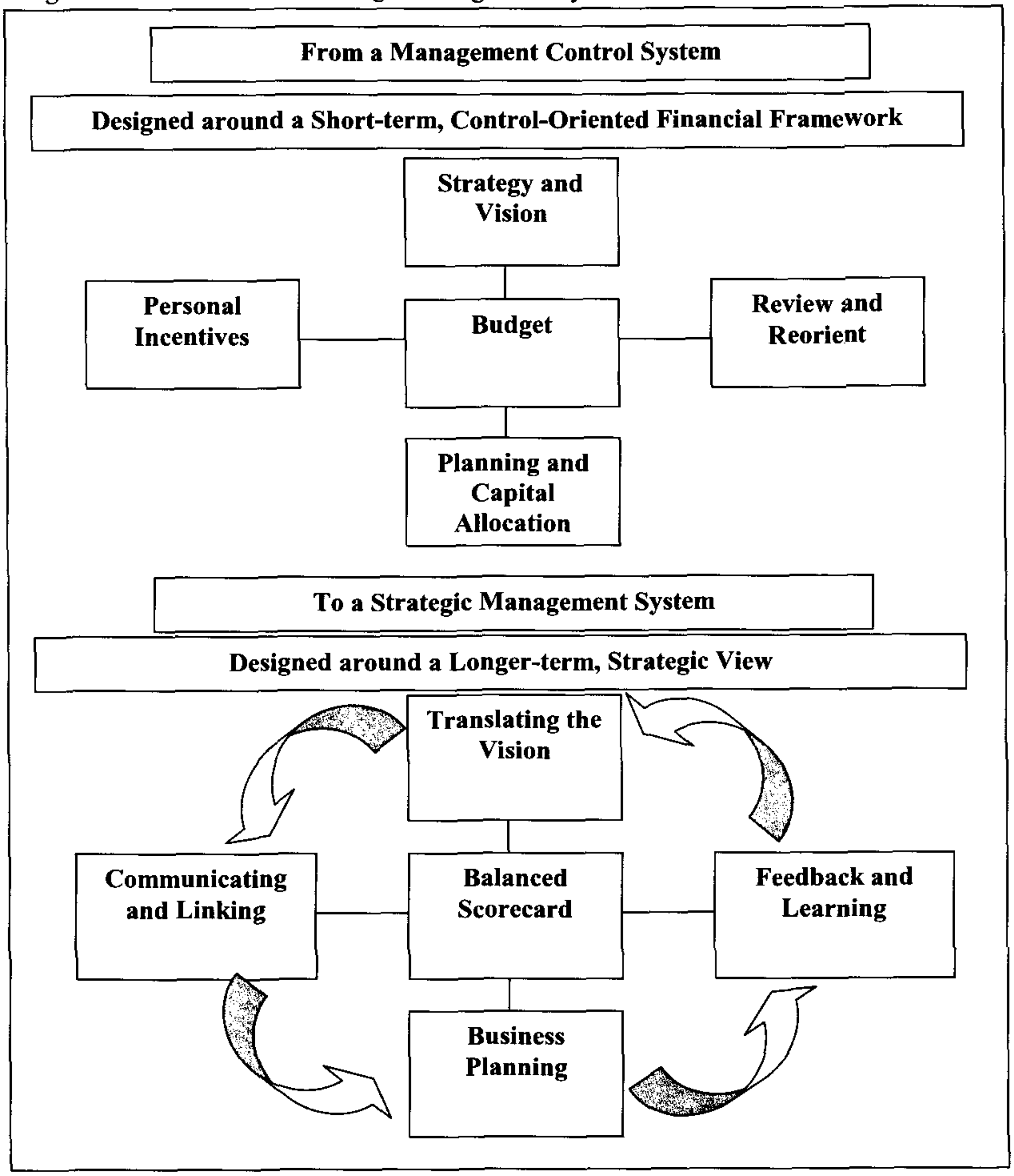
Balanced scorecards according to Kaplan & Norton (2001:8) enables companies to focus and align their executive teams, business units, human resources, information technology, and financial resources to their organisation's strategy. It is in many ways similar to executive or strategic dashboards. The main difference being that it specifies the four areas in which a company should measure itself. These four areas, divided into two internal and two external views, are: Customer perspective, financial perspective, internal perspective, and people innovation and learning. The balanced scorecard attempts to move performance measurement away from top-down, mainly financial control and to link it to achieving organisational strategy. It focuses on the processes and not only the people.

Kaplan and Norton (2001:9) identify five common principles for achieving strategic focus and alignment. These are:

- Translate the strategy to operational terms;
- Align the organisation to the strategy;
- Make strategy everyone's everyday job;
- Make strategy a continual process; and
- Mobilise change through executive leadership.

They advocate a movement (in line with Glass, 1996:27) away from management control towards a strategic management system. This transition is illustrated in Figure 2.5. Focus from a credit risk management perspective will be directed to the financial perspective predominantly due to the quantification aspects involved.

Figure 2.5 Transitions to a Strategic Management System



Source: Kaplan & Norton (2001:24)

2.5.5 Seven-S Model

A discussion on the strategic management process or framework will not be complete without mentioning the Seven-S model. The Seven-S model was created by Peters, Waterman and Phillips (Silbiger, 1993:308). The Seven-S model provides a structure with which to consider an organisation as a whole, so that the organisation's problems may be diagnosed and a strategy may be developed and implemented. The seven S's are: Structure, systems, skills, style, staff, shared values and strategy. The model shows a multiplicity or interconnectedness of elements that influence an organisation's ability to change (Peters & Waterman, 1982:265).

2.5.6 Feedback – a requirement for success

The main aim of any strategy is for an organisation to be successful. Success can be defined as achieving or reaching the goals that has been set (Weihrich and Koontz, 1993:8). From the definition provided, two aspects are highlighted: When is an organisational successful and how do we know that the strategy is successful? In the perspective of the organisation, success is the ability to ensure a profit through sustainable growth (Absa 2000a). All aspects e.g. performance areas, resource allocation, and people, culminates in one line item: The bottom line. Some may argue that it is the share price. The bottom line still determines the share price.

What then makes an organisation successful? Peters & Waterman (1982:201) identified eight characteristics of excellent enterprises. They state that these organisations specifically:

- Were oriented towards action;
- Learned about the needs of their customers;
- Promoted managerial autonomy and entrepreneurship;
- Achieved productivity by paying close attention to the needs of their people;
- Were driven by a company philosophy often based on the values of their leaders;
- Focused on business they new best;
- Had a simple organisation structure with a lean staff; and
- Were centralised as well as decentralised, depending on appropriateness.

An answer to the second question posed on how we know when a strategy is successful commences by realizing the importance of feedback throughout the process. Such a feedback loop creates the opportunity to continuously correct any deviations from the set objective (Pearce & Robinson, 1995:19). As part of a feedback loop, the strategy and its performance in terms of expectations and actual achievements should be measured. The balanced scorecard approach provides a mechanism whereby strategy, operations, finance, technology and people are brought together. It allows for and assists in strategy to be institutionalised, to be measured and ensures appropriate feedback and opportunity for corrective actions to be taken.

The importance of strategy and strategic management as an extension of top-management's role, responsibilities and activities, stems from the fact that it provides the direction for the organisation. The process and framework acts as a step-by-step guide in establishing and evaluating what is needed and how it is going to be achieved – what and how the strategy needs to be formulated and implemented.

2.5.7 Summary

The discussion to this point in this chapter is aimed at providing the reader with a framework or approach for managing credit portfolios from a management perspective. The first section focussed on the role of management with specific reference to management's primary activities, the evolution of management approaches as well as the decision component as key element to management. A deeper insight has been created regarding the role that management is required to play in any organisation (including a financial institution). A clear distinction has been made between the different levels of management and the associated decisions required as it provides insight into the placement of the credit decision – where credit risk should be positioned in terms of attention and importance.

The second section discusses the purpose of the institution as it relates to subsequent strategic imperatives. The credit decision is viewed to be made by top management, therefore it investigates the concepts of strategy and strategic management together with an overview on certain strategic imperatives due to its accepted importance in achieving its ultimate goal of profitability and sustainable growth. The overview shows that the strategic imperatives, act as pivot points for the organisation to survive in the organisation 'jungle', without which an organisation lacks direction to achieve and execute its purpose (profitability, sustainability and growth). The strategic imperatives play an important role in acting as pivot points for survival.

The discussion on and definition of the strategic imperatives and certain concepts relating to strategy and strategic management, provided the frame of mind against which a mechanism to evaluate credit risk management practices and the management of credit portfolios from a management perspective can be presented. The section is concluded with an overview of strategic management process as proposed mechanism, as it is not only simple in its structure, but address the total activity sphere of the strategic manager.

Finally, it needs to be acknowledged that the credit decisions are indeed strategic in nature. By illustrating the strategic nature of the credit decision, the application of the mechanism by way of the strategic management process to evaluate credit risk management practices and the management of credit portfolios from a management perspective, becomes evident. However, also of importance is the role of the credit portfolio risk manager in executing the strategy as determined by top management. Providing an overview of the relationship between credit risk, strategy and the role of the credit portfolio risk manager will be addressed in paragraph 2.6.

2.6 Credit risk, strategy and the role of the portfolio risk manager

The next and final section of this chapter aims to illustrate the relationship between the strategic decision, the credit risk decision and the portfolio risk management philosophy. This is done in the context of portfolio risk management's role in conceptualising, quantifying and influencing the resulting credit decisions, strategy, and benchmark performance monitoring. The section provides an overview of credit risk's importance in banking as the major component of financial risk together with a discussion on the resulting strategic nature of the credit decision.

The Asset and Liability Management Committee's (ALCO) role as intermediary between the Board of Directors and the operating units to execute strategy is shown. The section is concluded with the role of portfolio risk management as strategic "executioner" and "advisor" and its positioning and location to conceptualise, quantify and influence the credit decision, the corporate strategy, and monitoring of performance.

2.6.1 The importance of credit risk

Before continuing with the discussion of the strategic nature of the credit decision, the concept of credit risk needs to be placed in perspective. For this purpose, a brief overview of the evolution of credit risk and the different risks in a banking institution are presented.

2.6.2 Evolution of credit risk

Credit risk is regarded as the oldest form of risk in financial markets. Caouette *et al.* (1998:1) state that credit risk is as old as lending itself, dating back as far as 800 B.C. Banks as we know it, have, since its origination in Florence seven hundred years ago, been society's primary lending institutions. Their core expertise was the management of credit risk. Contracted and/or contingent financial transactions between the providers and users of funds lead to credit risk. In early years family and sovereign wealth were the main bearers of credit risk. Later, the formation of stock corporations allowed resources to be pooled and money to be borrowed while the created entities carried the economic risks. These entities also existed beyond the natural lives of those who created them.

Caouette *et al.* (1998:1) elaborates that financial intermediaries allowed for savings from different entities and individuals to be pooled and be provided to the users of funds (borrowers). The debt market was founded and corporations used it to raise funds from investors, using corporate assets or government guarantees to secure the borrowings. As markets grew and evolved, other institutions and secondary markets started to provide funds taking market share away from banks.

As financial innovation progressed with the development of innovative markets, structures and products, credit risk changed in many ways. Risk has been decomposed and repackaged into parts that appeal to different types of investors. As Caouette *et al.* (1998:6) state: "...credit risk has turned from a defensive concern to an offensive opportunity." Furthermore, the development of additional markets also resulted in unprecedented growth in the number of entities participating in credit relating activities.

Due to multi-party involvement, where credit risk is exchanged for market risk and counterparty financial institution risk, credit risk assessment is required from more than one perspective. Developments in the field of financial engineering, creating instruments where the potential construct, application and creativity thereof are *ad infinitum*, also contributed to the change in credit risk. The popularity of the derivative market, where derivatives are transacted in almost any commodity, provides proof of this potential.

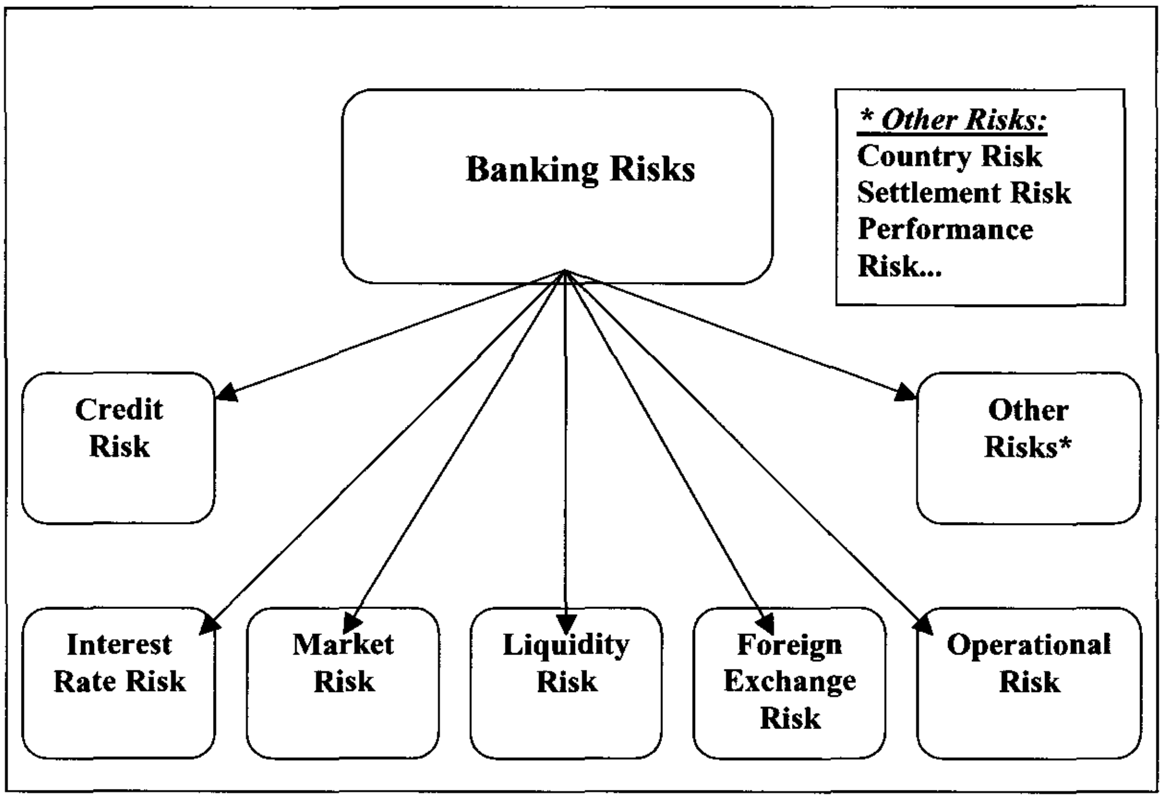
These developments resulted in a movement away from the traditional approach to managing credit risk. Where focus was traditionally directed towards a transaction-by-transaction "originate-and-hold" approach, and on relationship banking where the profitability of the transaction was overshadowed by the relationship, the recent focus has shifted towards the portfolio approach. The portfolio approach as applied in banking to manage credit asset portfolios is discussed in Chapter 3. Traditionally, when a loan was made, the associated credit risk remained on the lender's balance sheet until the debt was repaid or written off. The evolution of credit risk management will be discussed in greater detail in paragraph 3.3 of Chapter 3.

As banks are facing higher risks as a result of over-concentration, and earning lower returns as a result of increased competition, banks are forced to adopt a portfolio approach to manage its credit risk. The development of quantification models and techniques together with the aftermath of the Asian crisis contributed towards this movement to portfolio management. The focus became directed towards risk underwriting and risk distribution.

2.6.3 Banking risks

Bessis (2002:11) defines banking risks as adverse impacts on profitability of several distinct sources of uncertainty. These sources of uncertainty (the risks being present in a banking institution) are depicted in Figure 2.6 below. Because financial institutions (banking institutions) are in the business of lending, a loss resulting from default on the part of the borrower can have enormous negative consequences.

Figure 2.6 Main Risks in Banking



Source: Bessis (2002:12)

It was stated that the traditional approach resulted in over-concentration in a previous paragraph. Depending on the level of concentration default might lead to a bank closing its doors. The importance of credit risk is significant. Bessis (1999:5) shares an opinion by stating that credit risk is paramount in terms of the importance of potential losses. Bessis (2002:13) elaborates further and states that credit risk is the most important of all risks.

2.6.4 The strategic nature of the credit decision

Rapid changes in lending practices have forced banks to re-examine some basic assumptions of their credit processes. On the one hand, developments in financial engineering gave effect to increased liquidity which attracted investors prepared to take on credit risk directly at a fraction of the credit costs normally present in traditional banks (Caouette *et al.,* 1998:6). On the other hand, the development of technology such as models, techniques and credit scoring methods to quantify credit risk and to automate previous expensive manual review of loan applications, forced banks to adopt powerful new approaches to credit process design (Hickman & Wollman, 2002:2).

The imminent new Basel Capital Accord contributed to the review in credit processes as the accord sets forth a system for calculating minimum capital requirements for credit risk, based at least in part on methods embedded in leading credit portfolio risk models (Hickman & Wollman, 2002:2). Furthermore, recent bankruptcy events highlighted the destructive potential of credit events. Survival of such an event is not merely a credit related issue, but also becomes an image and strategic risk issue where the reputation of the organisation is at stake.

The increased competition amongst banking institutions where lower rated exposures are being taken on the balance sheet, where prices are being undercut and where little differentiation exists from a technological perspective, has lead to increased importance of capital. All banks are facing the same issues as they have entrance to the same models, techniques, and methodologies. Differentiation becomes a matter of capital allocation. The portfolio construct can provide differentiation through possible diversification opportunities, credit processes supporting the portfolio approach and the skills of the portfolio manager and capital savings.

In view of the above changes in the credit risk environment and the importance of credit risk in banking institutions, the strategic nature of the credit decision becomes paramount. In the corporate strategy process and framework (discussed earlier), the corporate goals and objectives in the form of portfolio targets and limits are determined by top-management based on the risk appetite of the banking institution, together with the other factors and elements of the corporate strategy (shareholder expectations, growth, sustainability, and profit). These parameters are passed on to the credit portfolio manager who is required to ensure that an optimum credit portfolio is created, maintained and managed.

The difference between an optimum and optimal portfolio stems from the asset composition and construct of the portfolio. Optimal (Absa, 2001f) refers to the best portfolio construct, which can be achieved in the most favourable conditions. Optimum refers to portfolio optimisation within the boundaries of parameters and constraints. To create an optimal portfolio, for example, might mean that a portfolio needs to be balanced between four assets as follows: 20% overdrafts, 40% mortgage loans, 30% personal loans and 10% instalment sales and leases. However, the current asset composition of the portfolio between these four products are: 15% overdrafts, 70% mortgage loans, 10% personal loans and 5% instalment sales and leases. Changing the portfolio construct overnight to be in line with the optimal portfolio composition is not only impractical but is also unrealistic. Given this constraint, the portfolio manager is responsible to establish an optimum portfolio – make do with the current composition within the objectives and parameters provided.

2.6.5 Strategy and portfolio risk management

The credit portfolio management function provides the direct linkage between credit risk management, enterprise risk management and shareholder value maximisation. The overall credit risk portfolio of an organisation should not only consist of the culmination of individual transactions. The credit portfolio manager constantly seeks opportunities to optimise the credit portfolio within a set of constraints as discussed previously. During this process, diversification opportunities are explored, possible active portfolio management strategies (risk transfer) are investigated and the portfolio manager endeavours to actively influence the decision-making process to benefit the credit portfolio. This is possible because credit portfolio management in banking is becoming more sophisticated; with a broadening array of credit and other risk transfer products and techniques, credit risk quantification models and techniques and credit scoring and assessment tools at the disposal of the credit portfolio manager. Portfolio management, as stated in Chapter 1, is ultimately a matter of balancing risk and reward.

Rich and Tange (2003:1) state that an appropriate credit risk quantification framework implies a portfolio perspective. This provides a long-term horizon, which is required in the rapidly changing credit environment. The portfolio perspective accounts for the realisation of an average low level of losses and is generally punctuated with an occasional large loss and an even more infrequent period of several correlated losses. The long time horizon is necessary to capture the credit risk associated with that period of correlated credit losses.

Bessis (1999:23) identifies several roles of risk management. Although intended as roles for risk management in the broader sense, these roles can easily be amended for credit risk management by appropriately inserting the word "credit". These identified roles (amendment in italics) are:

- The implementation of strategy;
- The development of competitive advantages;
- The measure of *credit* capital adequacy and of solvency;
- The aid to *credit* decision making;
- The aid to pricing decisions and *credit* pricing specifically;
- The reporting and the control of *credit* risk; and
- The management of *credit* portfolios of transactions.

The portfolio risk management function thus acts as strategic "executioner" (implementer) and strategic "advisor" to the Executive of the credit risk environment or larger risk environment. The portfolio manager uses the strategic credit goals and objectives to conceptualise, quantify and influence the credit decision, the credit strategy, and the monitoring of performance in the credit risk environment. The portfolio risk manager also provides as part of the performance monitoring function feedback to the corporate strategy to allow its performance monitoring with other inputs.

2.7 The role of Asset and Liability Management Committee (ALCO)

Bothma (2000:1) argues that the Asset and Liability Management Committee (ALCO) is one of the most important functions in any bank and should be a practical operation that delivers real value, not only an instrument that points out the "red lights" in the bank's operations. As the Board of Directors forms the supreme risk committee of a bank, they are required to manage all the risks associated with and impacting on the bank (Rossouw *et al.,* 2003:2 and Styger, 1998:2). The supervisory body provides the

Board with the necessary information to make decisions is the Asset and Liability Committee.

Styger (1998:2) provides a framework for an effective ALCO based on the following five principles:

- All banks are expected to have an ALCO. Regulators prefer a Board of Directors level committee devoted to interest rate risk, but the role of the committee is generally to articulate policies and oversee ALCO's activities.
- The Board's interest rate policy should define ALCO's responsibilities, establish risk limits and articulate ALCO's reporting responsibilities.
- Management should develop an Asset and Liability strategy that maximises the bank's performance within the parameters of the ALCO policy, address capital adequacy, allow internal models that accurately measure interest rate risk and take earnings, market value, objective and subjective inputs into account.
- Banks will have to evaluate the appropriateness of their assumptions and their subjective inputs, the performance of their models and the effectiveness of the model as a decision-making tool.

Maré (1995:1) identifies ten steps to be followed in the ALCO process:

- Review the previous month's results;
- Assessing the current balance sheet position;
- Projecting exogenous factors;
- Developing asset and liability strategies;
- Simulating asset and liability strategies;
- Determining the most appropriate strategy;
- Setting measurable targets;
- Communicating appropriate targets to managers;
- Monitor actions regularly and evaluate success; and
- Determining if the current strategy is appropriate.

The ALCO fulfil a role as intermediary between the Board of Directors and the operating units to execute strategy. Specific parameters are therefore provided to the credit portfolio manager within which he/she needs to operate in creating and maintaining an optimum credit asset portfolio. This aspect is further discussed in the next chapter.

Because the ALCO process has proven itself as a robust and comprehensive methodology (Styger, 2003), its application in establishing a forum where all factors impacting on the business overall (ALCO, risks including credit risk, external environment and internal environment) are identified, analysed, discussed and incorporated into the business strategy, should be considered in the formulation of a process approach to credit asset portfolios.

2.8 The placement of the portfolio risk management function

The placement of the credit portfolio risk management unit in the framework of strategic importance and credit risk management enhancement remains a very complex issue. What is clear is that the portfolio risk management unit should not form part of a third or fourth tier hierarchical structure. Because of its importance in achieving and executing strategy, and its key role from an advisory perspective, the function should be placed as close to executive management as possible. The debate regarding placement is more directed towards whether the function should be positioned at an enterprise-wide level or at a credit risk management level.

Toevs *et al.* (2003:19) take an enterprise-wide view of risk management and proves that the Chief Credit Officer report to a Chief Risk Officer. This structure in itself might not be the optimal structure to address credit risk and the management thereof as the importance of credit risk (most significant risk) and the role it has to play in servicing other strategic business units, are negated or minimised, especially within a financial institution. A banking institution's operating model should dictate which structure is to be followed.

Another factor, which will influence the decision of functional placement and positioning, is the respective roles and responsibilities of enterprise-wide risk management and credit risk management. Linked to this is the natural fit between the credit portfolio risk management function and the end-to-end credit process. This aspect is further discussed in Chapters 3 and 7. Another factor that will influence placement and positioning, is the approach followed by the credit risk management function in terms of centralisation or decentralisation and whether credit is managed from a centralised credit platform. Another important matter will be the expectations of the strategic business units in terms of credit risk deliverables and to what extent credit as a discipline can enable and assist these strategic business units to execute their value propositions. The placement and positioning of the credit portfolio risk management function need to support the strategic objectives, and specifically the credit strategic objectives of the banking institution. An implied positioning and placement framework will be discussed in Chapter 7.

2.9 Conclusion

Chapter two aimed at providing the reader with a framework or approach for managing credit portfolios from a management perspective. The first section focussed on the role of management with specific reference to management's primary activities, the evolution of management approaches as well as the decision component as a key element to management. A deeper insight has been created regarding the role management is required to play in any organisation. A clear distinction has been made between the different levels of management and the associated decisions required as it provides insight into the placement of the credit decision – where credit risk should be positioned in terms of attention and importance.

The second section discussed the purpose of the institution as it relates to subsequent strategic imperatives. The credit decision is viewed to be made by top management, therefore the section investigates the concepts of strategy and strategic management. This incorporates an overview on certain strategic imperatives due to its accepted importance in achieving its ultimate goal of profitability and sustainable growth. The overview indicates that the strategic imperatives specifically, act as pivot points for the organisation to survive in the organisation 'jungle'. Without this an organisation lacks direction to achieve and execute its purpose (profitability, sustainability and growth). The strategic imperatives play an important role in acting as pivot points for survival.

The discussion on and definition of the strategic imperatives and certain concepts relating to strategy and strategic management, provided the framework against which a mechanism to evaluate credit risk management practices and the management of credit portfolios from a management perspective can be presented. The section is concluded with an overview of the strategic management process as proposed mechanism, as it is not only simple in its structure, but address the total sphere of activity of the strategic manager.

Finally, it was confirmed that the credit decision is strategic in nature. The application of the strategic management process to evaluate credit risk management practices and the management of credit portfolios from a management perspective was discussed together with the role of the credit portfolio risk manager in executing the strategy as determined by top management. Furthermore, an overview of the relationship between credit risk, strategy and the role of the credit portfolio risk manager was provided. The relationship between the strategic decision, the credit risk decision and the portfolio risk management philosophy, in the context of portfolio risk management's role in conceptualising, quantifying and influencing the resulting credit decisions, strategy, and benchmark performance monitoring were discussed. The final section provided an overview of credit risk's importance in banking as the major component of financial risk.

An overview of the role of an Asset and Liability Management Committee was discussed. The section was concluded with the role of portfolio risk management as strategic "executioner" (implementer) and "advisor" and its positioning and placement to conceptualise, quantify and influence the credit decision, the corporate strategy, and the monitoring of performance.

The next chapter elaborates further on the credit decision, and the role of credit portfolio risk management. It however focuses on the portfolio approach and portfolio management theory to be adopted in support of strategy in achieving optimum performance. The importance of the discussion lies in the framework it provides for managing credit portfolios from a credit risk perspective; the data requirements and the underlying theory for managing portfolios of loans and advances. The discussion is directed towards the portfolio approach and compared to the management component as discussed in Chapter 2.

CHAPTER 3

PORTFOLIO APPROACH TO MANAGING CREDIT RISK

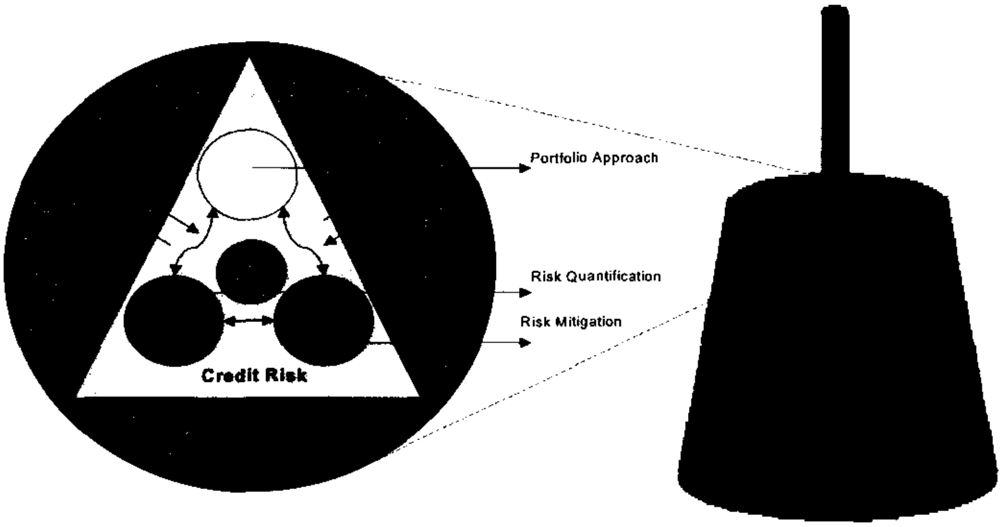
3.1 Introduction

In the previous chapter, a framework for managing credit portfolios from a management perspective was provided. The discussion was aimed to highlight that the credit decision, and therefore the portfolio risk management function, is strategic in nature as it supports both business and corporate strategy. The discussion started with the role of management in context of serving the organisation's purpose of profit and sustainable growth, followed by defining strategy and strategic management. This definition included the concept definition as well as a discussion of the strategic management process. Finally, an overview was provided illustrating the relationship between the strategic decision, the credit risk decision and the portfolio risk management philosophy in context of portfolio risk management's role in conceptualising, quantifying and influencing the resulting credit decisions, strategy, and benchmark performance monitoring.

Chapter 3 builds on these concepts and elaborates further on the credit decision, and the role of credit portfolio risk management, but focuses on the portfolio approach and portfolio management theory to be adopted in support of strategy in achieving optimum performance. The importance of the discussion lies in the framework it provides for managing credit portfolios from a credit risk perspective: the data requirements and the underlying theory for managing portfolios of loans and advances. Where Chapter 2 looked at the management component and importance of the portfolio approach, the focus in Chapter 3 is directed towards the portfolio approach. The portfolio approach in managing credit risk is regarded as best-of-breed practice, adopted by major banking institutions globally (Absa, 2000a and Basel, 2003a). Understanding the approach therefore becomes imperative, as it is the methodology ("tool") and philosophy by which the credit asset portfolio could be managed.

Referring to the thesis framework provided in Chapter 1, Figure 3.1 below provides the reader with a graphic illustration regarding the component being discussed:

Figure 3.1. Literature study: Chapter 3 – Portfolio Approach



Source: Author (2003)

The discussion presented in Chapter 3 starts with definitions regarding risk, credit risk and other selected and relevant concepts. Again, the importance of understanding these concepts lies in the framework the discussion creates as an understanding will enhance the later discussion on portfolio theory, and the role of portfolio risk management as it is build from these concepts. A broad overview regarding the traditional approach to credit risk management provides the introduction to the modern portfolio theory and credit portfolio management process. The overview is followed by a discussion of Funds Transfer Pricing (FTP) as methodology to determine asset margins to measure credit spread adequacy together with mention of the new Basel II Capital Accord. The chapter is concluded with a discussion of performance measurement and the link to corporate strategy and purpose of the organisation as stated in Chapter 2. The importance of the discussion lies in the framework it provides for managing credit portfolios from a credit risk perspective, the data requirements and the underlying theory for managing portfolios of loans and advances. The discussion is directed towards the portfolio approach compared to the management component as discussed in Chapter 2.

3.2 Concept definitions

3.2.1 Risk defined

The term risk in today's society has many different meanings. It is discussed in various spheres of peoples' lives as it has an impact on a range of daily decisions. The term risk however does not always have the same meaning. In general terms, risk means something that might not happen or that the outcome may be influenced by something beyond control (Absa 2000a). Whether driving a car or going by bus, or referring to agricultural harvests or even planning what should be worn to a dinner function involves a certain type of risk. In everything people do a choice needs to be made between alternatives, which contains a certain risk element. As the saying goes: "Life is about choices!" and each choice has a consequence.

In the financial field the term risk has a definite and distinct meaning. More specifically a distinction is made between uncertainty and risk. Whereas generally risk actually refers to uncertainty, the term, risk in the financial field relates to the probability of success or failure. When addressing risk a clear distinction is made between different types of risk such as financial risk, operational risk, or investment risk. The different types of risk in the banking environment are discussed in the subsequent sections of this chapter.

In order to understand what we refer to when discussing risk in financial terms, it is necessary to give an overview of the financial definition of risk. The most appropriate explanation of risk is found in Brümmer and Rademeyer (1989:97-98). They state that three traditionally universe concepts exist namely; certainty, risk and uncertainty. Certainty by implication means that foreknowledge exists regarding the consequences of certain outcomes. In the dynamic environment in which organisations operate, however, certainty has no operational validity from a risk perspective. It only has value when explaining the theoretical financial concepts of risk to students (Vosloo, 1998:12). Risk refers to the situation where decisions are based on the calculation of probabilities that certain outcomes will materialise, or where probabilities, based on historical information and statistical frequency distributions, are known (Brümmer and Rademeyer, 1989:11&97).

Uncertainty (Brümmer and Rademeyer, 1989:98) refers to a situation where at least some consequences and/or associated probabilities are unknown. As no historical information and frequency distributions are available, these decisions are based on subjective interpretation. Because of this subjectivity, mathematical and statistical problems exist when applying the concept of uncertainty in practice, resulting in literature that regards the terms risk and uncertainty as synonymous and utilizing the terms interchangeably. Both Herbst (1982:9) and Levy and Sarnat (1990:189-191) support this explanation.

Herbst (1982:9) states in his definition of risk, that risk prevails in situations in which, although exact outcomes cannot be known in advance, the probability distributions governing the outcomes are either known or may be satisfactorily estimated. He distinguishes risk from uncertainty and states that although it is known that possible outcomes in uncertain situations are random variables, the probability distribution that governs those outcomes, or it's parameters, are not known and can therefore not be estimated *a priori*. Hingorani *et al.* (2003:87) provide the following definition of risk: "Risk is the assignment of probabilities to expected or anticipated future outcomes."

Other authors such as Levy and Sarnat (1990:189-191) use the terms risk and uncertainty interchangeably. They see risk as an option where profit is not known in advance with absolute certainty, but for which an array of alternative outcomes and probabilities are known. Their view is that with regard to a risky investment, the profit distribution is always known, even though the distribution may have been estimated on the basis of either objective or subjective probabilities.

From the various definitions of risk, the following concepts are common to all authors. Risk relates to the probability that certain outcomes may or may not materialise. It involves the quantitative measurement of the degree or probability of potential loss to the organisation in order to maximise the wealth of the organisation's shareholders. The quantitative analysis regarding risk is supported by Chorafas (1990:6-12) as he states that risk is a function of the type of loss that is covered as well as the risk involved in the transaction due to the type of person or company and the kind of operation. He states that risk is "...a measure of variance around an expected value."

3.2.2 Types and dimensions of risk

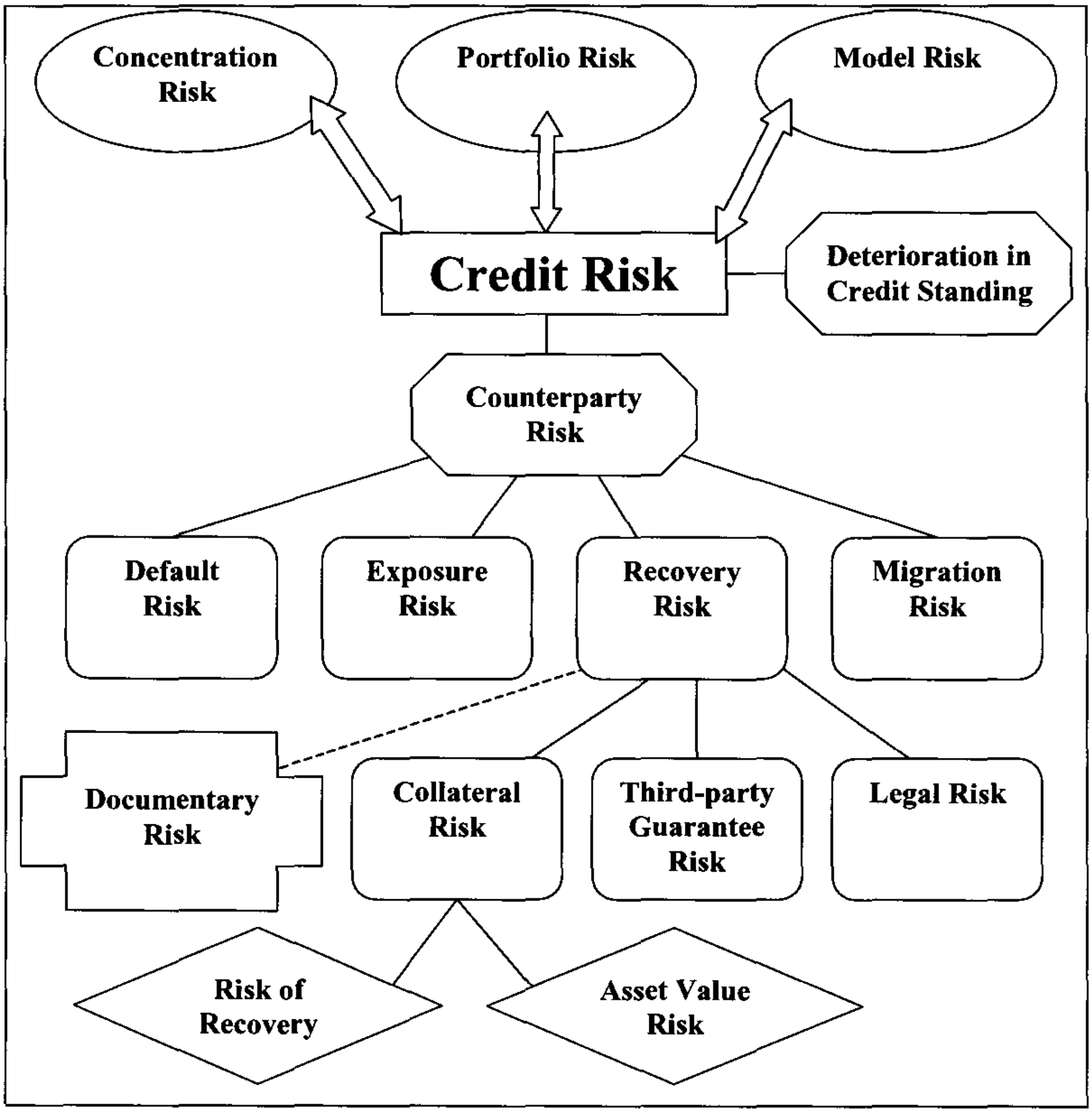
Crouhy *et al.* (2001:22) state that business is confronted with many definitions that emerged to describe the various risks. These are *inter alia* business risk, financial risk, market risk, liquidity risk, default risk, systematic risk, specific risk, residual risk, credit risk, counterparty risk, operations risk, settlement risk, country risk, portfolio risk, systemic risk, legal risk, and reputational risk (Crouhy *et al.*, 2001:22).

The list can further be expanded to include strategic risk, documentary risk, image risk, performance risk, model risk, downside risk, transaction risk, price risk, integrity risk, human risk, regulatory risk, recovery risk, foreign exchange risk, interest rate risk, solvency risk, asset value risk, legal risk, technical risk, performance risk, standalone risk, convexity risk, migration risk, collateral risk, equity risk, commodities risk, exposure risk, concentration risk, reporting risk, hedging risk, trading risk, syndication risk, third-party guarantee risk, sovereign risk, investment risk, inflation risk, unanticipated risk, non-diversifiable risk, or obligor-specific risk.

It is clear that a variety of different risks can be quoted: Some implying the other, others again the same but with a different name. For the purpose of this research document many of these risks need to be eliminated. Focus is directed towards banking risks and specifically, given the theme of this document, to financial risk, which includes credit risk, portfolio risk, and concentration risk. In this regard, the framework as provided by Bessis (2002) is used extensively.

Bessis (2002:12) identifies six main banking risks. These are credit risk, interest rate risk, market risk, liquidity risk, operational risk, and foreign exchange risk. Figure 2.6 (in Chapter 2) depicts these risks. Although the research predominantly concerns itself with credit risk, and to some extent with counterparty risk, it should be realised that the different risks impacts on one another. An interaction, call it an interdependency prevails between the different risks where a change in the one results in changes in one or more of the other. Figure 3.2 above provides a schematic diagram of credit risk and its various underlying risk components.

Figure 3.2 Credit Risk and its Components



Source: Adapted from the typology of risks in Bessis (2002)

Crouhy *et al.* (2001:34) on the other hand, although also identifying six banking risks, refer to these risks somewhat differently. They identify market risk, credit risk, liquidity risk, operational risk, legal and regulatory risk and human factor risk. For purpose of the discussion, Bessis' typology of risks is used.

The above discussion regarding the definition, types and dimensions of risk shows that the topic 'risk' in itself is a very broad concept. To lay the foundation for the discussions to follow the concept of 'risk' needs to be narrowed down, especially in light of the fact that the research deals with one aspect of 'risk', although very important, called credit risk. Providing the reader with specific relevant credit risk concepts to hone his/her thought process and further establish the frame of mind for later discussions becomes imperative.

The next part of the discussion focuses on credit risk, its various sub-risks or components, together with an overview of concentration risk, migration risk and model risk.

3.2.3 Credit risk defined

Coyle (2000:2) defines credit risk as the possibility that loss could arise from non-payment or late payment of a financial obligation by a customer. He provides the following examples of the most frequent causes of bad lending decisions resulting in increased credit risk:

- Over trading by the borrower;
- Adverse trading for the borrower;
- A liquidity run on the borrower's business;
- Excessive capital commitments by the borrower;
- Faulty credit analysis by the lender;
- Creative accounting by the borrower masking the business's true financial position; and
- Deceit by the borrower.

According to Sobehart *et al.* (2003:179) credit risk can be defined as the potential that a borrower or counterparty will fail to meet its obligations in accordance with the terms of an obligation's loan agreement, contract, or indenture.

The most elaborate definition of credit risk found is that of Bessis (1999:5) stating that credit risk is (i) the risk that customers default, that is, fail to comply with their obligation to service debt. Default triggers a total or partial loss of any amount lent to a counterparty, and (ii) the risk of a decline in the credit standing of a counterparty. In other words, credit risk is defined by the losses in the event of default of the borrower, or in the event of a deterioration of the borrower's credit quality.

Crouhy *et al.* (2001:35) define credit risk as "the risk that a change in the credit quality of a counterparty will affect the value of a bank's position." In this regard, they state that default is the extreme case of credit risk. Interesting however, is that their main classification, before discussing the different components of credit risk, is a differentiation between transaction risk and portfolio concentration (Crouhy *et al.*, 2001:39).

The definition as quoted by Bessis (1999) implies several underlying risks. The "quantity" of risk is the outstanding balance lent to the borrower while the "quality" of risk results both from the probability of the default occurring and from the guarantees or collateral that reduce the loss should actual default occur. There is a difference between the loss in the event of default and the amount at risk (outstanding balance at the date of default) because of potential recoveries, which again, are dependent on guarantees, collateral, and other securities and available funds to repay the debt. Default is an uncertain event.

Furthermore, the future exposures at the time of default are not known in advance in many cases. Potential recoveries from default cannot be predicted in advance because these are dependent on market and economic forces, which influence the recovery rate. Given this explanation, credit risk can be divided into four additional risks, namely; default risk, exposure risk, recovery risk and migration risk, which will be discussed in greater detail in the next paragraphs.

3.2.3.1 Default Risk

Default risk is the probability of a default event happening (Bessis, 1999:82). In order to determine the probability of the default event, the term default needs to be explained and defined. In this regard, Bessis (1999:82) provides several possible definitions of default. Default can occur when:

- a scheduled payment has been missed or has not been made for a minimum period after the due date (also called stages of delinquency being for example one month in arrears, or three months in arrears) called a payment default,
- a covenant is broken when the borrower fails to comply with specific prerequisites for example a financial ratio subject to upper and lower bounds (the breaking of a covenant does not imply default *per sae* but triggers action and/ or negotiation although some covenants can trigger immediate repayment of all amounts due) called a technical default,
- a legal process or procedure is started and entered into,
- or a purely economic default that is not associated with any particular event (for instance when economic factors cause the economic value of assets to go below the value of outstanding debts like deflation) called economic default.

Ong (2000:63) defines default risk as the uncertainty regarding an institution's ability to service its debts and obligation. Crouhy *et al.* (2001:35) elaborate in their definition of credit risk and state that default, as the extreme case of credit risk, refers to a counterparty that is either unwilling or unable to fulfil its contractual obligation.

Rating agencies and the Basel II Capital Accord (Basel, 2003b:80) consider default to occur when a contractual payment has been missed for at least three months. In chapter seven of this research, the importance of determining default in the end-to-end account lifecycle, from a portfolio management perspective will further be discussed in paragraph 7.2.3.4 ("The point of ultimate default" (PUD)).

As stated in the beginning of the discussion, default risk is the probability of a default event happening. Default risk is measured by the probability that default occurs during a given period of time. The risk of default is dependent on the credit standing of the borrower which is a function of the client's ability to meet his interest and capital contractual repayment as and when due (Absa 2001f). The main driver of credit standing is the ability of the client to manage his/her cash flow irrespective of the state of the economy.

The focus in the end-to-end account life cycle is directed towards normalising of the irregular accounts and accounts in arrears. Credit standing from a company perspective on the other hand, depends on numerous factors such as market outlook, the size of the company, its competitive factors, the quality of management and the shareholders (Absa 2000a).

Default probability cannot be measured directly. As Bessis (1999:83) explains: Historical statistics, derived from either internal sources or collected from rating agencies or central authorities, are used to derive the probability of default. For instance, using statistics of observed defaults, the ratio of defaults in a given period over the total sample of borrowers is derived. This ratio, representing a default rate, serves as a historical proxy for default probability. The shortcoming of such historical data is that they do not capture expected default probabilities. Statistical measures are applied to historical data to derive expected default probabilities.

3.2.3.2 Exposure Risk

Exposure risk is the second sub-risk of credit risk. Coyle (2000:123) defines exposure as a financial risk facing a business that can be categorised according to its cause or source e.g. credit risk exposures. Bessis (1999:83) argues that exposure risk is generated by the uncertainty prevailing with future amounts at risk. Bessis (2002:436) argues that exposure is also referred to as the 'quantity' of risk. Exposure risk relates to the exposure at the time of default. For this purpose, it is necessary to determine, what the current and future exposure will be at time of default. For some credit facilities, there is almost no exposure risk. Two clear distinctions can be made regarding the nature of loans and advances, namely, open lines of credit and closed lines of credit (Absa 2000a).

A closed line of credit is associated with a loan with an amortization schedule. The fact that future exposures can be calculated using the amortization schedule (repayment schedule) to a large extent limits the associated exposure risk. In this regard refer to the discussion in paragraph 3.2.1 earlier on the definition of risk and uncertainty. If the exposure is known in advance, there is very little uncertainty associated with it and therefore the exposure risk is very small or negligible. The reason why the exposure risk is not zero is the result of potential prepayments, which borrowers can make. Difficulty arises when bullet payments are made or when a client pays on an irregular basis, additional amounts, irrespective of his or her repayment obligation. Bessis (2002:436) refers to an amortizing credit when referring to a closed line of credit.

An open line of credit on the other hand, refers to a facility, which can be taken up or fully drawn by the client at any point in time (Absa 2000a). Examples are overdraft facilities, revolving loans, credit lines and access bond facilities. To calculate future exposure, the total potential exposure (limit) must be regarded as exposure, irrespective of the outstanding balance. Exposure risk is present in off-balance sheet items and derivatives because of potential commitments associated with these facilities. It should however be noted that although the realisation of some future commitments might be highly unlikely, it still constitutes exposure risk, albeit small. Bessis (2002:436) refers to a committed line when referring to an open line of credit.

In order to calculate future exposures, the nature of the expected growth needs to be clearly specified and understood, as it will impact pricing and capital allocation calculations.

3.2.3.3 Recovery Risk

Recovery risk is the third sub-risk of credit risk. Recoveries in the event of default cannot be predicted due to the dependency it has on prevailing economic circumstances and various internal and external factors (Bessis, 1999:84). For instance, the type of default and "quality" of security or guarantee (guarantee received from the borrower, the type of guarantee being either collateral or third-party, and the context at the time of default e.g. area of property, close vicinity of squatter camps etc.) influence the amount recovered. The prevailing economic climate, at the time of default can impact recoveries either positively or negatively, for instance, the level of interest rates, business confidence, availability of property, and the stock market will influence the value of the security or guarantee. Recovery risk according to Bessis (1999:84) can be divided in three further specific risks. These are collateral risk, third-party guarantee risk and legal risk.

3.2.3.3.1 Collateral risk

Having collateral as security minimises credit risk especially if the collateral can be easily taken over and sold at a significant value. Collateralisation is the easiest method to mitigate credit risk (Bessis, 1999:84). Collateralisation as risk mitigating mechanism is discussed in detail in chapter five. Many types of collateral exist for example, cash (cash cover), financial assets (stocks and bonds) and fixed assets (property, planes, ships and fixed equipment and machinery). The value of the collateral is dependent on the collateral's nature (cash, financial assets, fixed assets) and the prevailing market conditions as discussed above. Due to fixed equipment and machinery's nature, it is normally associated with a low resale value, mainly as a result of its limited use and resale market (Bessis, 1999:85).

The risk associated with collateral has two components: first a recovery risk in itself meaning the uncertainty with respect to the ability to access the collateral, to dispose of it, to the costs required to sell it. In the case of property, how easily can possession of the property be taken taking into account the legal process as well as impacting legislation? Once possession has been obtained, how easily can it be sold giving the prevailing market conditions, and situated area. Lastly, during this process many costs were incurred, for example, legal costs, funding costs, maintenance costs, the payment of levies and municipal fees, protection costs, administration costs, legal costs, and holding costs. Furthermore, an uncertainty exists with respect to the collateral's value (asset value risk), which is dependent on again the collateral's nature, but also the secondary market conditions.

3.2.3.3.2 Third-party Guarantee Risk

Third-party guarantee risk is the second sub-component of recovery risk. Guarantees are contingencies given by third parties to a banking institution (Bessis, 1999:85). Third-party guarantee risk refers not only to the ability of the guarantor to meet his contingent liability at the time of default implying a simple transfer of risk. It specifically refers to the risk that both the borrower and the guarantor default simultaneously, meaning that neither can repay the borrower's debt obligation. The enforceability of the guarantee at the time of default becomes the critical aspect when determining whether the credit risk on the borrower, in fact has been turned to a credit risk on the guarantor.

3.2.3.3.3 Legal Risk

Legal risk is the third sub-component of recovery risk. Bessis (1999:85) states that legal risk stems from the possibility that the guarantee provided by the borrower or guarantor is not legally enforceable. When the decision is taken to commence with legal proceedings, that is, the borrower defaulted and no corrective actions are taken by the defaulter to rectify the default status, all commitments of the borrower is placed on hold until some legal conclusion is reached. Legal risk thus refers to the risk that the legal process (prolonged or otherwise) will influence the recoverability negatively at the time of default.

Crouhy *et al.* (2001:37) bring another dimension to legal risk as they argue that legal risk can arise from a wide variety of reasons. They argue that legal risks usually only becomes apparent when a counterparty, or an investor, loses money on a transaction and decides to sue the banking institution to avoid meeting its obligations. Legal risk also arise when a counterparty lack the legal authority to engage in a transaction.

3.2.3.3.4 Documentary risk

Although not strictly part of credit risk but rather operational risk, documentary risk (the risk that documents are completed incorrectly or are incomplete) impacts the recoverability of any form of guarantee (collateral or third-party) (Absa 2001f). Normally, the fact that documents are not legally enforceable, only become known at the time of legal proceedings. Due to the difficulty associated with allocating the resulting loss between operational and credit losses, and the fact that the document usually forms part of similar documentation; the resulting loss manifests itself in credit.

3.2.4 Migration Risk

Migration risk is the fourth sub-risk of credit risk. Bessis (2002:438) defines migration risk as the risk or probability that an organisation migrates from one risk class to any other risk class. For illustration purposes take a BBB client for instance. From a migration perspective, the client can move upwards to A, or downwards to BB, or for that matter, to any other risk class. Moving from one risk class to another has several implications for the portfolio manager. These might include more capital, and change in the portfolio risk profile. The risk associated with this movement from one risk class to another, especially when deteriorating to a lower risk class, is referred to as migration risk.

3.2.5 Concentration Risk

Financial institutions, because of paying insufficient attention to portfolio management, in the past have focussed on analysing individual loans with little regard for portfolio implications (Caouette *et al.*, 1998:231). This practice resulted in excessive concentrations and consequent excessive losses. Caouette *et al.* (1998:231) summarises the concept of concentration risk as follows: "Concentration of credit risk may generally by characterised as inordinately high levels of direct or indirect exposures to a single or related group of borrowers, credit exposures collateralized by a single security, or securities with common characteristics, or credit exposures to borrowers with common characteristics within an industry or similarly affected group."

The above explanation then implies in broad terms that concentration is caused when a financial institution has a level of exposure to a single name, product, sovereign, or sector such that adverse developments in this exposure would seriously hamper the organisation's ability to continue with its functions.

Ong (2000:248) identifies some factors that contribute to concentration risk in a credit portfolio:

- Specialisation in industries or geographical areas;
- Credit trends – because of greater access to capital markets, larger corporations bypassed bank financing, leaving disproportionate concentration of lower-quality portfolios in banks;
- Relationships in anticipation of future non-credit related income generation where commitments are increased beyond the point where it is profitable.

In order to manage concentrations more effectively, the application of portfolio management enables the quantification of not only the transactional risk, but also the effect a loan transaction will have on a credit portfolio. Credit risk increases exponentially with concentration as the credit losses becomes highly correlated and the risk of default between individual obligors is not sufficiently mitigated by portfolio effects. When discussing concentration risk, the issue of the credit paradox comes into play. Due to the unique dilemma created by the credit paradox, an overview regarding the concept needs to be provided.

3.2.5.1 Credit Paradox

Ong (2000:59&247) defines the credit paradox as the phenomenon associated with the dramatic rise in the loan spreads required as exposure to the same obligor increases because banks are forced to take on additional credit exposure in search of larger spreads, thereby exposing themselves to even larger default probabilities.

The phenomenon is counterintuitive to other, non-credit-related areas where economy of scale dictates that it is cheaper to do more of the same thing. In credit, it works the other way around, as less is required rather than more!

Nelken (1999:3) defines the credit paradox more explicitly as the "relationship versus credit exposure" dilemma. To illustrate the following: On the one hand the relationship manager wants to extent a major client's facilities (take on additional exposure) because it is a major and important client of the bank, and on the other hand the credit manager argues that should such a facility be granted and the client defaults, the bank has from a concentration risk perspective, a major problem (the credit manager wants to reduce the exposure).

The credit paradox as defined by Nelken (1999:257) is illustrated in Table 3.1 below.

Table 3.1 The Credit Paradox

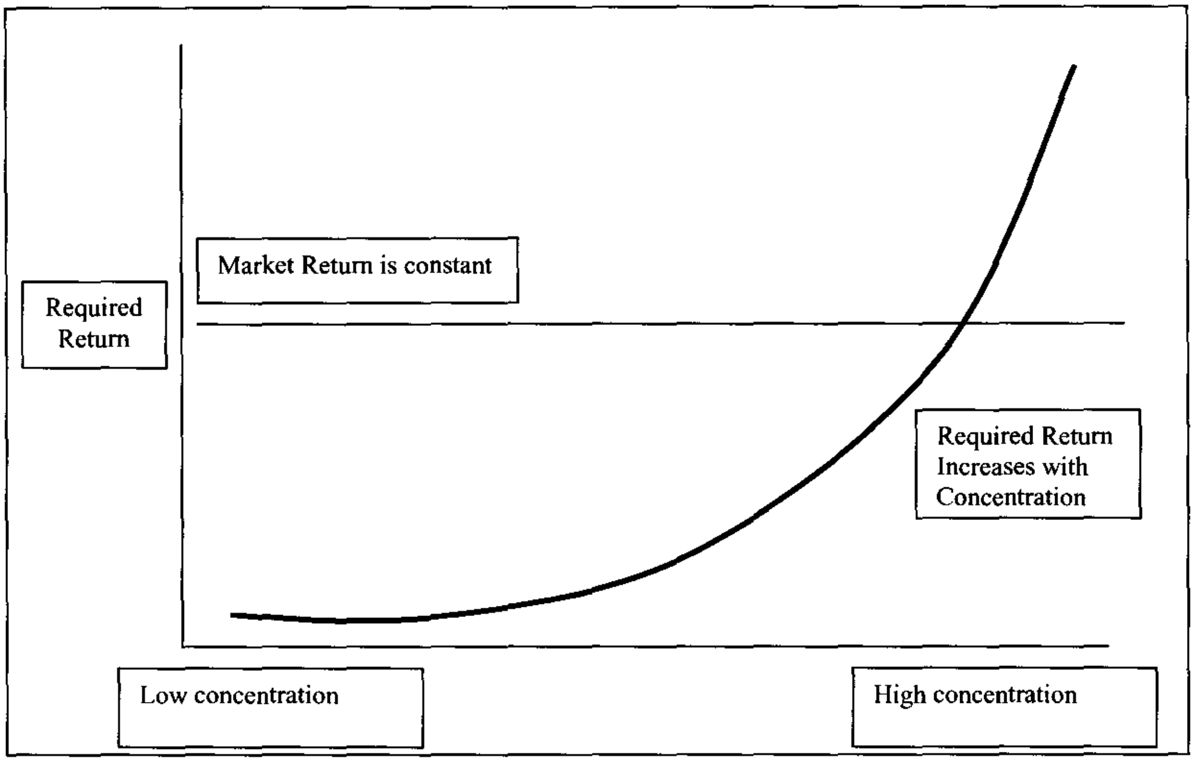
Relationship Banker		**Credit Line Manager**
Familiar credit	$\Longleftrightarrow$	Increasing concentration
Ongoing business	$\Longleftrightarrow$	Missing other credit opportunities
Profitable structured transaction	$\Longleftrightarrow$	Consuming capital
$\Downarrow$		$\Downarrow$
More Exposure	$\Longleftrightarrow$	**Less Exposure**

Source: Adapted from Nelken (1999:257)

Nelken (1999:258) shows that the risk increases nonlinearly with an increase in concentration. Figure 3.3 shows the incremental risk associated with increases in concentration. From figure 3.3 it is evident that as the bank's exposure increases (concentration increase), it needs more and more required returns. Keeping in mind that a bank is also facing an unexpected loss, a portion of the required return should cover the unexpected loss. The more concentration a bank has, and the more the unexpected loss risk grows, the more the required return to make up for the added risk. On the other hand, a bank cannot charge a client any amount that it sees fit because there is a limit to how much a specific borrower will pay the bank. Should the bank charge too much interest, the client will borrow somewhere else.

While the required return grows with the concentration, the market will only pay a specific return.

Figure 3.3 Required returns versus concentration



Source: Nelken (1999:258)

At first glance it might seem that the two definitions provided by Ong and Nelken are totally different from one another. However, as shown in the graph above, there is not a contradiction. The one provided by Ong is more from a statistical and credit premium perspective.

The credit paradox can also be explained as the situation that arises when a banking institution, one that has a strong and longstanding relationship with a client, is requested to extent facilities to the client and the banking institution is of the opinion that from a concentration perspective, such an extension would not be appropriate (Absa 2001f). Should the banking institution then grant the requested extension because of possible pressure as a result of the relationship, an option for the bank to mitigate the risk, that is selling the credit risk off into the market, becomes very attractive. The credit paradox is illustrated by the fact that the banking institution on the one hand cannot inform the client that his risk is becoming a problem for the bank due to the longstanding relationship, and on the other hand, cannot inform the client due to the confidential nature and trust between the client and the bank, that because of the unacceptable risk it wishes to sell off the credit risk into the market.

3.2.6 Portfolio Risk

Bessis (2002:426) states that the aggregation of individual or standalone risks culminates in portfolio credit risk. Portfolio risk (Bessis 1999:300) can be characterised by the expected or anticipated loss and the volatility of losses. From a portfolio perspective, the portfolio loss equals the summation of all the random individual losses. The individual losses are random because: Many counterparties exist and the number of defaults can vary anywhere between zero and the total number of counterparties. The portfolio risk depends upon the individual or standalone risks of transactions plus the correlation between the individual risks.

3.2.7 Model Risk

Crouhy *et al.* (2001:579) define model risk, as the special risk that arises when an organisation uses mathematical and statistical models to value and hedge securities as the model used can either be irrelevant or incorrect. According to Bessis (2002:21), one of the main contributors of model risk is insufficient data for testing the reliability of inputs and models. When models are used in credit risk, model risk can be quite significant, as major credit events remain scarce.

3.2.8 Summary

The discussion to this point in this chapter covered certain definitions regarding risk, credit risk and other selected and relevant concepts. The importance of understanding these concepts lies in the framework and mindset the discussion creates as an understanding will enhance the later discussion on portfolio theory, the role of portfolio risk management as it is build from these concepts. The above discussion narrowed the concept of 'risk' as an overview of credit risk is provided. The aim, as stated previously, is to provide the reader with specific relevant credit risk concepts to hone his/her thought processes and further establish the frame of mind for later discussions.

In the next section, the portfolio management concept is explained with specific reference to an overview regarding the traditional approach to credit risk management as it provides the introduction to the modern portfolio theory and credit portfolio management process. The importance of the discussion lies in the framework it provides for managing credit portfolios from a credit risk perspective, the data requirements and the underlying theory for managing portfolios of loans and advances. The discussion is directed towards the portfolio approach itself compared to the management component as discussed in Chapter 2. The remainder of the chapter should then, in light of the aforementioned, be regarded as an integral unit.

3.3 Portfolio Management

3.3.1 Introduction

Credit risk management according to Bessis (1999:85) covers both the decision-making process, before the credit decision is made, and the follow-up of credit commitments, plus all monitoring and reporting processes. Portfolio management actively influences the decision-making process and also plays a role in the monitoring and reporting processes.

Scott (2003:419&447) argues that poor risk management is ultimately an expensive mistake, especially in emerging markets because deficiencies in credit risk management systems are so severe that the gap between a bank's risk assessment and its true risk has commonly led to total default. He states that to build a prudent portfolio is equal in importance to evaluating individual loans due to the possible losses that can be incurred as a result of similar characteristics shared by individual credit exposures. Again, the importance of possible concentration is highlighted.

Bessis (2002:62) states that the classical emphasis of credit analysis is at transactional level, rather than the portfolio level, subject to limits as defined by the credit department. Although banks followed well-known diversification principles, the active management of the banking portfolio remained limited. Loan portfolio management or credit portfolio management therefore, is one of the newest fields of credit risk management. Bessis (2002:62) further identifies several incentives for developing a portfolio management capability for banking transactions:

- A willingness to make portfolio diversification effects more explicit and to quantify these effects;
- The belief that significant potential exists to improve the risk-reward trade-off by managing the total banking portfolio as entity, rather than focussing only on individual banking transactions;
- The increase in securitisation transactions to transfer risk to the market;
- The emergence of new products and techniques to manage credit risk e.g. credit derivative instruments (discussed in Chapter 5); and
- The emergence and increase in popularity of the loan trading market where loans, usually illiquid, are traded in an organised market.

Due to the infancy of credit portfolio management, the potential gains of more active credit portfolio management are still subject for much debate, especially in the light of relationship banking. The relative merits of both portfolio management compared to relationship banking, in light of a bank wanting to do business with, and maintaining and continuing to keep relationships with customers that they know well, where volumes are not that flexible, will be discussed extensively in future.

Having stated the above, it becomes clear that a definition of credit portfolio management is absent. The following definition, based on the literature, is presented as a possible solution to this dilemma. Credit portfolio management involves the management process (refer Chapter 2) where the credit portfolio approach, its principles and its theory (Chapter 3) are applied to attain specific strategic goals and objectives within a framework of shareholder wealth creation and maximisation. These strategic objectives are directed towards the minimising of overall credit portfolio risk by actively influencing the marketing, pricing and credit decision, exploring possible diversification opportunities and where appropriate, to utilise credit risk mitigating strategies to the benefit of the business, the organisation and the shareholders. This will include the objective to avoid concentration risk.

3.3.2 Portfolio Management *vis a vis* Portfolio Risk Management

The concept of portfolio management was defined in the previous paragraph. Based on the proposed definition, and the role of the portfolio manager, the specific focus and specialised nature and importance of portfolio management as business function becomes evident. However, the use of the term 'portfolio management' in all general spheres of life leads to much confusion amongst the general public as well as practitioners. For instance, the real estate agent manages a portfolio of properties, the telephone operator at the call centre is assigned a portfolio of clients, the portfolio manager managing client relationships have a portfolio of clients, and then we have the investment portfolio manager as well amongst others.

As mentioned previously, portfolio management is one of the newest disciplines in credit risk management. This maybe, is also the reason for not having a clear, and definite understanding of the definition. To enable a better understanding and provide a clear differentiation regarding the subject matter, the term portfolio risk management is felt to be a more descriptive reference to the subject matter. The term distinguishes itself in that it shows the focus towards risk on the one hand while still maintaining its roots in the portfolio theory. Further differentiation in terms of credit portfolio risk management, or credit asset portfolio risk management, can contribute to defining the parameters of the subject more decisively.

3.3.3 Traditional Approach to Credit Risk

Before introducing the modern portfolio theory, it is appropriate to provide an overview of the traditional approach to credit risk. In the first sentence of Chapter 1 it was stated that the needs of clients, their financial strength, future commitments and possible financial stress were considered known facts to the client's banker as a very close relationship existed between bank and client. It was further stated that the management of third party risks inevitably lead to concentrations of exposures. In the previous chapter, mention was made of a transaction-by-transaction "originate-and-hold" approach, relationship banking and the fact that traditionally credit risk remained on the lender's balance sheet until the debt was repaid or written off.

Serfaty (2003:10) in his article: "The Changing Nature of Credit Relationships and Banking" states that client-oriented banking historically has been predominantly relationship driven and not quantitative in character. The traditional view that the character of the borrower was more important than its reported financial position is reflected in the maxim that "character is the foundation of credit". The changes in technology and information supplanted this view as more sophisticated analysis became possible. However, when the availability of data is compromised in quantity or quality, the subjective elements of credit assessment became the drivers for credit risk management.

Another aspect of traditional credit management is provided by Caouette *et al.* (1998:35) as they state: "Traditionally, banks have managed credit risk almost exclusively by adopting procedures for credit analysis. Credit analysis focuses on two distinct but interrelated issues: the borrower's willingness and ability to repay a loan. Analyzing willingness to pay is, essentially, a matter of investigating the borrower's character. Analyzing the ability to pay is a matter of investigating the borrower's economic prospects". Given the above views of Serfaty and Caouette *et al.*, the traditional approach entailed predominantly the relationship-banking concept where credit was granted based on affordability and borrower character. This philosophy resulted in credit processes being aligned accordingly.

Wyman (1999:1) in this regard, identifies several assumptions on which traditional credit processes are based. Historically, all focus was directed to avoid losses as it were viewed as a lapse in judgement rather than as a predictable part of assuming risk. This focus on loss avoidance spawned an elaborate credit infrastructure that in it was based on several underlying assumptions (Wyman, 1999:1). These assumptions are:

- ➢ The evaluation and approval of credit require a rigorous, "four eyes" approach where both the originator and the credit analyst were responsible for evaluating lending propositions, with the final decision being with the credit analyst.
- ➢ The assessment of risk should be based on in-house judgement and experience, where credit officers, with many years of experience in a

specific market, were regarded as the most reliable assessors of risk and ratings and rating agencies were largely ignored.

- As the size of the loans under review increases, it requires and deserves more scrutiny where mandate and authority levels were driven by transaction size that served as a proxy for risk. Large transactions were elevated to senior professionals or credit committees that combined the judgement and experience of several evaluators.
- As a result of loan originators focussing on volume because their incentives were linked to asset growth, it was deemed necessary to overcome this moral hazard by separating the "credit" and the "sales" or "line" functions.
- The prevailing philosophy was that loans were to be held to maturity, a 'buy and hold' origination. Once a loan was made it was expected that the loan will remain on the books until maturity or default. This resulted in *ex ante* credit approval or renewal being seen as the most important part of the credit process. Little focus was directed towards *ex post* credit risk management, or on ongoing attempts to steer the risk/ return performance of the portfolio.

By posing the questions, the above assumptions can be challenged: Do the costs associated with the traditional credit process justify the 'four eyes' approach? Are human evaluators necessarily better than cheaper alternatives such as statistical models or external ratings? Is transaction size a valid proxy for the risk of loss to the bank? Does the moral hazard outweigh the benefits of integrated risk/return decision-making? Are investors willing to assume credit risk and if so, whose credit evaluation then becomes important, the bank's or the investor's?

Challenging these assumptions resulted in a revaluation of current credit processes with the result that new fundamentals have seen the light and have become dominant in credit risk management. In this regard, Wyman (1999:2) states that the breakdown of the classical assumptions is leading banks to rethink the fundamentals of how they organise and restructure their credit processes, usually along three main thrusts:

- An increase reliance on objective risk assessment as provided by statistical models, external credit ratings, and market data. In some segments these assessments are cheaper, more accurate and more consistent than subjective opinions. In other segments the judgemental approach might be more accurate.

- Credit processes are differentiated on the basis of transaction and portfolio risk and not the size of the transaction. The effort of skilled and experienced credit analysts should be heavily skewed towards exposures that are high risk, illiquid and have unusual structures.
- Greater investments in back-end processes as considerable payback can be achieved where additional resources have been invested in loan monitoring, recoveries, and portfolio risk management abilities. These initiatives usually pay for themselves through early risk detection, and ultimately, better loss mitigation.

The legacy of the 1980's caused certain changes to come about in credit risk management that should not be underestimated. A renewed focus on credit risk management came about after the late 1980's, and resulted in a variety of new methodologies and industry challenges coming about. Oleksiw (2003:74) states in this regard that although the economic environment showed improvement in the USA with rock-bottom interest rates and a more stable real estate market, which resulted in a more friendly lending climate, the biggest change contributing to these improved conditions came from the banks themselves. She states that the earlier difficult period taught banks new lessons, and banks on balance have become better credit risk managers. Many factors contributed to being better credit risk manager of which the following are the most prominent (Oleksiw, 2003:74):

- Size: Larger banks enabled a reduction in concentrations, which many large banks have accomplishes by not letting their hold limits increase proportionately with loan growth. Also, larger banks meant bigger budgets, rendering more sophisticated portfolio management tools affordable.
- Diversification of revenue sources using investment banking – although the fee-driven income from investment banking resulted in better diversification, this transaction-based business doesn't mesh well with a relationship-banking strategy, which emphasises the risk-mitigating benefits of getting to know your customer.
- Capital levels: Large Bank holding companies are better capitalised than they were in the 1980's. It is argued that more capital affords more flexibility in

dealing with problem loans and also improves a bank's competitive position as it results in a better rating for letters of credit and other credit supporting instruments.

- Loan Sales Market: New opportunities exist with the development of the secondary market. Unlike in the late 1980's, there is now an active market for non-performing loans. From a portfolio management perspective, the secondary market provides a vehicle to manage concentrations and forms a logical part of a more focussed attempt to manage risk at a portfolio level.
- Disclosure changes: Regulators in the USA added additional delinquency categories to public disclosure in regulatory reports. Broadening disclosure leads to greater transparency and better-informed investors.
- Risk Ratings: Another dramatic change in the past ten years is expanded risk-rating scales. Two drives for this expansion are identified, the one the need to identify deterioration as early as possible and the other, the expectations of the New Basel Capital Accord.
- Credit Scoring: Although credit-scoring small business loans was not developed and widely adopted by banks until the 1990's, it now plays an important role in credit approvals for these types of loans. In some instances, it outperforms judgemental decisions in predicting credit quality.
- Risk-based pricing: In the late 1980's, a minority of large banks explicitly quantified the credit risk component in commercial loan pricing. Since then, there's been a great deal of effort put into achieving this goal.
- Document and credit exceptions: A tendency and heightened interest amongst large banks in reporting of missing and outdated documents, covenant violations, policy overrides and other exceptions.
- MIS-Assisted Credit Risk Management: Large banks have been engaged in a new level of portfolio analysis from the previous manually monitoring, spread analysis and portfolio analysis, spurred by the confluence of cost cutting and new technology. A shift in focus has resulted in larger investments in portfolio analysis where it is not uncommon today to have an individual or department dedicated to portfolio analysis.
- Maintaining balance: The challenge of lending is to balance growth and credit quality. This is *inter alia* achieved through communication, quality staff and accountability of decisions.

The improvement in credit risk management practices resulting from the factors as discussed and the adoption of new credit practices since the traditional approach, can best be summarised in the next paragraph. The next section discusses the evolutionary stages of credit risk management.

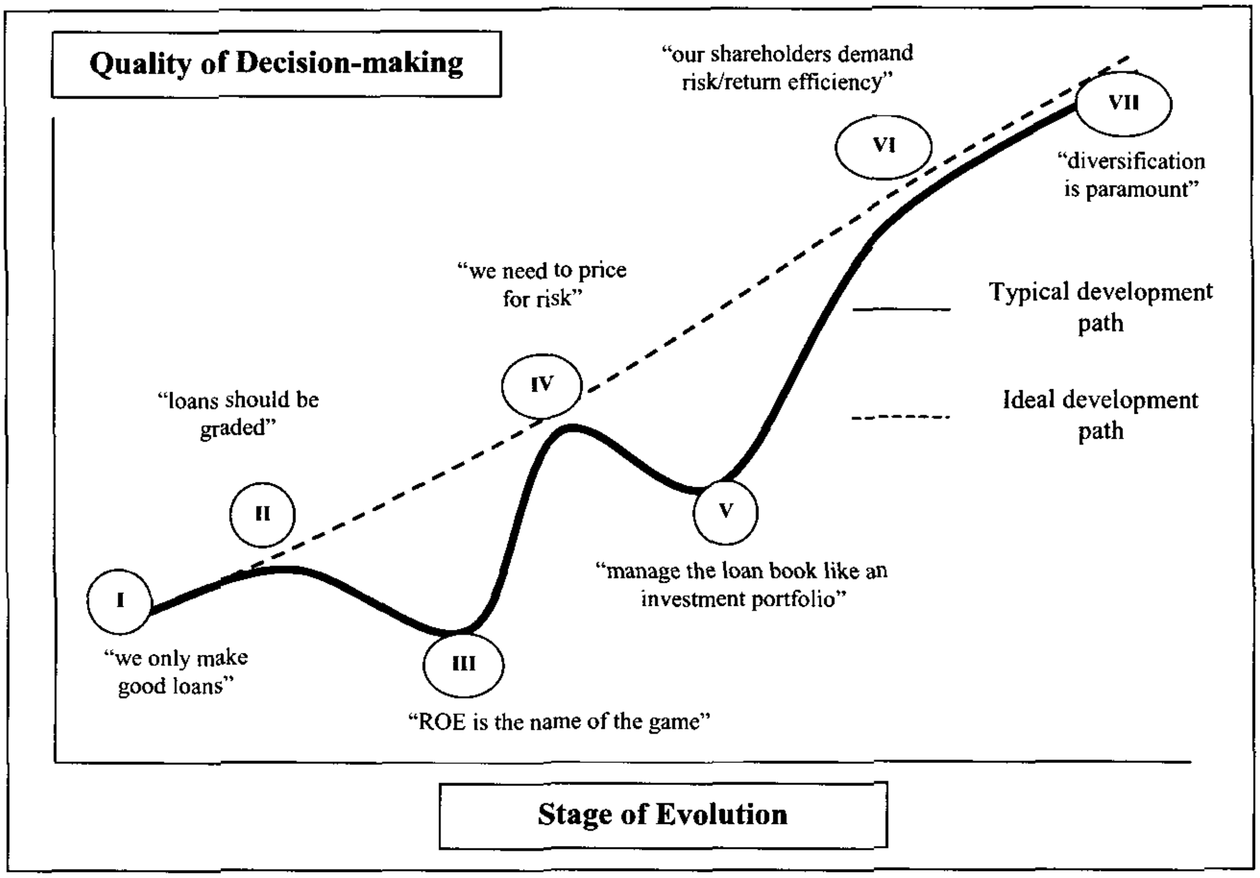
3.3.4 The Stages in Credit Risk Management

The discussion in the previous paragraph as stated can be summarised using an evolutionary outlay of the different stages as they evolved through the years. Anon. (1999b:1) identifies seven stages in the evolution of credit risk management as shown in Figure 3.4. The discussion draws extensively on the findings of this report.

In the first stage ("We only make good loans"), all key decision-making processes such as credit approval, monitoring and pricing, are decentralised and judgemental. A credit decision is made intuitively with either a yes or a no, 'good' loans are accepted and 'bad' loans are rejected. Write-offs are attributed to bad judgements or changed circumstances. During this first stage, the line of business has not yet been defined for profitability measurement purposes – provisions, reserves, and capital are items, which are only applied centrally. Technological support is absent and management focuses on maximising net income within an intuitively defined set of risk constraints.

In the second stage ("Loans should be graded"), the relative riskiness of different loans is formally recognised and a loan grading scale is formally introduced. Typically, the 'good' and the 'bad' loan categories are divided into 3-4 grades respectively. Unfortunately, due to the definition of a 'good' loan, they all fall into one category. Grades are assigned by line officers, are generally regarded as administrative in nature and have no impact on the credit approval or pricing. In this stage, the line of business (LOB) profitability measurement concept is introduced notwithstanding the fact that provision levels are not linked to the grading system and capital is not yet assigned to individual businesses. ROA or net income is the typical performance yardstick. Although stage two represents only a modest advance on stage 1, the importance lies in the introduction of a risk grading scale that provides an important foundation for subsequent developments.

Figure 3.4 Evolution of Credit Risk Management



Source: Anon (1999b:1)

In stage three ("ROE is the name of the game"), management is starting to drive an ROE culture, as they believe that maximising ROE will maximise shareholder value. An organisation-wide ROE benchmark or hurdle rate is determined, each business line's ROE is measured, and line managers' performance and incentives are based on the achieving or non-achieving of the business line's ROE target. The underlying performance measurement however, lack the adjustment for or measurement of credit risk as capital is still assigned on an undifferentiated regulatory basis, provisioning is strictly based on historical write-off levels (charge-offs), and customer/ product profitability data is not risk-adjusted at all. In addition, the pricing of loans still remains the sole responsibility of the line officers. The best way for line managers to maximise short term ROE, given the way that it is measured, is to originate a large volume of high yielding (high risk) assets, which in itself, is very dangerous. The best and easiest way to originate these high yielding, risky assets, is to undercut the competitor's price.

In the fourth stage ("We need to price for risk"), a series of key risk measurement advances allow the successful implementation of the ROE culture attempted in stage three. These advances include: (a) An expansion of the loan grading scale to ten levels, each explicitly calibrated to an expected loss [EL] level based on the best estimate of default probability and loss severity for loans in that particular grade. (b) Introduction of differentiated risk adjustments into various systems (customer, product and LOB profitability measurement systems), where capital allocation is differentiated based on estimated loss volatilities or unexpected losses [UL].

The changes reflect in a culture change where the fact that default risk is probabilistic (it should be expected that even 'good' loans have some quantifiable probability of default and that loans of different grades have significantly different default frequencies), is recognised. A congruent and reinforcing development is a commitment on the part of management to price for risk (to vary loan spreads in relation to estimated loss probabilities and volatilities). This is accomplished through an embodied risk-adjusted pricing model in the risk measurement advances discussed previously (Anon, 1999b:3). This enabled the setting of pricing policy guidelines, feedback regarding the effectiveness of risk measures, and consequently, better pricing guidelines. As this stage progresses, management increasingly recognises the critical importance of assigning grades and quantifying credit risk accurately and consistently. This resulted in either moving the responsibility for assigning risk grades away from line officers to credit officers, or using a quantitative model as part of the grading process, or toughening the process for auditing loan grades, or all of the above (Anon, 1999b:3).

In stage five ("Manage the loan book as an investment portfolio"), bank management seek to apply the modern portfolio theory to the management of the loan book. A Portfolio Manager is typically appointed with responsibility for monitoring portfolio quality, estimating portfolio losses, setting sectoral exposure limits and measuring the risk/ reward trade-offs in the portfolio. A few mathematicians and statisticians ("quants") are hired to support the Portfolio Manager. Despite the conceptual sophistication of the models employed, initial results are disappointing largely because the underlying input to the models is inaccurate.

Initial correlation measurement is inadequate due to its reliance on industry sector loss history as the primary data source. Attempts to bring portfolio effects into the existing profitability measurement and pricing models are awkward and therefore confusing to the line, creating conflict between line and quant. Additionally, credit portfolio risk implications come into conflict with the often very sound intuition of the bank's seasoned credit officers. The silver lining in this troubling stage is that the newly formed Portfolio Management Unit heightens the organisational focus on two critical initiatives: (i) Building an enterprise-wide exposure monitoring system which consolidates credit data from various product-oriented accounting systems and (ii) Validating and improving the accuracy and consistency of internal loan grades through the use of quantitative rating models.

In the sixth stage (Our shareholders demand risk/return efficiency"), portfolio management techniques are applied successfully to a loan book due to advances in the bank's risk measurement analytics which, by virtue of their combination of theoretical soundness and intuitive appeal, resolve many of the conflicts which were problematic in stage five. The advances include: (i) Better risk discrimination, (ii) Correlation measurements which accounts appropriately for default interrelationships, and (iii) The implementation of techniques to quantify the unique unexpected loss contribution of each credit exposure accurately. These measurement advances allow for the development of a coherent management framework for setting: (i) A limit on overall portfolio loss volatility, compatible with the bank's overall capital structure and risk appetite (tolerance), (ii) Limits on the exposure size of sectors and individual transactions which ensure the credit portfolio will be adequately diversified, (iii) Target weights for sectors and individual counterparties which increase return within the target risk limits, and (iv) Expected returns for individual assets based on their unexpected loss contribution.

The central recognition underpinning both the technical and management advances in this stage is that banks must be paid a fair market price for absorbing volatility or they will detract from their shareholder's value. It also becomes evident that if credit loss volatility can be accurately quantified, risk-adjusted loan prices can be compared readily to risk/return performance indices of other markets. Increasingly, banks also recognise that they can only charge for the systematic component of volatility and that unsystematic risk must be diversified. This obviously creates a need to understand portfolio diversification at the deeper level.

Congruent developments in this stage include the improved internal information systems which allow the automated monitoring of daily or real-time exposure changes, introduction of real-time market-based credit risk monitoring systems for the more liquid bank portfolios, the development of a user-friendly computer network capability which facilitates the communication of information and an increasingly dominant role for centralised units in the grading, pricing and approval of new credits.

In stage seven ("Diversification is paramount") the developments of stage six foreshadowed the separation of Portfolio Management and Origination as the improved information systems provided an analytical foundation. The improved information systems and analytical foundation developed guide the bank's Portfolio Management unit to an inexorable conclusion: diversification is paramount to achieving risk/return efficiency, particularly in a debt portfolio where little or no upside for asset concentration exists. This insight inevitably leads to a strategic conflict with loan origination units, whose business economics benefit from larger transaction sizes, and increased industry and geographical specialisation. In illiquid markets, this forces coordinated planning between Origination and Portfolio Management, and a revision in performance measurement, which gives incentive to all parties to take actions, which lead to optimisation at the portfolio instead of the transactional level.

3.3.5 Summary

The discussion presented up to this point explained the portfolio management concept with specific reference to an overview regarding the traditional approach to credit risk management as it provides the introduction to the modern portfolio theory and credit portfolio management process. It contributed in providing a framework for managing credit portfolios from a credit risk perspective, the data requirements and the underlying theory for managing portfolios of loans and advances.

In the next section, the framework for managing credit portfolios from a credit risk perspective, the data requirements and the underlying theory for managing portfolios of loans and advances are expanded further. Before explaining the credit portfolio theory, a discussion of the theory from where the credit portfolio theory originated, is required. The following discussion will address the theory of choice, the efficient frontier, expected risk and return and diversification.

3.4 Modern portfolio theory

In the next paragraphs, the modern portfolio theory is discussed as background to the credit portfolio theory.

3.4.1 Introduction

There is a perception that bank's senior credit officers are homegrown and started off with a narrow focus as they have risen to senior positions by demonstrating their ability to concentrate on a relatively small group of companies or activities. While advancing in their careers their organisation may have shifted them from one specialised industry group to another so that they would gain broader perspective. However, perspective and portfolio theory are two different things.

Transforming the credit function into a loan portfolio management function implies that the bank maximises risk-adjusted return to the loan portfolio by actively buying and selling credit exposures where possible, and otherwise managing new business and renewals of existing facilities. This implies that the principles of modern portfolio theory should be applied to the credit portfolio.

The modern portfolio theory was developed by Markowitz in the 1950's (Weston and Copeland, 1992:365) and briefly states that a higher expected return can be obtained for a given level of risk should assets be combined in a portfolio or alternatively, by combining assets in a portfolio, the risk can be reduced for a given level of expected return. Sharp in 1964 (Weston and Copeland, 1992:399&403) contributed significantly in the initial refinement of the theory's application. As the modern portfolio theory is to be applied to a credit portfolio, a discussion on key elements of the modern portfolio theory is considered appropriate at this stage.

The elements are: Theory of choice, the efficient set theorem, expected return and risk, the effect of combining assets in a portfolio, the limit of diversification and the challenges in applying modern portfolio theory to portfolios of credit assets.

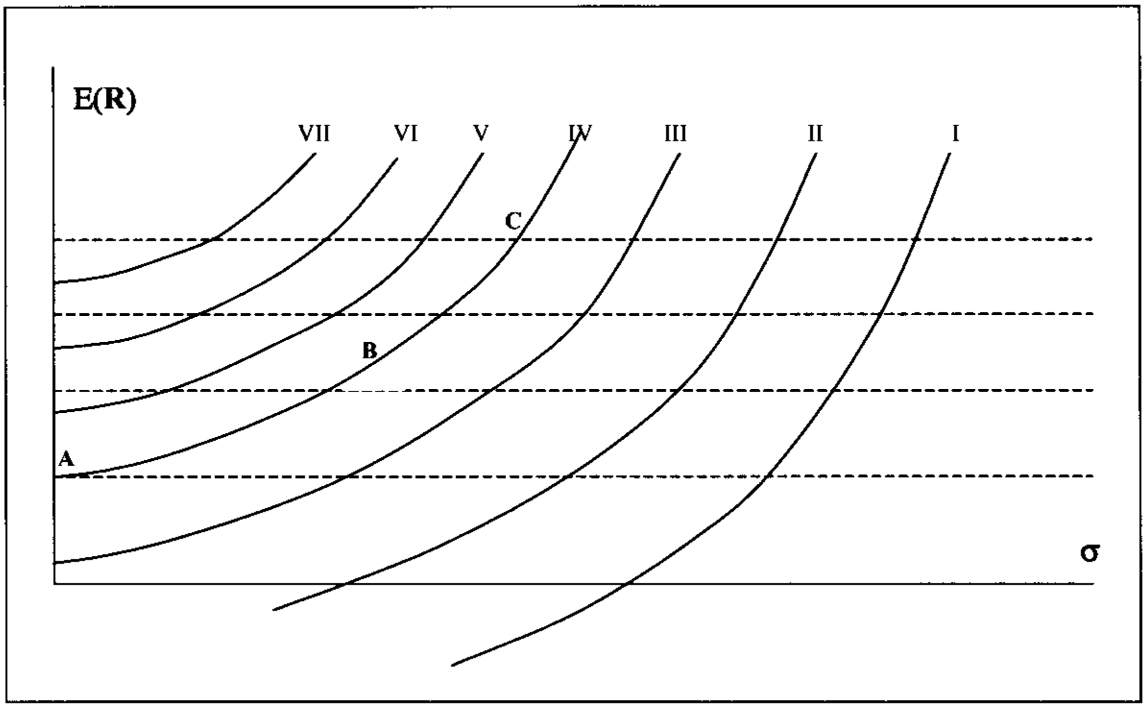
3.4.2 Theory of choice

The predominant assumption to many decision models in finance is that of risk aversion as it involves the utility theory and the notion of diminishing marginal utility of wealth. Diminishing marginal utility leads directly to risk aversion, and this risk aversion is reflected in the capitalisation rate investors apply when determining the value of an organisation. A risk-return trade-off is always present for different levels of total utility when dealing with a risk-averse individual. As the riskiness of an investment increases, the risk-averse investor strives toward a higher return to compensate for the higher risk, in other words, decision-makers will require a higher return to accept greater risk. A risk premium is thus required.

Using the expected return (defined later in this section with calculating methodology), different combinations of the mean and variance of return (or square root of the variance – standard deviation), can be measured and plotted on a graph. This measurement provides an absolute measure distribution of values around the expected return and illustrates the risk-averse investor's indifference toward risk given a certain return on his investment (the trade-off between risk and return – points A, B, and C in Figure 3.5).

The key assumptions necessary to draw the indifference curves of risk-averse investors are that people prefer more wealth to less and that they have diminishing marginal utility of wealth. This relationship as illustrated by the investor indifference curves in Figure 3.5 (lines I to VII), represents the theory of choice. E(R) refers to the expected rate or required rate of return while σ refers to the degree of total utility.

Figure 3.5 Mean-Variance Indifference Curves



Source: Weston & Copeland (1992:362)

When evaluating risk trade-off a distinction can be made between two main components or types of risk namely covariance and diversifiable risk. Covariance risk is also known as systematic risk or as Bodie *et al.* (1996:194) calls it, market or non-diversifiable risk (Smithson, 2003:34 - "undiversifiable" risk). Diversifiable or non-systematic risk is sometimes referred to as institution-specific or unique risk (Bodie *et al.,* 1996:194) or residual risk (Smithson, 2003:34).

Systematic risk (also known as the average covariance) cannot be diversified away as it arises from the way that the assets "covary" with one another. Systematic risk relates to risks that are associated or correlated with the economy, the portfolio, or industry, depending on the perspective. These include national and international macro-economic determinants such as business cycle (conjuncture), changes in interest rates, inflation, political instability and war.

Unique risk can be diversified away and relates to the individual asset's associated risk. It can also refer to risks inherent to a institution and its activities or inherent to a specific project that may include legal actions against the institution, legal requirements on a project, changes in top management, high marginal production costs, superannuated technology compared to competitors and even the entrance of new competitors.

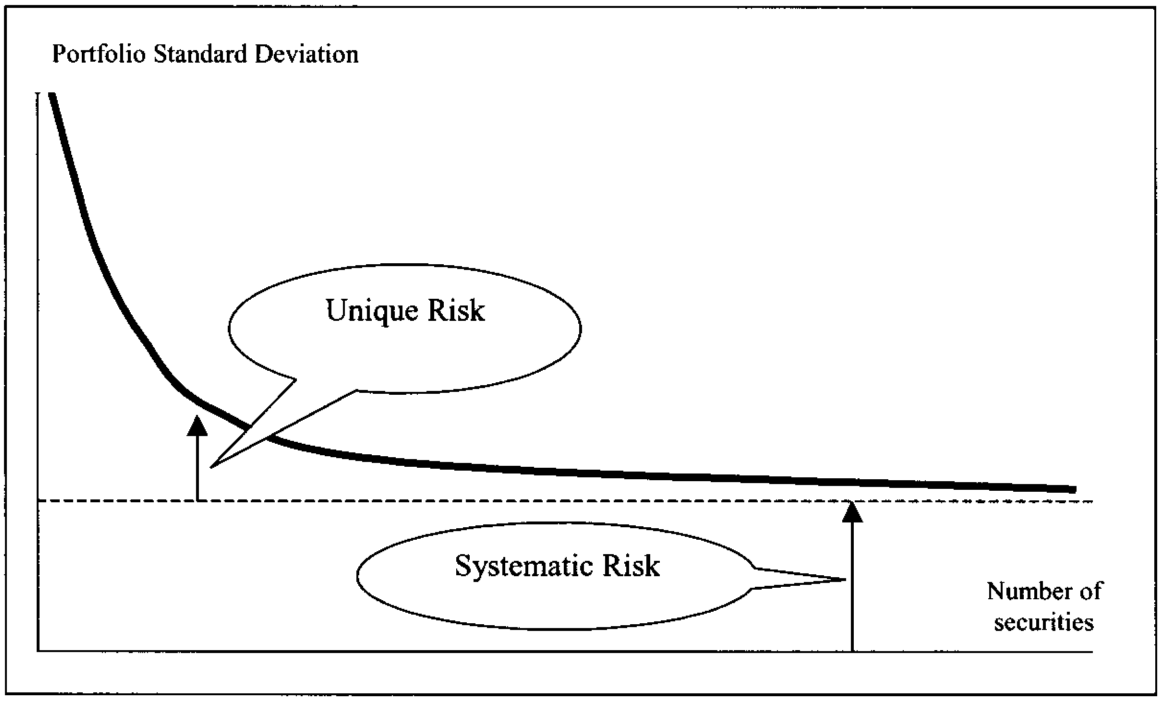
As the covariance relates to market imperfections, and portfolio imperfections, the investor cannot eliminate or avoid this type of risk through diversification and will thus require a risk premium as compensation. A portfolio of assets offers the advantage of reducing institution-specific risk through diversification.

Total risk can thus be stated as:

Total risk	=	**Systematic risk**	+	**Diversifiable risk**
(Variance of returns)		(Covariance risk)		(variance risk – covariance risk)

Total risk	=	**Market related risk**	+	**Institution Specific risk**
(Variance of returns)		(Covariance risk)		(variance risk – covariance risk)

Figure 3.6 As the number of Assets increases, the portfolio risk approaches the average covariance



Source: Smithson (2003:34)

The above relationship between systematic risk and unique risk is illustrated in Figure 3.6, which shows that as the number of assets or investments increases, the portfolio risk approaches the average covariance. Crouhy et al. (2001:65) state that highly concentrated portfolios have a great deal of specific risk as the portfolio components are highly correlated with one another. The more diversified a portfolio, the greater the ratio of systematic to specific risk and *visa versa.*

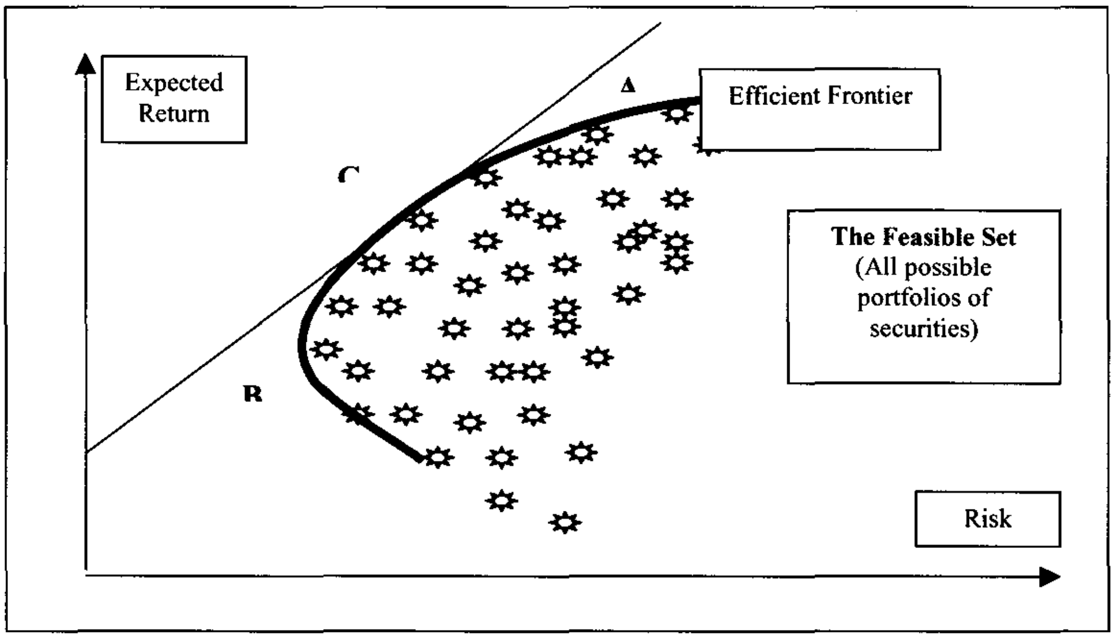
3.4.3 The Efficient Set Theorem

The efficient set theorem provides the philosophy behind the efficient frontier, which in portfolio management is the first step to determine the efficient set of portfolios. The efficient frontier according to Bodie *et al.* (1996:213) is often called the efficient frontier of risky assets. Smithson (2003:27), defines the efficient set theorem as:

"An investor will choose his or her optimal portfolio from the set of portfolios that:

- *Offer maximum expected return for varying levels of risk.*
- *Offer minimum risk for varying levels of expected return."*

Figure 3.7 The Efficient Set Theorem leads to the Efficient Frontier



Source: Adapted from Smithson (2003:28)

The efficient set theorem leads to the efficient frontier i.e. the collection of portfolios that simultaneously maximise expected return for a given level of risk and minimise the risk for a given level of expected return. The challenge of the portfolio manager is to move as closely to the efficient frontier as possible. The efficient frontier is illustrated in Figure 3. 7.

The principal idea behind the frontier set of risky portfolios is that, for any risk level, we are interested only in that portfolio with the highest expected return. Alternatively, the frontier is the set of portfolios that minimise the variance for any target expected return. Conservative investors would choose portfolios towards the lower left side of the efficient frontier (point B), as these portfolios would contain the least risk but would also yield a smaller return. On the other hand, positions closer to the right end of the curve denote high risk and high return investments (point A).

3.4.4 Expected Return and Risk

Since we defined risk as a deviation from an expected value in the beginning of this chapter, it is necessary to define the expected value. Also note the reference made in the previous paragraph on theory of choice regarding the expected return.

According to Du Toit *et al.* (1997:230) the expected value that is required for the measurement of risk refers to the expected rate of return on risky investments. They state: "The expected value is the weighted average of X_i number of results of an experiment. The weight of each result X_i is P_i, the probability that X_i will occur. Weston and Copeland (1992:363) call this expected value the mean or average return and define it as the probability of observing each rate of return, p_i, multiplied by the rate of return, R_i, and then summed across all possible returns.

Possible returns to be earned are based on an expectation of such returns materialising. In modern portfolio theory we refer to expected return, which in statistical terms, is the mean of the return distribution as measured over a certain period of time and according to Smithson (2003:29) can be written as:

$$E[R_i] = \mu_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

where μ_i is the mean of the return distribution for equity *i*.

In order to evaluate risk scientifically, it is necessary to measure the deviation that occurs from an expected value. In modern portfolio theory, risk is expressed as the standard deviation (σ) of the returns of the security. The standard deviation (square root of the variance (σ^2)) allows us to measure risk as it presents information on the degree to which actual rates of return deviate from expected values – a dispersion around expected values. Therefore, the standard deviation for equity *i* is the square root of its variance (σ^2), which measures the dispersion of the return distribution as the expected value of squared deviations about the mean, or in other words, the volatility around the mean. The variance for equity *i* is:

$$\text{Variance:} \quad \sigma^2_i = E[(E[R_i]-R_i)^2] \text{..(2)}$$

The variance and standard deviation provide an indication of an absolute dispersion of a set of values around an expected value (return). A greater standard deviation will mean a greater dispersion of values around the expected value resulting in a greater (larger degree) risk. A major shortcoming of the variance and standard deviation as risk measure is the fact that they cannot be used in comparing the risk of different investments. The reason being that they are both absolute measures of risk.

To overcome this problem, the correlation coefficient (coefficient of correlation), which indicate the strength of the relationship between assets of investments, and the coefficient of variation (covariance) are used. Both these measures are relative measures of risk. The coefficient of variation (covariance) is a measure of relative dispersion of a set of values around an expected value. The relative risks of assets concerned can thus be compared as it gives an indication of the degree of risk for each unit of expected value. The lower the coefficient of variation, the smaller the degree of relative risk.

The correlation coefficient is calculated by dividing the covariance by the product of the standard deviations of the two assets or investments. The correlation coefficient takes on values between −1 and +1, and can be calculated with the following equation:

Correlation coefficient: $r_{ij} = (cov_{ij})/(\sigma_i\ \sigma_j)$..(3)

Where:

r_{ij} = the correlation coefficient between securities (assets) i and j

cov_{ij} = the covariance for the returns between securities (assets) i and j

σ_i = the standard deviation of returns on security i

σ_j = the standard deviation of returns on security j

The coefficient of variation (covariance), a measure of the degree to which two variables move together over time, is calculated by the following equation:

Covariance: $\sigma_{im} = \rho_{im}\ \sigma_i\ \sigma_m$...(4)

Where:

σ_{im} = the covariance between the returns of security i and the market

ρ_{im} = the correlation coefficient between security i and the market

σ_i = the standard deviation of returns on security i

σ_m = the standard deviation of returns on the market

The coefficient of variation (covariance) can also be calculated by obtaining the average of the deviations from the mean.

3.4.5 Diversification

The effect of combining assets in a portfolio is called diversification. The expected return of a portfolio of investments is the sum of each investment's expected return, multiplied by its weighting. In other words, the expected return for the portfolio is the weighted sum of the expected returns of the assets in the portfolio. The equation to calculate the expected return for a two-asset portfolio is:

$E[R_p] = w_1\ E[R_1] + w_2\ E[R_2]$...(5)

A fundamental aspect of the portfolio theory is the idea that the riskiness inherent in any single asset held in a portfolio is different from the riskiness of that asset in isolation. Therefore, when evaluating the riskiness or variance of a portfolio, the variances of risky assets cannot merely be calculated (added) as the sum of the assets in the portfolio. The covariance as well as the correlation between the assets in the portfolio should be included in determining the portfolio variance. The variance of the portfolio depends on the variances of the individual investments or assets as well as on the covariance between the returns for the investments or assets ($\sigma_{1,2}$):

$$\sigma^2_p = w^2_1\,\sigma^2_1 + w^2_2\,\sigma^2_2 + 2w_1w_2\sigma_{1,2} \qquad (6)$$

Or, if expressed in terms of the correlations between the returns of the investments or assets ($\rho_{1,2}$):

$$\sigma^2_p = w^2_1\,\sigma^2_1 + w^2_2\,\sigma^2_2 + 2w_1w_2\rho_{1,2}\,\sigma_1\sigma_2 \qquad (7)$$

The above equation means that unless the equities are perfectly positively correlated (i.e. $\rho_{1,2} = 1$) the riskiness of the portfolio will be smaller than the weighted sum of the riskiness of the investments or assets that were used to create the portfolio. This leads to the conclusion that risk inherent to a specific asset when viewed in isolation, can be reduced or eliminated by diversification within a portfolio of assets.

The benefits of diversification can be calculated mathematically using the following equation:

$$DG = (\sigma_w - \sigma_p)/\,\sigma_w \qquad (8)$$

Where:

DG = Diversification Gains

σ_w = Weighted average of the standard deviations of the assets

σ_p = Standard deviation (risk) of the portfolio

3.4.6 The Limit of Diversification

Combining assets or investments in a portfolio, the risk of the portfolio is less than the weighted sum of the risks of the individual assets or investments unless the assets are perfectly correlated. By continuing to add additional investments to the portfolio, in theory, we can continue to reduce the risk of the portfolio. However, there is a limit to this diversification, a point where the addition of an extra investment to the portfolio will not reduce the overall risk of the portfolio. Full or total diversification is obtained when the total portfolio risk is approximately equal to average covariance. Also refer to the discussion on theory of choice above.

Although a discussion on the beta coefficient, the market theory, the concept of a risk-free asset as introduced by Sharpe in 1964 (Weston and Copeland, 1992:403), the security market line and the Capital Asset Pricing Model (CAPM) forms part of the modern portfolio theory, these concepts are omitted from this discussion and research as the focus is directed to the application of modern portfolio theory on credit asset portfolios.

3.4.7 Summary

In the previous section, the framework for managing credit portfolios from a credit risk perspective, the data requirements and the underlying theory for managing portfolios of loans and advances were expanded on. The discussion focussed on the modern portfolio theory, as originating theory for credit portfolio theory. The discussion addressed the theory of choice, the efficient frontier, expected risk and return and diversification.

The next section aims to explain the credit portfolio theory taking into account the challenges in applying the modern portfolio theory to credit asset portfolios, the application to asset portfolio itself, credit portfolio approaches, funds-transfer-pricing, the Basel II capital accord and performance measures. The discussion will expand on the framework for managing credit portfolios from a credit risk perspective, the data requirements and the underlying theory for managing portfolios of loans and advances.

3.5 Credit Portfolio Theory

3.5.1 Challenges in applying Modern Portfolio Theory to Credit Asset Portfolios

Risk refers to uncertainty. An asset on a stand-alone basis has a probability of default, and when it defaults, it has a certain percentage of its value that is lost. Therefore, certain challenges need to be overcome in applying the modern portfolio theory to credit asset portfolios. These challenges according to Smithson (2003:34) are:

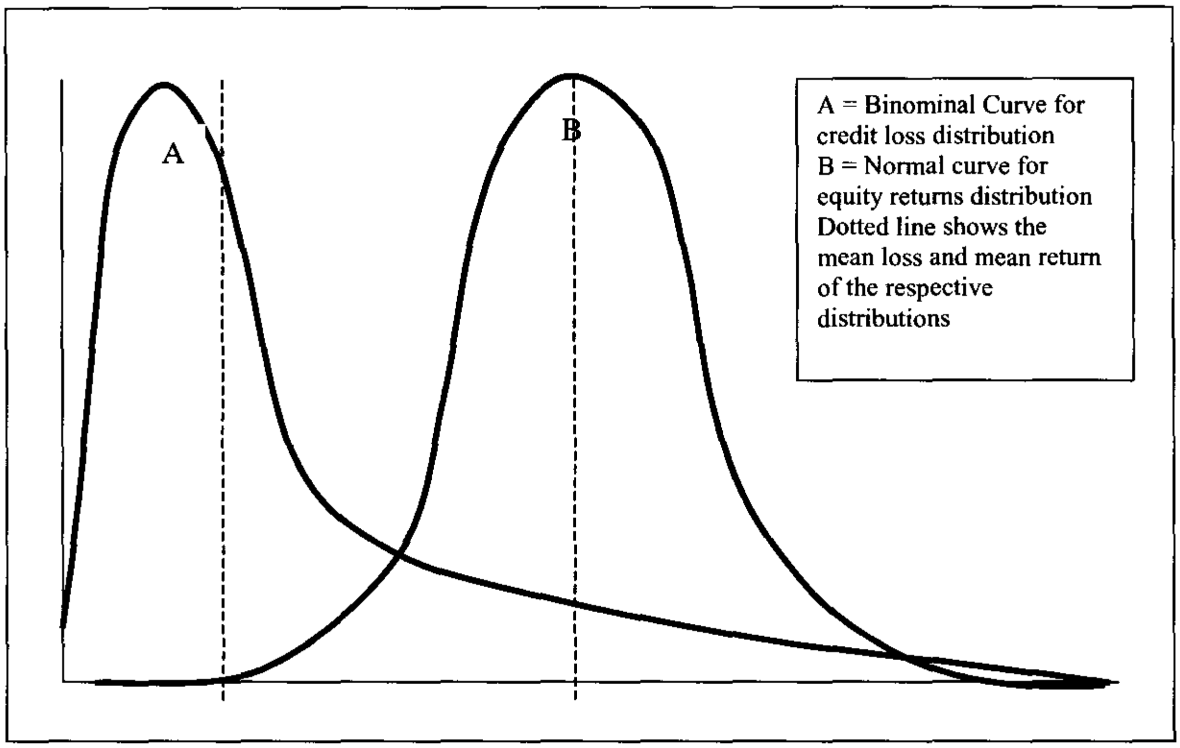
- Credit assets do not have normally distributed loss distributions;
- Overcoming other sources of uncertainty that are prevalent; and
- Implementing modern-portfolio-theory-based models for credit portfolios.

3.5.1.1 Credit assets do not have normally distributed loss distributions

Modern portfolio theory is based on two critical assumptions: the first is that investors are "risk averse" and the second is that security returns are normally distributed. Regarding the first assumption, risk aversion implies that when an investor is offered two baskets of assets where both have the same expected return, but they have different risk, the investor will choose the basket with the lower risk. In this regard it can be argued that investors in credit assets have the same risk aversion propensity as with a stock or equity portfolio. Regarding the second assumption however, the credit portfolio differs significantly from the equity portfolio. The assumption that security returns are jointly normally distributed means that the expected return and standard deviation completely describe the return distribution of each security, implying that if we combine securities into portfolios, the portfolio returns are normally distributed.

From a credit portfolio perspective, the first realisation we have to make is that where in equity portfolios we are interested in returns, a credit portfolio does not have returns. For loans and other credit assets, we are interested in expected losses. What we need to know is whether credit portfolios have normal distributions. In the case of loan and other credit portfolios, the loss distribution is binominal as shown in Figure 3.8.

Figure 3.8 The distribution of equity returns are primarily normal and the distribution of credit losses are neither normal nor symmetrical



Source: Adapted from Smithson (2003:36)

Credit portfolio managers are concerned with a different part of the distribution (the areas in the tail of the distribution) compared to equity portfolio managers who predominantly focus on the area around the mean. The importance of focusing on the tail area is that very small errors in the specification of the distribution will result in a very large impact. The main reason for the credit portfolio manager to be more concerned with the tail end of the distribution stems from the fact that downside risks for a bank is significantly important. As the credit quality of a loan deteriorates, the bank will not be compensated for the additional risk it has to carry, predominantly because the loan pricing in many instances cannot be changed (except when performance clauses allow such changes). Should the loan reach a stage where focus is placed on legal recoveries, resulting exorbitant administrative and legal costs might be incurred which might not be recovered.

The fact that the credit loss distribution is not normal, implies that the mean and standard deviation are not sufficient and that we have to collect large data sets, or alternatively, simulate the loss distribution, or specify distributions that have long tails. The main reason for not having enough data is that loss data can only be collected once default has occurred, at which stage the obligor is bankrupt.

3.5.1.2 Overcoming other sources of uncertainty that are prevalent

Credit asset portfolios leads to sources of uncertainty that do not occur in equity portfolios. We stated that in credit portfolios focus is directed towards losses instead of returns. Expected losses (EL) broken down in components have many uncertainties embedded in each of the components as is illustrated by the following equation:

[Exposure] x [Probability of default] = [Expected loss]...........................(9)

Exposure for instance refers to the amount outstanding at the time of default, which needs to be estimated (EAD – exposure at default), expected loss given the default occurring which in itself is a function of the exposure as well as possible securities (LGD – loss given default – severity) and volatility of loss given default. Probability of default needs to be estimated and is a complicated function of the institution, the industry, economy-wide variables, and management ability. Ong (2000:56) subscribes to this view.

Unlike equity portfolios, the covariance term or covariance of defaults in the case of credit asset portfolios cannot be directly estimated. Much more subtle techniques are required. Significant however, is that the diversification effect for portfolios of loans or other credit assets will be larger than the diversification effect for portfolios of equities.

3.5.1.3 Implementing modern-portfolio-theory-based models for credit portfolios

Due to the underlying nature of different market segment's loan and other credit portfolios, selecting an appropriate credit risk model becomes very difficult. In some cases, like the corporate environment, rules and regulations of the Johannesburg Stock Exchange compel listed institutions to have certain data regularly available. Also, stock prices and market movements are easily available and quantifiable, especially as a result of the normal distribution of returns. However, when models need to be selected for retail credit portfolios or specialised credit portfolios (commercial property finance), these models in many instances need to be developed in-house as they are not always readily available. Another issue to be considered for instance, is the question whether to apply a highly sophisticated model to a third world financial system in a underdeveloped or developing country where in many instances, business acumen, managerial adulthood and financial discipline still need to be developed.

3.5.2 Applying Modern Portfolio Theory to Credit Asset Portfolios

Applying modern portfolio theory to credit asset portfolios requires that certain key variables be redefined. In the previous section, much has been said about expected losses and risk. The following discussion aims to clarify these concepts and provide definitions from a credit asset portfolio perspective. The concepts to be discussed include: expected loss, unexpected loss, and extraordinary loss.

By virtue of conducting business, certain loans granted to clients become bad loans, i.e. the clients credit standing deteriorate and eventually, they are unable to repay the loan. Remedial actions embarked upon do not provide an acceptable solution and such a client moves into ultimate default. Capturing these and historical trends of clients who defaulted as well as their respective associated losses, will allow for the expected loss per portfolio or sub-portfolio to be calculated. Statistically this is the average loss over a period of time. Expected loss (EL) according to Caouette *et al.* (1998:268) is not subject to diversification. A credit portfolio's expected loss is the average of the expected losses of the assets in the portfolio. Ong (2000:94) provides another equation for calculating expected losses, but along the same lines as the one previously provided: Expected loss equals the assured payment at maturity time T, multiplied by the loss given default, multiplied by the probability that default occurs before maturity T. The following equation reflects this relationship:

$$EL = \text{Exposure x LGD x PD} \quad \ldots\ldots (10)$$

Bessis (1999:99) provides a similar methodology. As departure point, he first calculates the loss give default and then calculates the expected loss:

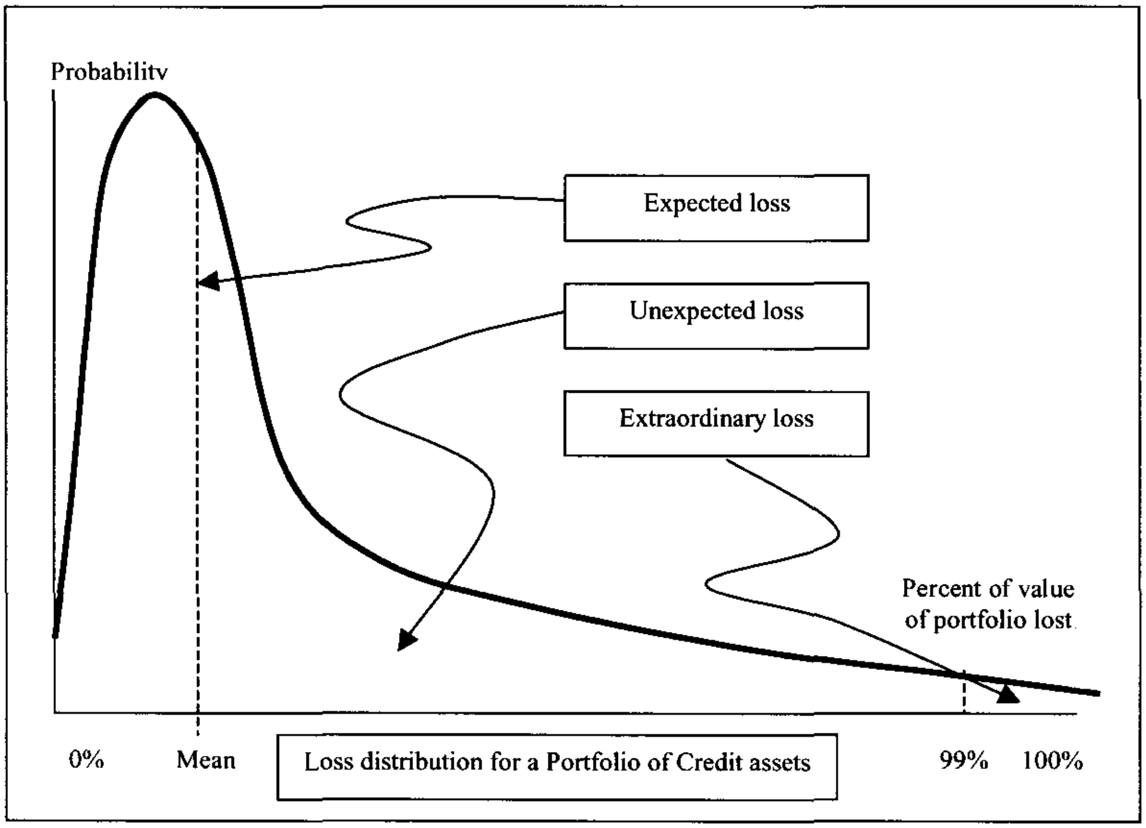
$$
\begin{aligned}
LGD &= \text{exposure} - \text{recovery} \\
&= \text{Exposure x } (1 - \text{recovery rate } \%) \quad \ldots\ldots (11) \\
EL &= \text{LGD x default probability} \\
&= \text{Exposure x } (1 - \text{recovery rate } \%) \text{ x } (\text{PD } \%) \quad \ldots\ldots (12)
\end{aligned}
$$

Expected losses cannot be regarded as a risk to the bank because a degree of certainty can be attached to the probability of these losses occurring. It is what is expected to be lost. These losses will be accommodated in the pricing policy by adding a credit risk margin or credit risk premium for expected losses. The risk is the deviation of the actual loss from the expected loss, the unexpected.

Caouette *et al.* (1998:268) state that the portfolio risk, or unexpected loss, is much less than the average of the risks of individual assets. Unexpected losses refer to the quantum deviation from the expected as defined. For instance, a negative deviation is regarded as unexpected. Statistically this refers to the variance or volatility (standard deviation) from the average losses incurred over a specific period in time. As the unexpected losses are indeed unexpected, a price to be charged (credit risk premium) cannot be calculated. The bank is forced to hold capital (a certain percentage) against an unexpected event occurring. Unexpected losses thus are provided for through the allocation of risk capital. Note that the capital allocation requirements are addressed in the Basel II Capital Accord.

Extraordinary losses (also referred to as exceptional losses) refer to losses, which might occur due to extraordinary events. The probability of this type of loss occurring is extremely low. It will normally result in the bank closing its doors and filing for bankruptcy. The possible effect of extraordinary losses is determined through stress testing e.g. Monte Carlo Simulation and confirms the importance of concentration risk management. The difference between expected losses, unexpected losses and extraordinary losses is illustrated in Figure 3.9. Regarding the portfolio equations provided previously in our discussion on modern portfolio theory, the same are applied to credit asset portfolios.

Figure 3.9 Loss distribution for a Portfolio of Credit assets



Source: Adapted from Smithson (2003:8)

For ease of reference, both the expected return and risk equations from a two-asset portfolio perspective are provided (Smithson, 2003:8):

Expected return: $E\,(R_p) = X_A\,E(R_A) + X_B\,E(R_B)$ ....(13)

Where:

$E\,(R_p)$ = Expected return of the portfolio

X_A = Weight contribution of asset A to the portfolio

$E(R_A)$ = Expected return of asset A

X_B = Weight contribution of asset B to the portfolio

$E(R_B)$ = Expected return of asset B

Variance (risk): $\sigma^2_p = X^2_A\,\sigma^2_A + X^2_B\,\sigma^2_B + 2\,X_A X_B\,\rho_{AB}\,\sigma_A\,\sigma_B$ ....(14)

Where:

σ^2_p = The portfolio variance

X^2_A = Weight contribution of asset A to the power of two

σ^2_A = Variance of asset A

X^2_B = Weight contribution of asset B to the power of two

σ^2_B = Variance of asset B

X_A = Weight contribution of asset A

X_B = Weight contribution of asset B

ρ_{AB} = The correlation coefficient between asset A and asset B

σ_A = Standard deviation of asset A

σ_B = Standard deviation of asset B

3.5.3 Credit Portfolio Approaches

Caouette *et al.* (1998:270) identify several approaches to portfolio management. These approaches together with additional approaches as discussed in Cossin and Pirotte (2001:270) are reflected in table 3.2 below. As can be seen from the information provided, each approach manifests in a credit risk quantification model.

Chapter four takes a more detailed view on these approaches together with some decision-making tools and techniques used to provide certain supporting variables to the models.

Table 3.2. Alternative Portfolio Approaches

Technique	**Author**	**Output**
Optimisation	Morgan (1989,1993)	Portfolio variance relative to the market efficient frontier
Optimisation	Altman (1997)	Optimum portfolio weights
Econometric/ Simulation	Chrinko and Guill (1991)	Industry losses
Econometric/ Monte Carlo	RAROC 2020 (Bankers Trust 1995)	Risk-adjusted return on Capital, daily price volatility, risk limit usage
Econometric/ Monte Carlo	CreditRisk+ (1996)	Expected loss, risk contribution, 99^{th} percentile loss
Econometric/ Monte Carlo	CreditMetrics (Gupton, Finger, and Bhatia 1997)	Portfolio value, standard deviation of value, 1% value, marginal risk
Econometric/ Monte Carlo	CreditVaR I & II – first model analog to CreditMetrics (Canadian Imperial Bank of Commerce)	Second model (II) takes into account stochastic interest rates for the case of credit-sensitive derivatives such as forwards and swaps
Credit Grading	KMV (KMV Corporation) Moody's KMV	Risk rating
Econometric/ Monte Carlo	CreditPortfolioView Wilson (1997)	Portfolio value distribution

Source: Caouette *et al.* (1998:270) & Cossin and Pirotte (2001:270)

3.6 Funds-transfer-pricing (FTP)

The two main tools according to Bessis (2002:311) for integrating global risk management with decision-making are the Funds Transfer Pricing (FTP) system (used for allocating interest income) and the capital allocation system (used for allocating risks). Transfer prices serve as benchmark rates for calculating interest income of transactions, products, segments and business units. Transfer prices also transfer the liquidity and the interest rate risks from the 'business environment' to a bank's ALCO environment (Asset and Liability Management Committee). The capital allocation system will be discussed in paragraph 3.8.3.

Bessis (1999:33) defines funds transfer pricing as internal prices used to transfer resources across business units. From a credit perspective, the funds transfer pricing methodology provides a mechanism to determine the spread or margin received for credit risk related costs.

An FTP system serves several major strategic purposes, including *inter alia* to:

- Allocate funds within the bank between business units;
- Calculate performance margins of transactions at transactional level or any other sub-portfolio of transactions and its contributions to the overall margin of the bank;
- Define economic benchmarks for pricing and performance measurement purposes;
- Define pricing policies: risk-based pricing to compensate the risks of the bank;
- Provide incentives or penalties;
- Provide reports on pricing deviations;
- Transfer liquidity and interest rate risk to ALCO making the performance of business units independent of market movements that are beyond their control.

Transfer prices differ for lending and calculating margins on resources. For assets, transfer prices include all financial costs also referred to as the "all-in" costs of funds with all the factors influencing the cost being included. For deposits, the transfer prices should reflect the market rates on investment opportunities concurrent with lending. A comprehensive pricing scheme includes risk-based references and mark-ups or mark-downs as required.

Table 3.3 provides a view of a comprehensive pricing scheme where commercial incentives and risk-based references are included.

Table 3.3 Risk-based pricing and commercial incentives

Component (%)
Cost of funding
+ Cost of liquidity
= "All-in" cost of funding
- Expected loss from credit risk
= Economic transfer price
+ Operating allocated costs
+ Risk-based margin for compensating credit risk capital
= Target risk-based price
+ Business mark-ups or mark-downs
= Customer price

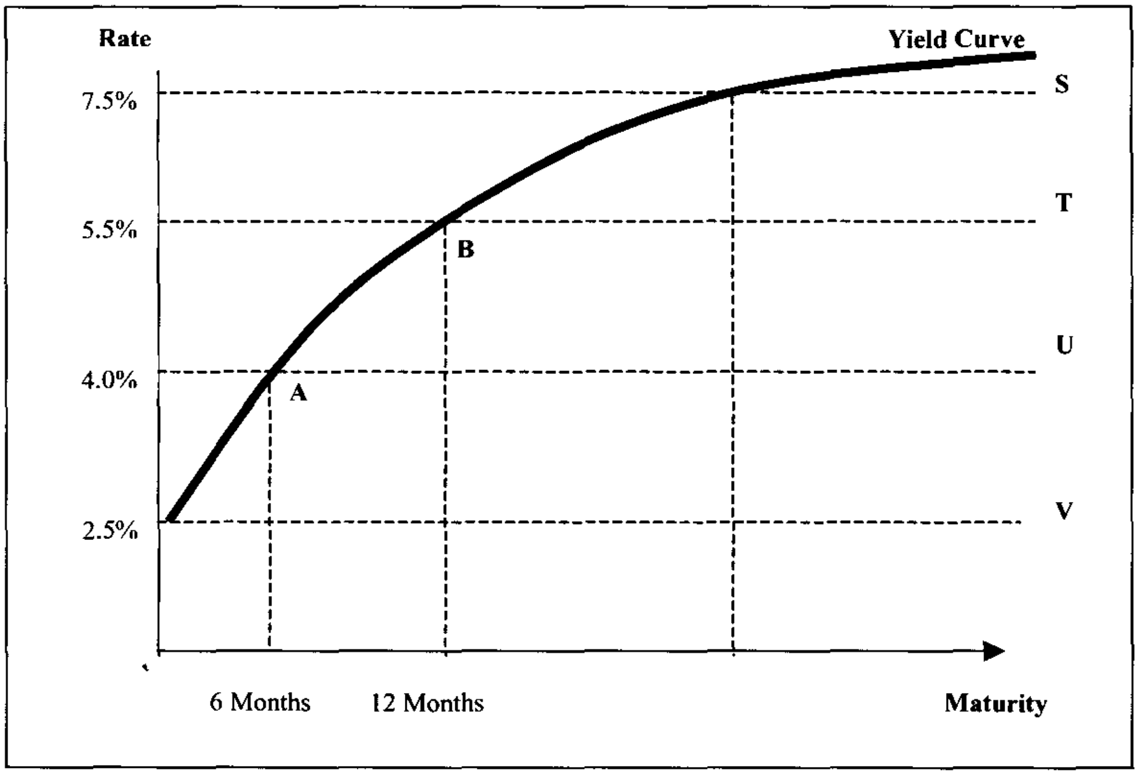
Source: Bessis (2002:328)

Another view, although along similar lines as above, is provided by the following graph and discussion based on a presentation made by Stiven (date unknown:5). He identifies three alternative methodologies for gross funds transfer pricing: coterminous (transaction by transaction, contractual), pooled (whole portfolio, behavioural) and total value (takes optionality into account). KPMG (1999:30) and Hodnett (1998:17) identify the following methods available for funds transfer pricing, namely: single pool method, double pool method, multiple pool method, and the matched funds transfer pricing method.

Focussing on the matched funds transfer pricing methodology, also known as the coterminous method, the pricing margin is divided into its three contributing components, being liability margin, asset margin and the mismatch margin (Refer Hodnett 1998:18 and Stiven above). The liability margin covers liquidity risk and associated costs, the asset margin covers credit risk and associated costs while the mismatch margin covers the interest rate risk.

To illustrate, the following example is provided. Figure 3.10 assumes that competition does not exist. A depositor wishes to make a 6-month deposit at the bank to the amount of x. The market rate for the 6-month deposit equals 4,0% (point A). Furthermore, assume that the banking official offers the depositor 2,5% interest (the customer rate) on the 6-month deposit and he accepts it. At the same time, a borrower requests a 12-month loan for a similar amount. The market rate for such an amount is 5,5% (point B). The bank uses the 6-month deposit to fund the 12-month loan. The banking official offers the loan at an interest rate of 7,5% (customer rate). It can be seen that a liability spread or margin of 150 bp (basis points) are realised on the 6-month deposit-taking transaction (margin between points VU). By using the deposit and making a 12-month loan at an interest rate of 7,5%, an asset spread or margin of 200 bp (basis points) are realised on the 12-month loan (margin between points ST). The difference between the liability and asset spreads (150 bp) is referred to as the mismatch spread or margin due to the difference in the time to maturity (margin between points TU). The asset margin, the liability margin plus the mismatch margin combined, is the total pricing margin.

Figure 3.10 The coterminous method in Gross Funds Transfer Pricing



Source: Adapted from Stiven (Unknown:5)

The following benefits of funds transfer pricing can be formulated:

- FTP removes interest rate risk from business units;
- FTP re-emphasise sales and pricing in business units;

- FTP allocates net interest income (NII) appropriately;
- FTP provides a system applicable for the whole group
- FTP is fair to everyone;
- FTP is easy to understand; and
- FTP reflects reality and market rates.

The importance of the funds-transfer-pricing concept for portfolio risk management lies in the calculation of the asset margin per transaction and client. By adding the asset margins for a given portfolio, the result should be at least sufficient to cover the expected losses of the portfolio. It thus provides a mechanism to pro-actively influence the pricing decision from a credit perspective. Important to note at this stage is to realise that pricing consists of different components and that the influence and calculation have reference to the credit component only!

3.7 The Basel II Capital Accord

In the first chapter, the Basel II Capital Accord was mentioned as a contributor to a new paradigm regarding the manner in which credit risk management is viewed. The requirements as determined by the new capital accord proposals (hereafter referred to as Basel II), are the building blocks for implementing the portfolio risk management approach and require major developments in credit risk management systems, policies, and practices (Absa, 2002a:26). In light of these imperatives, an overview of Basel II is needed.

Basel II has three pillars, namely minimum capital requirements, bank supervision and public disclosure (Basel, 2003a:2). The importance from a data requirements perspective, stems from pillar one, which focuses on capital requirements. In this regard, distinction is made between market risk, operational risk and credit risk (Basel, 2003a:3).

With regard to credit risk, three approaches are proposed: Standardised approach, internal ratings-based foundation, and advanced internal ratings-based (IRB) approach. Banks adopting the advanced-IRB approach, the following elements need to be catered for: Probability of default (PD), loss given default (LGD), exposure at default (EAD) and maturity (Basel, 2003a:5 and 2003b:38). Referring to the discussion in paragraph 3.5.2 and paragraph 3.6 above, the role of these elements as building blocks are emphasised.

3.8 Performance Measures

Hodnett (1998:16) identifies several methodologies that a financial institution needs to adopt in order to implement a risk-adjusted performance measurement framework. These methodologies include, *inter alia* the following:

- Funds Transfer Pricing (already discussed in paragraph 3.6 above);
- Product Costing utilising methods such as (a) use actual costs incurred, (b) use of expected costs, (c) standard costing and (d) activity based costing.
- Credit risk management, mainly discussed in paragraphs 3.5.1 and 3.5.2, and utilising the following methods:
  - Expected credit exposure
  - Expected default rate
- Capital allocation using two basic approaches being (a) top-down approach and (b) bottom-up approach; and
- Non-funded income methodology.

The discussion in the next section is mainly focused at selecting performance measures such as credit risk management and capital allocation. When evaluating performance measures, it should be noted that the evaluation is based on a credit portfolio perspective. In this regard, the performance measures discussed in the next paragraphs, focus on the credit risk component as "contributor" to the overall performance and objectives of the banking institution and not as sole "player" in overall results.

In paragraph 3.6, it was stated that the two main tools for integrating global risk management with decision-making are the Funds Transfer Pricing (FTP) system (used for allocating interest income) and the capital allocation system (used for allocating risks). Paragraph 3.6 discussed the funds-transfer-pricing concept. The allocation of capital is discussed as part of the performance measurements. Before the allocation of capital can be optimised, the return of the capital already employed by the bank needs to be measured. The goal with performance measurement is to move to the efficient frontier (refer to the discussion in paragraphs 3.4.2 and 3.4.3 previously) because it represents the line of minimum risk for a given level of expected return and maximum expected return for a given level of risk.

3.8.1 Risk-adjusted performance measurements (RAPM)

Hodnett (1998:7) identifies several factors that give rise to the use of risk-adjusted performance measures. These factors can be summarised as:

- Pressure on the creation of shareholder value;
- Effective use of capital as scarce resource;
- Impact of new developments in technology;
- Regulatory authorities' requirements in terms of the Basel II accord;
- Increased competition and competitive advantage;
- The securitisation of assets;
- Volatile financial markets making it increasingly difficult to rely on intuitive risk assessments; and
- Management focus towards the different levels of risk.

The most generic risk-adjusted performance measure, as defined by Ong (2000:218), is:

RAPM = (Revenues – Costs – Expected losses)/(Value-at-risk) ....(15)

Where:

RAPM	= Risk-adjusted performance measure
Revenues	= Revenues generated
Costs	= Costs of doing business
Expected loss	= equivalent to the loan loss provision the bank needs to set aside as part of carrying on its daily business activities
Value-at-risk	= is the amount of operating capital needed to cushion the bank against unexpected losses, operating risk, market risk and other conceivable risks (risk capital)

A simple and clear approach amongst all risk-adjusted performance measures is RAROC. Ong (2000:220) states that it is also known by other acronyms, all meaning the same thing, the only difference being where the risk adjustments are done. These are: RORAC and RARORAC (Risk-adjusted return on risk-adjusted Capital) where the risk adjustment is made on both the revenue and capital components of the equation.

Punjabi (1998:294) argues that both the RAROC and RARORAC measures are superior to ROC and RORAC measures, due to the combination of risk-adjusters in the numerators. The benefits of risk-adjusted performance measures according to Hodnett (1998:9) are:

- The assistance provided in the strategic decision-making process by influencing behaviour and strategic direction;
- Performance evaluation on both an ex ante and ex post basis;
- The setting of limits as management will be able to establish position limits based on the amount of capital they are willing to put at risk in a transaction or portfolio; and
- Product pricing and the setting of hurdle rates.

3.8.1.1 Risk-Adjusted Return On Capital (RAROC) & Return on Risk-Adjusted Capital (RORAC)

The most important and most common performance measure used in financial institutions is the RAROC measurement. This statement is mirrored by Crouhy *et al.* (2001:529) as they are of the opinion that the RAROC analysis is the glue that binds an institution's risk management and business activities together. RAROC is a single period measure that can be calculated at the institutional level, business level or the individual transactional level.

Smithson (2003:262) states that, in a RAROC approach, in order to determine whether a transaction creates or destroys value, it is sufficient to compare the calculated RAROC with the hurdle rate. As long as the RAROC of the transaction exceeds the shareholders' minimum required rate of return (hurdle rate), the transaction is judged to create value for the institution, otherwise it will destroy value. Because of the only difference being where the risk adjustment is made, the same views apply to RORAC as performance measure. RORAC therefore, is not discussed under a separate heading.

Hodnett (1998:6) states that the RORAC ratio relates return to the capital at risk and that in order to risk adjust the capital allocation, the risks the business is incurring must be translated into an amount of capital needed to keep the business operational. He defines RORAC and RAROC using the following equations:

RORAC = (Return / Capital at risk) ....(16)

RAROC = (Risk adjusted return / Capital) ....(17)

The RAROC measure uses the same basis as RORAC, but instead of the denominator, the numerator is adjusted for risk. RAROC, according to Smithson (2003:263) can be calculated using the following equation:

RAROC = (Risk-Adjusted Net Income)/ (Economic Capital) ....(18)

Where:

RAROC	= Risk-adjusted return on Capital
Risk-Adjusted Net Income	= Revenues – Cost of Funds – non-interest expenses – taxes and adjustments -/+ costs or revenues – expected credit losses
Economic capital	= credit risk capital + market risk capital + operational risk capital + other risk capital

Non-interest expenses include direct and indirect expenses + allocated costs

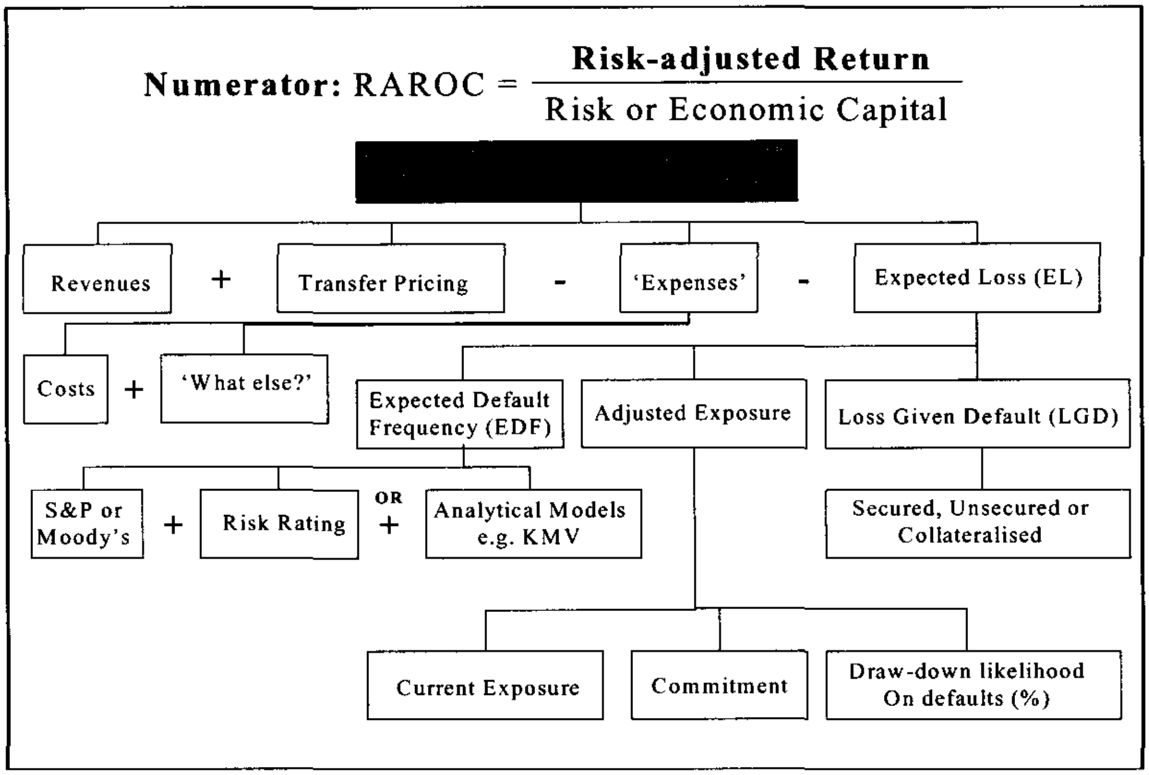
Costs or revenues associated with book capital.

Ong (2000:221) on the other hand provides the following equation for calculating RAROC:

RAROC = (Risk-adjusted return / Risk or economic capital)

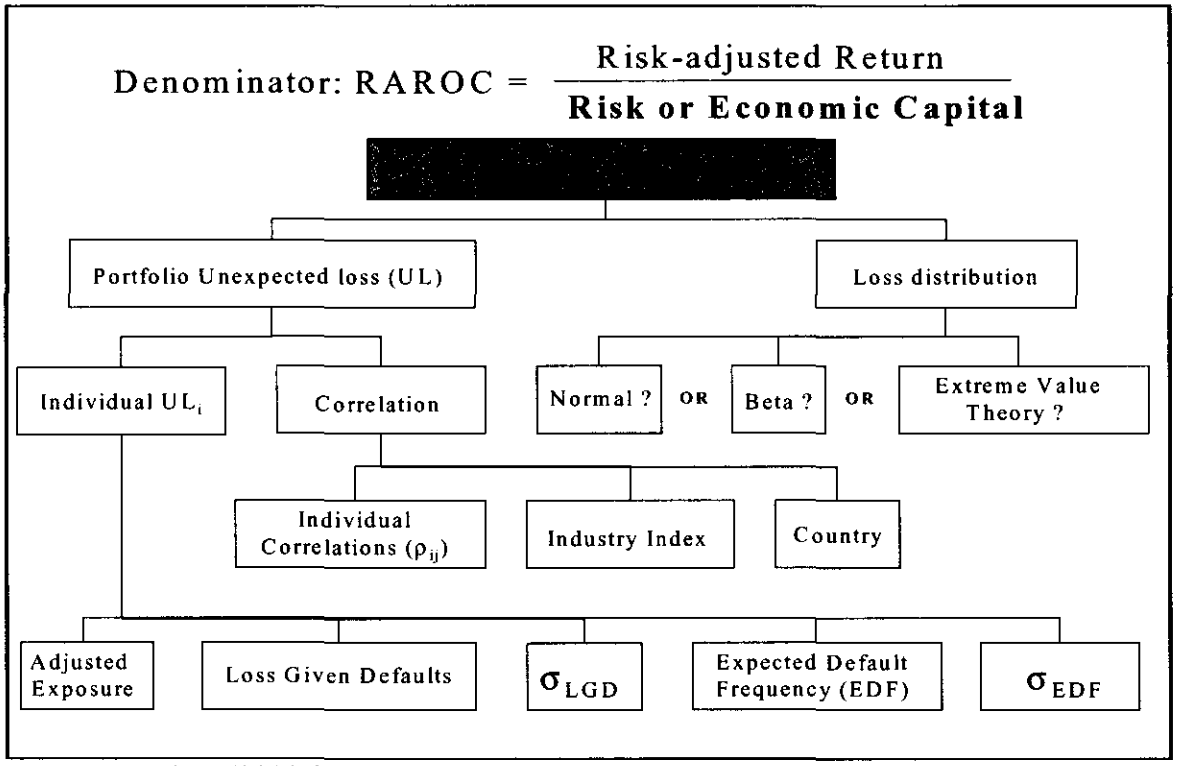
= (Revenues +/- treasury transfer prices – expenses – expected credit losses) / (Capital for unexpected losses)....(19)

Figure 3.11 The numerator of the RAROC equation



Source: Ong (2000:222)

Figure 3.12 The denominator of the RAROC equation



Source: Ong (2000:223)

From the literature study, it was found that Ong (2000:222) provides the most appropriate breakdown and structure of the building blocks and components of the RAROC performance measure. This breakdown is provided in Figures 3.11 and 3.12.

Smithson (2003:263) identifies the following advantages of RAROC:

- It reflects a bank's concern with total risk using economic capital as a risk measure.
- It is easy to implement and to communicate.
- It separates the risks faced by a business unit into those it can influence and those it cannot.
- Through its use of economic capital, it adjusts the risk of an individual transaction to that of the bank's equity by effectively changing the leverage of the transaction – RAROC avoids the need to estimate the external beta of the transaction).

3.8.1.2 Risk-Adjusted Return On Risk-Adjusted Capital (RARORAC)

Punjabi (1998:294) states that RARORAC is a risk-adjusted performance measure in which risk-adjusted return (RAR) is divided by risk-adjusted capital. The risk-adjusted return component of RARORAC is valuable for performance measurement independent of the capital requirement. As a result, RARORAC enables, in a single measure, evaluation of the after-risk performance, risk contribution and capital requirements of a transaction or business. It should however be noted that for credit transactions, when risk-adjusted return is implemented, focus should be directed to the actual portfolio. In this regard Punjabi (1998:297) states that the optimal portfolio is not a realistic objective for credit transactions, particularly for the commercial lending products, for the following reasons:

- The competitive realities of the market-place where spreads are driven down in an efficient market;
- The credit paradox; and

- The difficulty in trading commercial lending products due to the relative high illiquidity of the loans.

3.8.1.3 A comparison of Risk-adjusted performance measurements (RAPM)

The following table provides a risk-adjusted performance measurement comparison between ROC, RAROC, RORAC, and RARORAC (Punjabi, 1998:302).

Table 3.4 Risk-adjusted performance measures compared

Definition	**ROC (Return on Capital)**	**RORAC (Return on risk-adjusted Capital)**	**RAROC (Risk-adjusted return on Capital)**	**RARORAC (Risk-adjusted return on risk-adjusted Capital)**
Typical Measurement	Excess adjusted return/ regulatory capital	Excess adjusted return/ risk-adjusted capital	Excess risk-adjusted return/ regulatory capital	Excess risk-adjusted return/ risk-adjusted capital
Nature of Measure	Measure of profitability relative to regulatory capital	Reflects profitability relative to desired economic (risk) capital	Incorporates market-based risk cost as well as regulatory capital requirements	Pure economic measure: based on bank's desired cushion and market risk adjustments
Hurdle rate	Difficult to calculate; the same hurdle rate may be used for all businesses not because it is correct but because it is easier to implement and communicate		Natural hurdle rate of zero resulting from deduction of risk and other costs; linked to changing business/ portfolio composition and available market opportunities	
Advantage	Straightforward to implement and institutionalise	Links capital need to asset as well as non-asset risks	Combines risk and regulatory costs in one measure	Produces risk-based decisions that appropriately differentiate assets
Limitation	Does not capture different transaction risks	Biased towards acceptance of low-risk assets	Affected by lack of risk differentiation in regulatory capital	Ignores regulatory cost of doing business

Source: Punjabi (1998:302)

3.8.2 Credit Risk Management

Although the concepts of expected credit exposure and expected default rates were discussed in paragraphs 3.5.1.2 and 3.5.2, the following aspects of credit risk management, as risk-adjusted performance measure should be highlighted. Firstly, the calculation of credit risk return (within the context of the generic measure provided in paragraph 3.8.1) is reflected in the following equation:

Credit Risk Return = Standard credit risk – Provisions – Write Offs + Recoveries ....(20)

KPMG (1999:48) identifies the following benefits of measuring expected losses:

- Provides a view of the normal cost of doing business;
- Assist with the determination of pricing;
- Assist in the provisioning and other policies;
- Allows the active management of the book;
- Allows correlation to macro-economic conditions; and
- Allows the lending portfolio to be segmented.

Both Hodnett (1998:36) and KPMG (1999:50) argue that specific areas need to be addressed during implementation, including:

- Level of credit scoring calculation (product vs. customer level);
- Revision of the credit score over the life of the product;
- 'True' profitability of a specific customer;
- Uneven credit losses; and
- Data availability.

3.8.3 Capital Allocation

Crouhy *et al.* (2001:531) define economic capital as the cushion that provides protection against the various risks inherent in the institution's business – risk that would otherwise affect the security of funds that are deposited with, or loaned to, the institution. The purpose of economic capital is to provide confidence to claim holders such as depositors, creditors, and other stakeholders. Economic capital is designed to absorb unexpected losses, up to a certain level of confidence. By contrast, 'reserves' together with loan pricing, are set aside to absorb any expected losses on a transaction, during the life of the transaction. KPMG (1999:54) states that the main role of capital is to act as a buffer against future, unidentified, even relatively improbable losses, whilst still leaving the institution able to operate at the current level of activity – it is an approach to measure risk and to convert the risk into capital required.

As stated above in the introduction to performance measures, two approaches are available for calculating the denominator of the RAPM measure or capital to be allocated, are:

- Top-down approach – Earnings at risk
- Bottom-up approach – Asset volatility

3.8.3.1 Top-down approach – Earnings at risk

The point of departure in this approach is that risk or economic capital is derived from the observed volatility of the bank's earnings. Smithson (2003:243) states that the top-down approach employs earnings volatility (or cash flow volatility) to estimate the volatility of a unit's asset value. Hodnett (1998:37) states that an 'earnings-at-risk' (EAR) amount is calculated by using a number of standard deviations, chosen by management based on their level of comfort, from the bank's mean (average) earnings. In order to convert the EAR-measure into a meaningful risk capital measure, the following three methods can be used:

- Allocate the bank's available equity across the different business units, in proportion to their relative EAR;
- Treat regulatory capital as a cost of doing business as it is the capital required to do business, and risk capital is taken to be equal to the annual EAR; and
- Define risk capital as being equal to the amount of capital, which, invested at the risk free rate, covers the potential downside in earnings.

The respective equations for the above three methods are:

Method I:

(Return) / (total available equity x (EAR of business / EAR of bank))........(21)

Method II:

(Return – opportunity cost of regulatory capital) / (earnings-at-risk) ....(22)

Method III:

Risk capital = (earnings-at-risk) / (risk free rate) ....(23)

The advantage of the top-down approach, according to Smithson (2003:245), is that it provides an estimate of total economic capital. The constraint in the approach however, is that the number of businesses for which you can do a top-down approach, is significantly limited. The business needs to be stable and a high frequency of date is required for the approach to be successful.

3.8.3.2 Bottom-up approach – Asset volatility

Smithson (2003:246) states that the bottom-up designation is derived from the fact that individual transactions are modelled and then aggregated to arrive at portfolio or business unit capital. To determine the amount of capital required for allocation, the potential volatility in the value of the assets is used to determine the potential loss to which the bank could be exposed.

This approach measures the value-at-risk (VaR) of the individual components of risk, which are then aggregated. The approach is similar to regulatory capital, but differs in that it makes use of statistical techniques and is broader in its risk coverage. West (2001:4) defines VaR as the loss experienced by a portfolio to a given level of confidence, over a specified holding period, based on a distribution of value changes. From a credit Var perspective, the distribution follows a binominal curve.

According to Hodnett (1998:40), the value-at-risk can be calculated using the following equation:

VaR = current value of portfolio x sensitivity of portfolio to changes in underlying factors x potential changes in underlying factors ....(24)

The asset is first converted into a standard measure of sensitivity to loss in value and the resulting standardised exposure is then multiplied by the potential change in the sensitivity factor to produce a theoretical loss in value. The derived VAR must then be matched with capital. The VAR needs to be measured for each risk (credit risk, market risk, operational risk, interest rate risk, currency risk, liquidity risk) that drives volatility in the various business units and the individual amounts are then aggregated to determine the risk capital amount to be used in the RAPM-model.

West (2001:30) identifies several other methodologies to calculate VaR, namely:

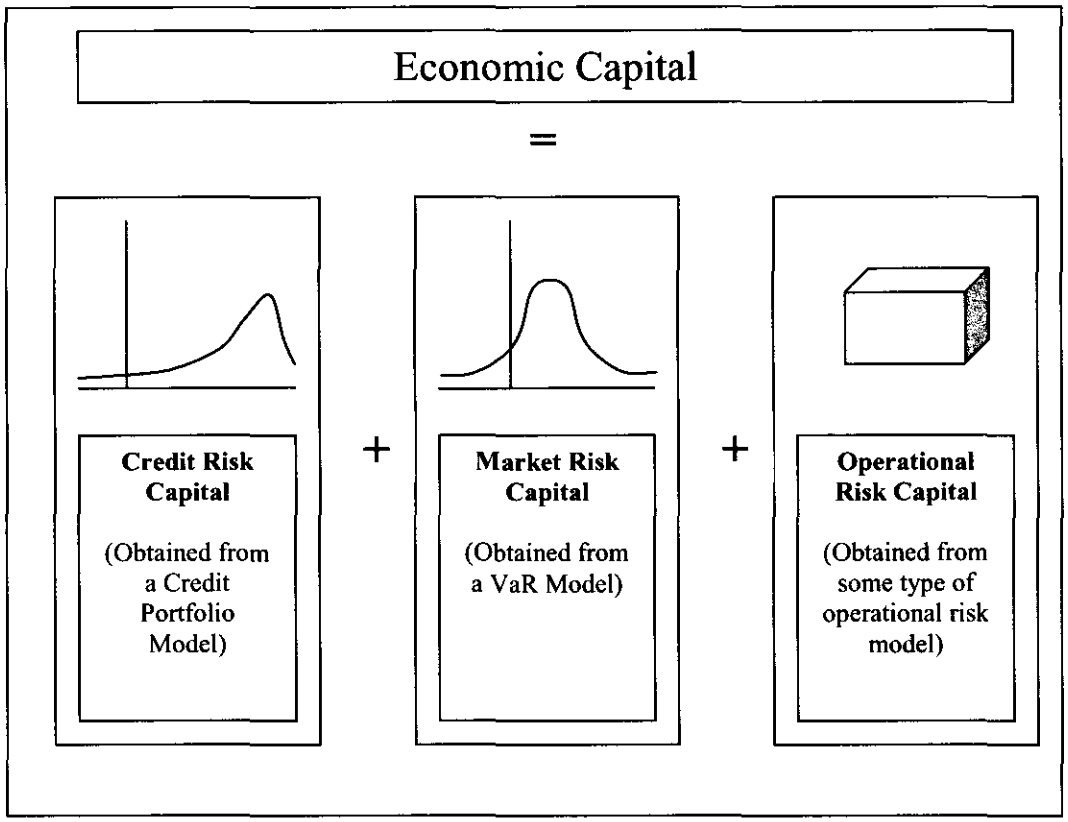
- Simple local revaluation (delta-gamma) method which calculate the risk for a single instrument purely as a function of the current status of the instrument, in particular, its current value and sensitivities, and 'rand equivalents';
- Delta Gamma Delta method, introduced by RiskMetrics in an attempt to overcome the problem that the Delta Gamma method only works when the payoff function is a monotone function of the spot price – usually applied when the distribution is no longer symmetrical around its mean;
- Simple full revaluation method where approximation is eliminated. It shares the delta gamma delta method's weakness in that it assumes that the volatility is known and constant;
- Variance-covariance method recognising the possible interactions (correlations) between the prevailing risks;
- Historical simulation method including classical historical simulation and historical simulation with volatility adjustments; and
- Monte Carlo method used for stress testing and scenario evaluation.

Hodnett (1998:42) identifies specific areas that need to be addressed in the implementation process:

- Treatment of 'excess' capital;
- VAR parameters;
- Validation through benchmarking;
- Funding of resources;
- Regulatory capital; and
- Net vs. Gross Return on Capital (ROC).

Smithson (2003:246) provides an interesting illustration, reflected in figure 3.13, of the bottom-up approach.

Figure 3.13 Bottom-up Approach to Measuring Total Economic Capital



Source: Smithson (2003:246)

3.8.4 Risk-adjusted performance measures as strategic imperative

An overall objective of any institution is to make the best use of available capital by allocating it efficiently to different businesses. The RAROC and RARORAC procedures have value in both performance measurement and capital allocation. These measures evaluate risk-adjusted performance relative to regulatory and economic capital utilisation, respectively.

RAROC enables performance measurement using the expected loss approach together with risk costs of a transaction or business unit and allocates capital based on regulatory standards. RARORAC provides a mechanism for capital allocation tied to the aggregate risk profile (all risks); it takes into account the varying capital requirement across counterparty risk rating.

For an institution with heavy regulatory capital consumption, closer adherence to a hurdle RAROC being achieved by new transactions becomes significant. In the reverse situation where an institution has substantial economic capital requirements, RARORAC has great value.

Punjabi (1998:299) argues that the four risk-adjusted performance measures (RAPMs), Return on capital (ROC), return on risk-adjusted capital (RORAC), risk-adjusted return on capital (RAROC), and risk-adjusted return on risk-adjusted capital (RARORAC), all distinctively measure return on capital and incorporate different forms of risk adjustment.

If the correct performance measure is used, it will result in the correct view of performance on the one hand, but also capital allocation at the business, customer and transaction levels of analysis on the other. The use of performance measures will thus affect not only pricing guidelines, but also institutional strategies and, ultimately, shareholder value, again reflecting on its strategic importance.

3.9 Conclusion

Chapter 3 builds upon the concepts provided in Chapter 2 as it elaborated further on the credit decision, and the role of credit portfolio risk management, while focusing on the portfolio approach and portfolio management theory to be adopted in support of strategy in achieving optimum performance. It provided a framework for managing credit portfolios from a credit risk perspective; the data requirements and the underlying theory for managing portfolios of loans and advances. The discussion is directed to the portfolio approach itself compared to the management component as discussed in Chapter 2. Where Chapter 2 considered the management component and importance of the portfolio approach, the focus in Chapter 3 deviates slightly from the management concept and is directed towards the portfolio approach.

The discussion presented included certain concept definitions, the traditional approach to credit risk management and the evolutionary stages to the modern portfolio theory, portfolio theory and credit portfolio management processes and approaches. Broad overviews on the new capital accord, and Funds Transfer Pricing (FTP) as methodology to determine asset margins to measure credit spread adequacy were addressed. The chapter was concluded with a discussion of performance measurement and the link to corporate strategy and purpose of the organisation as stated in Chapter 2.

In the next chapter, the framework is expanded even further as the approaches to credit risk management, i.e. the quantification models used to quantify credit risk, is discussed. The importance from a managerial perspective for discussing risk quantification techniques lies in the portfolio risk manager's need and requirement to *inter alia* know which models are available that can be drawn upon in the decision-making process, what data requirements prevail, and what outputs can be expected from the different models and techniques. The terminology used: 'approaches' and 'models' will be used interchangeably as the models are based on the approach followed.

The chapter starts with a few selected and related concept definitions from a modelling perspective, a broad discussion of the data requirements for portfolio risk management, followed by an overview of evaluating techniques such as credit scoring in the context of providing certain data as a building block for credit risk quantification. A discussion regarding the approaches or models for credit risk quantification forms the main component of the chapter. The discussion of the approaches/models available is followed by a comparison between the models and a conclusion.

CHAPTER 4

CREDIT RISK QUANTIFICATION APPROACHES

4.1 Introduction

In the previous chapter, the role of portfolio risk management with specific focus on the portfolio approach as "tool" and philosophy by which the credit asset portfolio is to be managed was discussed. The discussion presented includes certain concept definitions, the traditional approach to credit risk management and the evolutionary stages to the modern portfolio theory, portfolio theory and credit portfolio management processes and approaches. Broad overviews on the new capital accord, and Funds Transfer Pricing (FTP) as methodology to determine asset margins to measure credit spread adequacy were provided. The chapter expanded on the concepts provided in Chapter 2 as it elaborated further on the credit decision, and the role of credit portfolio risk management, while focusing on the portfolio approach and portfolio management theory to be adopted in support of strategy in achieving optimum performance. It provided a framework for managing credit portfolios from a credit risk perspective; the data requirements and the underlying theory for managing portfolios of loans and advances. The discussion is directed towards the portfolio approach compared to the management component as discussed in Chapter 2.

Chapter 4 aims to provide an overview of the approaches to credit risk management, i.e. the quantification models used to quantify credit risk. As stated in the previous chapter, the importance from a managerial perspective for discussing risk quantification techniques lies in the portfolio risk manager's need and requirement to *inter alia* know which models are available that can be drawn upon in the decision-making process, what data requirements prevail, and what outputs can be expected from the different models and techniques. The main challenge confronting risk managers in the late 1980's was a standard methodology to quantify and measure risk. During this time, the concept of applying a portfolio approach to credit risk was in early stages of development and had not yet been acknowledged nor applied as a risk management tool. (Refer to the discussion on the development of the portfolio approach to credit risk as discussed in Chapter 1 and 3).

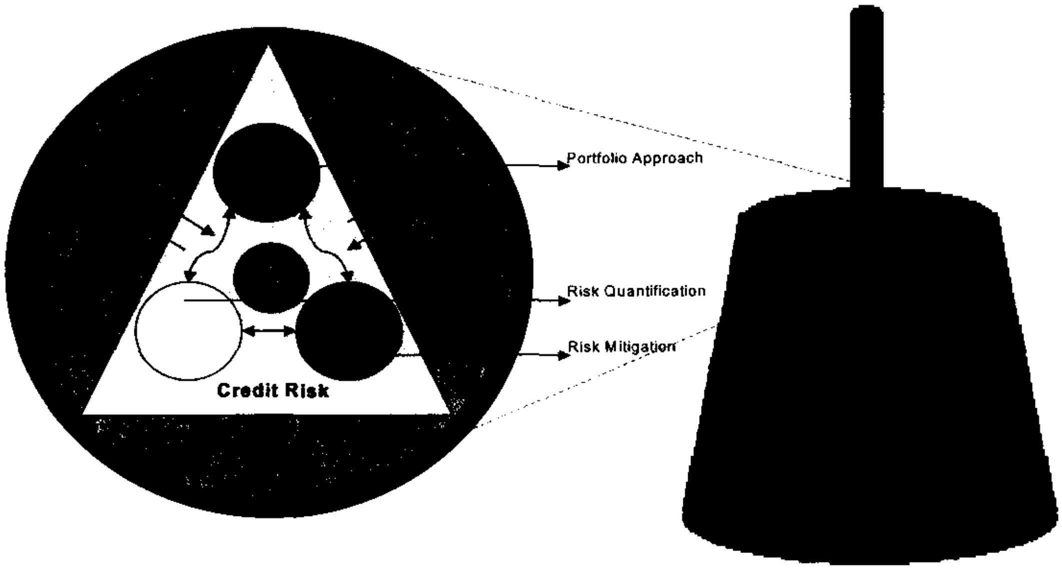
Prior to 1998, only few uncoordinated and fragmented efforts had been directed at quantifying credit risk. The main focus was directed towards risk management and the management of losses. In 1988, the Basel Committee of the Bank for International Settlements, a group of banking regulators from the world's leading industrialised nations, first attempted to regulate the amount of capital banks held as a cushion against credit risk. This however applied only to internationally active banks in the G10 countries (Basel 2003a). The Asian crisis in 1998 shook the world's financial systems and renewed focus was directed to developing models for quantifying credit risk and allocating capital for credit risk in the credit portfolio. The Basel Committee revisited the 1988 Accord, and the New Capital Accord (Basel 2003a) was proposed as a benchmark for all financial institutions competing globally. Financial regulators in many countries have adopted the new regulations as a benchmark for doing business in the global village.

The capital adequacy requirements provided renewed impetus for credit risk modelling techniques and tools to assist in the quantification and measurement of credit risk. Over the last few years many new approaches to credit modelling have been presented. Some have been proved, and many are new additions in the market and are yet unproven. The development of these models is still continuing with many existing models reaching further iterations of refinement on their initial developments.

It is more difficult to model credit risk than market risk for several reasons. Firstly, the lack of a liquid market makes it difficult to price credit risk correctly. Secondly, true default probabilities in the market cannot be observed. Users must either determine these probabilities by inferring default rates based on observed historical experience of the public credit ratings (Moody's KMV Credit Monitor), or determining the default rates through a subjective credit approval process. Thirdly, default correlations are difficult to observe and measure making the aggregation of credit risk extremely difficult. Lastly, to calculate the capital/equity cushion, it is necessary to estimate the tail risk probabilities of asymmetric, fat-tailed loss distributions.

Referring to the thesis framework provided in Chapter 1, and highlighted components in the beginning of each chapter, Figure 4.1 provides the reader with a graphic illustration regarding the component being discussed and its relative position in context of this research:

Figure 4.1. Literature study: Chapter 4 – Credit Risk Quantification



Source: Author 2003

The purpose and layout of this chapter *inter alia* are to provide an overview of models and approaches available for credit risk measurement and credit risk quantification. It is not claimed that all available models are accounted for. Neither does the discussion intend to cover all available models. The focus is on the mainstream models being used in the industry. It is also not the intention to discuss the models in detail as the developers of the models provide enough information in the explanatory documentation of their methodologies, models and their internal mechanics.

The author is of the opinion that a detailed discussion of the different models is not appropriate given the theme of this research (management focus and not quantitative in nature). However, the credit risk portfolio risk manager can ill afford to be ignorant of the available models and their respective points of departure and underlying assumptions. In this regard it should be noted that the most fundamental assumption with regard to this thesis and specifically this chapter is that the knowledge and application, which include the advantages, disadvantages, model assumptions, model shortcomings and applied methodologies concerning these quantification models, is expected as a given. The reason stems from the focus of this research being directed towards the management process of credit asset portfolios and not at the statistical construct of the credit quantification models.

Chapter 4 starts with a few selected and related concept definitions to be aware of from a modelling perspective, a broad discussion regarding information technology and the data requirements for portfolio risk management, followed by an overview of evaluating techniques such as credit scoring in the context of providing specific data as a building block for credit risk quantification. A discussion regarding the approaches or models for credit risk quantification forms the main component of the chapter. The discussion on available models is followed by a comparison between the models and a conclusion.

4.2 Concept Definitions

A discussion on quantitative techniques requires that certain related concepts be defined. The purpose of providing concept definitions is done to define the concepts relating to the approaches as it is viewed as the most appropriate place to do so. An understanding of the concepts aims to assist in the process approach to credit risk management as specified roles of the credit portfolio risk manager should be related to these concepts. Selected concepts being defined include model risk (provided again for ease of reference - initially defined in chapter three), back testing, model calibration, stress testing, mark-to-market valuation, and mark-to-model valuation.

4.2.1 Model risk

The definition provided in Chapter 3 (paragraph 3.2.7) is repeated for ease of reference. Crouhy *et al.* (2001:579) define model risk, as the special risk that arises when an organisation uses mathematical models to value and hedge securities as the model used can either be irrelevant or incorrect. According to Bessis (2002:21), one of the main contributors of model risk is insufficient data for testing the reliability of inputs and models. When models are used in credit risk, model risk can be quite significant, as major credit events remain scarce.

4.2.2 Back-testing

West (2001:26) states that back-testing is used to verify VaR models as it entails the application of statistical tests to determine if the number of exceptions that have occurred is consistent with the number of exceptions predicted by the model. Crouhy *et al.* (2001:159) define 'back-testing' as the process whereby a bank's internally generated VaR figures are compared with the actual performance of the bank's portfolio over an extended period of time. It is not only a key test to determine how accurate and robust a bank's internal models are, but also forms a vital part of the regulatory oversight of the use of internal models.

Glennon (1998:219) views 'back-testing' as a key component in model validation and defines 'back-testing' as the comparison of expected performance (as predicted by the model using current information) to actual performance after accounts have seasoned beyond the model's performance window. Bessis (2002:411) states that back testing aims to check if measures are in line with actual portfolio variations of value.

Ong (2000:236) defines 'back-testing' from a technical perspective and states that the 'back-testing' of an internal credit risk model becomes quite problematic because the internal credit risk model estimates the probability of credit loss over a longer time horizon (at least one year), resulting in two dilemmas to prevail: Firstly, the time frame required to collect annual loss experiences to achieve a desired level of confidence generally measures in the impractical zone of dozens of years and second, the credit portfolio is extremely sensitive to credit cycles implying that it might take a back-test process through several instances of credit cycles before conclusions can be drawn.

In summary, 'back-testing' thus refers to the process whereby the outcomes generated by internal credit models (future perspective) are mapped to actual credit portfolio performance results (history perspective) in order to minimise the model risk and to ensure that the outcomes of the model can be drawn upon in the decision-making process.

4.2.3 Model calibration

Arvanitis & Gregory (2001:410,417) define calibration or as they tend to refer to it: 'Parameterisation', as the subjective choice of parameters used as inputs to a risk model; also known as 'calibration'.

Calibration according to Bessis (1999:390) on the other hand, refers to the adjustment required when for instance, the value of listed assets, calculated with all the time paths of interest rates are brought in line with the data observed in the market. In other words, a connection between observed prices and calculated prices needs to be established. This adjustment is called calibration and enforces the 'external' consistency with market data.

The above, for purpose of the research, can be translated and defined as the process whereby, any specified probability of default of a portfolio is mapped to actual portfolio default statistics to ensure that the default probability (calculated value) is in line with what is actually happening in the portfolio (observed value). The parameters of the probability of default methodology are the adapted to ensure the same values as the actual portfolio – calibration to what is actually happening.

4.2.4 Stress testing and Scenario Analysis

Crouhy *et al.* (2001:162) define stress testing as the process where stress scenarios are used to calculate the losses that might arise as the result of imagined crises. The crises would be relevant to the bank given the nature of its portfolios. The purpose of stress testing and scenario analysis (analysing the outcomes of different scenarios) is to determine the size (not the frequency), of potential losses related to specific scenarios (Crouhy *et al.*, 2001:232). The major benefit of stress testing and scenario analysis is the identification of the vulnerability of a portfolio to a variety of extreme events (Crouhy *et al.*, 2001:239).

Bessis (2002:411) states that stress testing aims to investigate the possibility of exceptional losses by stressing the value of the risk drivers. Bessis elaborates further and states that stress testing is a common practice to address highly unlikely events (Bessis, 1999:52). The only way in which to deal with unpredictable events that might generate fatal risks is through stress scenarios or 'worst-case' scenarios, where all relevant parameters take extreme values. Those values are considered unlikely, but serve the purpose of illustrating the consequences of such extreme situations.

Ong (2000:237) states that stress testing acts as a control mechanism whereby the sensitivities of a model to various shocks to the model parameters are analysed. The effect of various scenarios on the portfolio can be observed in order to gauge the breaking point, parametric sensitivities and performance of the internal model.

Based on the above, stress testing entails a process whereby the parameters of an internal model are stretched to observe the effects extraordinary and fatal events might have on the credit portfolio, in order to understand the consequence of each scenario on the overall portfolio, in conjunction with other parameters or alone on a stand-alone basis.

4.2.5 Mark-to-market valuation

Mark-to-market according to Ong (2000:266), refers to the methodology where all cash flows emanating from the risky asset is discounted using the appropriate forward curves associated with each credit rating class. Ong (2000:266) states that mark-to-market valuation is an important component of credit risk modelling as the value of a risky asset changes with time, and time provides the opportunity for the asset to change its credit quality, thereby potentially changing its value.

Crouhy *et al.* (2001:445) state that marking a derivatives position to market, at the end of each trading day, each counterparty exchanges in cash the change in market value of their positions, a zero-sum transaction – the counterparty whose position has declined in value compensates the other party for the gain it has made. They argue that by marking-to-market the value of a transaction is one of the most efficient credit enhancement techniques as it can practically eliminate credit risk.

Caouette *et al.* (1998:267) define marking-to-market as valuing assets and liabilities at market prices. Marking-to-market allows for better decision-making as it help in deciding which risks are to be retained in the portfolio and which markets to emphasize.

Absa (2003:3) defines mark-to-market as follows: At a point in time (reporting period) future cash flows on the advances book including the realisation of security should be estimated to derive a fair value (required by the current national accounting standards). These cash flows are discounted at the original effective rate of the loan to obtain the present value of the recoverable amount of the loan (calculating the net present value – NPV) (also refer Bessis, 1999:21 and Bessis, 2002:9,100-108).

In this regard, fair value and mark-to-market value is similar, except that it extends to non-tradable assets such as loans (Bessis, 2002:8). Absa (2003:3) states that specific provisions must be raised for the difference between the carrying value and the recoverable amount of the advance. The methodology used is referred to as the mark-to-market value.

The Basel Capital Accord (Basel 2003b:132) defines mark-to-market as the daily valuation of positions at readily available close out prices that are sourced independently. Mark-to-market value of security therefore implies that the price or value of the security or portfolio is recorded on a daily basis, in order to calculate profits and losses or to confirm that margin requirements are being met. Marking-to-market means to value to the market the daily calculation of debit or credit margins resulting from price fluctuations of the underlying asset.

4.2.6 Mark-to-model and mark-to-future valuation

Bessis (2002:109) states that full mark-to-market valuation used for market risk uses all parameters influencing prices to find the distribution of random values at future time points. The net present value (NPV) of the balance sheet uses a single set of market rates differentiated by maturity, but not by risk class – it does not differentiate the discount rates according to the risk of each individual asset.

In the case of credit risk the interpretation of NPV can be derived in considering that a bank 'borrows' from the market at its average cost of funding, which depends on the risk class. If the bank borrows exactly the amount needed for future repayments inclusive of interest, identical to the cash flows of all assets at the future date, and calculating a NPV, it is called mark-to-model rather than mark-to market. Mark-to-model valuation eliminates some of the drawbacks of the full mark-to-market valuation methodology (Bessis, 2002:109). The Basel Capital Accord (Basel 2003b:133) defines mark-to-model as any valuation, which has to be benchmarked, extrapolated or otherwise calculated from market input. When marking to model, an extra degree of conservatism should be applied.

When isolating credit risk, day-to-day variations due to interest rate fluctuations are not necessarily relevant because the aim is to differentiate future values according to their future random credit states. Credit risk can be priced using the current rates allowing credit spreads only to vary according to the future credit states at the time horizon – the process thus avoids the generation of unstable values due to interest rate risk.

Bessis (2002:109) states that mark-to-future refers to the forward valuation of the assets. It is different from mark-to-market as it addresses the issue of unknown future values using models to determine the possible future risk states of assets.

Aguais and Rosen (2001:10) state that risk management is characterised by the ability to define what may happen in the future and to analyse the various possible alternatives. Using mark-to-future an effective scenario-based framework is created for managing risk and reward across the enterprise. They propose a mark-to-future framework based on five steps, being:

- Scenario generation for risk factors;
- Obligor exposures, recoveries and losses;

- Joint default/ migration;
- Scenario conditional portfolio loss distributions; and
- Aggregation of losses in all scenarios (Aguais and Rosen, 2001:11-14).

4.2.7 Summary

As stated in the introduction, a discussion on quantitative techniques requires a definition of certain related concepts. The previous section defined specific concepts relating to quantitative approaches and techniques such as model risk (provided again although already defined in chapter three), back testing, model calibration, stress testing, mark-to-market valuation, and mark-to-model valuation. The aim of providing these definitions was to define the concepts relating to the approaches. An understanding of the concepts is aimed to assist in the discussion of the process approach to credit risk management in Chapter 7.

The purpose of the chapter was to discuss *inter alia* an overview of models available for credit risk measurement and credit risk quantification. In the first section a few selected and related concept definitions were discussed.

In the next section a broad overview regarding information technology and the data requirements for credit risk management and consequently credit portfolio risk management is discussed. The aim is to sensitise the credit portfolio risk manager about (i) the data required, (ii) the building blocks for portfolio risk management and (iii) the components the process approach needs to cater for in managing credit asset portfolios.

4.3 Information Technology – key for effective credit risk management

The discussion on information technology addresses three main components, namely the information systems, the data requirements and the credit screening models.

4.3.1 Information Systems and Technology

Bessis (2002:72) comments that information technology plays a key role in banks in general, and in risk management particularly, because:

- Risk data is continuously improving in quality and quantity;
- New model development and usage across the banking environment produce new measures of risk; and
- Actively using the new risk measures necessitates dedicated front-ends for user decision-making.

Risk data extends from observable inputs (market prices) to new risk measures (VaR, Capital, EL, UL, Ratings, RORAC, RAROC, RARORAC, and EaR). New risk data warehouses are required to meet the risk management requirements (Bessis (2002:72). These include data collation, organising the data collection process, historical data storage. New risk models (quantification models) produce various risk measures across the different risks e.g. operational risk, market risk and credit risk measures. The scope of the Information technology (IT) department needs to be broadened and should extent to the implementation of these models to produce the required data in a usable format.

Bessis (2002:73) states that the challenge for the IT department is to bring the information to life because it requires new generation tools capable of on-line queries and analyses embedded in front-ends and reporting. IT is required to assist in designing risk, profitability and business reports so that they integrate smoothly within the bank's processes. In this regard Bessis (2002:74) argues that multidimensional reporting is dependent on the extensive usage of new tools:

- Slicing and dicing the portfolio across different dimensions and combinations of dimensions (e.g. reporting risk-adjusted profitability by market segment, business unit, product or combined);
- Drill-down functionality to determine which transactions are sources of risk for subsets of transactions (e.g. which transactions/ obligors contribute most of the risk of a market segment, business unit, product and/ or other sub-portfolio, or determining which transactions make a risk metric (exposure, expected loss, risk allocation) higher than expected; and

- 'What if' simulation capabilities to find and analyse the outcomes of various scenarios (e.g. adding or withdrawing a transaction, business line, product, or sub-portfolio, or conducting sensitivity analyses to determine which risk drivers have the greater impact on risk components, or when considering rebalancing the bank's sub-portfolios to obtain an optimum portfolio construct in terms of risk and reward).

New releases of risk software increasingly embed such functions for structuring and customizing reports.

4.3.2 Data Requirements – The key to effective credit portfolio risk management

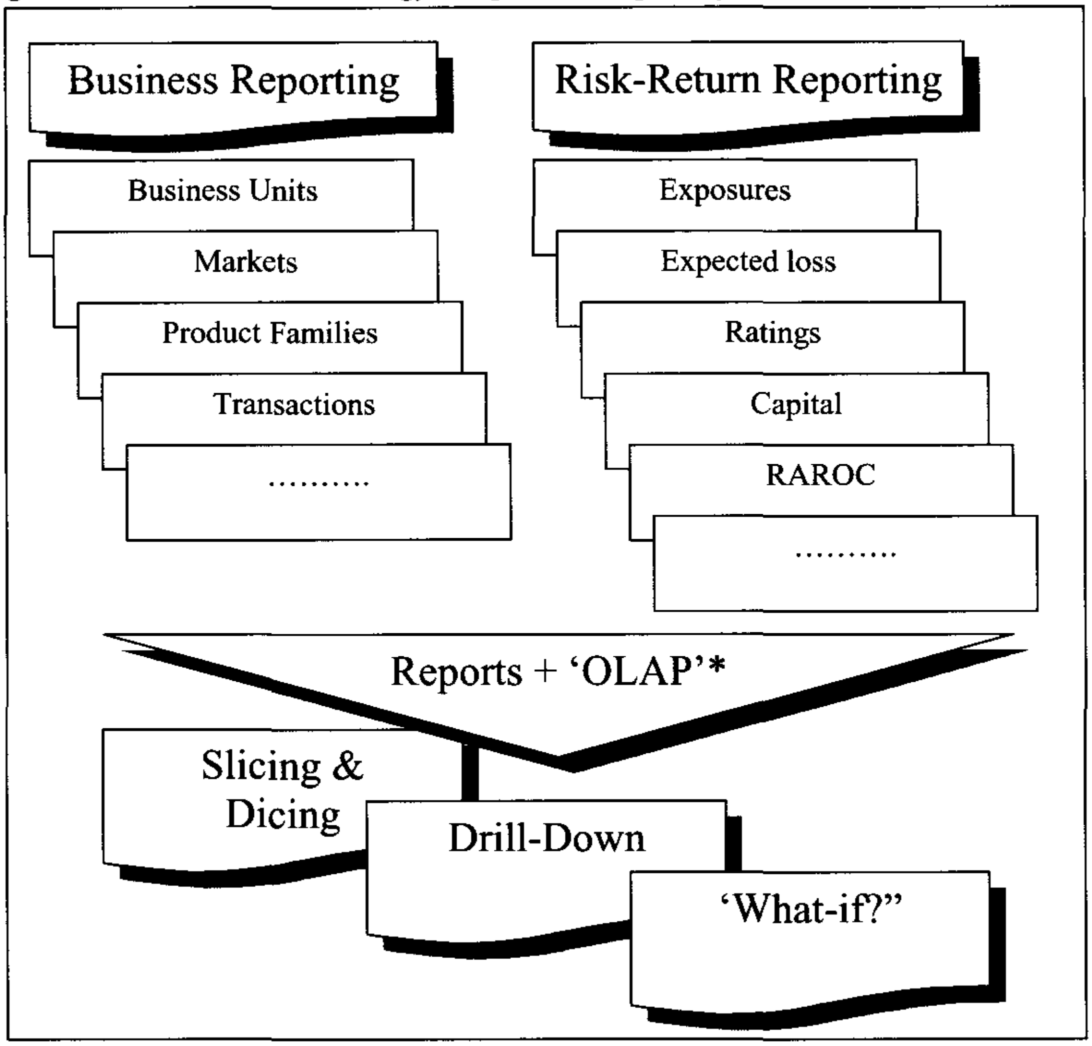
Multiple risk measures generate several new metrics for risks, which supplement the simple and traditional book exposures for credit risk (Bessis, 2002:73). Data requirements are being extended to accommodate three reporting dimensions namely a risk dimension, profitability dimension and business dimension. The risk dimension includes expected losses, unexpected losses, capital and risk allocations, mark-to-market valuation measures of loan exposures, mark-to-model valuation measures, mark-to-future valuation measures. The profitability dimension includes various profitability measures (from traditional earnings to risk-adjusted measures ex ante and ex post), at all levels, transactions, sub-portfolios, and the total portfolio. The business dimension includes business lines, transactions, product families, market segments or business unit sub-portfolios (Bessis, 2002:73). Combining several risk dimensions with profitability dimensions and business dimensions requires multidimensional reporting abilities and remains an enormous challenge. The multiple dimensions and related reporting challenges are illustrated in figure 4.2.

As stated above, the challenge for the IT department is to bring the information to life. However, specific data elements are required to allow the necessary analyses and enable the required transition to information. Data elements required could be identified using the requirements proposed by the Basel II Capital Accord. In this regard, the following elements can be identified (Basel, 2003b:38-120):

- Exposures per exposure type and asset class;

- Risk weights;
- Risk components (PDs, LGDs, EADs, and Maturity) including default rates, loss rates, recovery rates;
- Provisions;
- Ratings;
- Time horizons (assessment horizons);
- Profitability measures e.g. asset margin and cost of funding (FTP);
- Security values (collateral, guarantees, LTV-analyses); and
- Capital calculations (allocation and requirement).

Figure 4.2 Information Technology and portfolio reporting



* OLAP = On-line Analysis and Processing

Source: Bessis (2002:73)

Ong (2000:63) identifies the following credit risk elements as essential components for prudential risk management:

- Individual risk elements:
    - Default probability;
    - Recovery rates; and
    - Credit migration reflecting credit quality.
- Portfolio risk elements:
    - Default and credit quality correlation; and
    - Risk contribution and credit concentration.

Ong (2000:104) further notes that several ingredients are necessary for estimating the expected loss of a single risky asset in a two-step default process, which are:

- Adjusted exposure:
    - Outstanding exposure;
    - Committed exposure; and
    - Usage or exposure given default.
- Loss given default:
    - Secured or unsecured.
- Expected default frequency;
- Maturity; and
- Internal risk class rating.

Bessis (2002:694,696) provides a more specific list of data requirements culminated in a portfolio risk overview report, summarised in the following:

- Total exposure value X;
- Total LGD value;
- Average LGD percentage;
- Expected loss value EL;
- Expected loss to exposure ratio (EL / X);
- Portfolio loss volatility (LV_p);
- Loss volatility as percentage of exposure (LV_p / X);
- Sum of the transaction loss volatilities (Σ LV_i);
- Diversification effect, or retained risk ((Σ LV_i / LV_p);

- Diversity score exposure;
- Concentration index exposure;
- Diversity score capital (in excess of EL);
- Concentration index capital;
- Loss percentile at 99% (L[99%]);
- Loss percentile at 99% to exposure ratio (L[99%] / X);
- Loss percentile at 99% to portfolio loss volatility ratio (L[99%] / LV_p);
- Loss percentile at 99% to Σ of transaction loss volatilities (L[99%] / (Σ LV_i);
- Capital in excess of Expected loss (K_{EL} [99%] = L[99%] – EL);
- Capital in excess of Expected loss to exposure ratio (K_{EL} [99%] / X);
- Capital in excess of Expected loss to portfolio loss volatility ratio (K_{EL} [99%] / LV_p);
- Capital in excess of Expected loss to sum of the transactions loss volatilities ratio (K_{EL} [99%] / (Σ LV_i);
- All-in spread (AIS);
- Expected spread (ES = AIS – EL);
- All-in spread to exposure ratio or ROA (AIS / X);
- Expected spread to exposure ratio or expected ROA (ES / X);
- Capital in excess of the expected spread (K_{ES} [99%] = L[99%] – (AIS – EL);
- Capital in excess of the expected spread to exposure ratio (K_{ES} [99%] / X);
- Cost of Capital ρ, pre-tax and pre-operating costs;
- RAROC ratio (AIS – EL) / (L[99%] – EL); and
- Shareholders Value Added (SVA = ES – k x K_{EL} [99%]).

Smithson (2003:41-107) identifies the following data requirements:

- Default rates and probabilities of default;
- Recovery rates and recovery rate in the event of default;
- Utilisation and utilisation in the event of default;
- Loss rates and loss rate in the event of default; and
- Correlation of defaults.

Bessis (2002:702) states that risk information has several characteristics making risk data management a serious challenge:

- Risks are multidimensional;
- Requires interactive investigation by end-users; and
- Require moving back and forth from synthetic Value at Risk (VaR) to underlying sources of risk.

As a prerequisite for risk hedging, the different sources of risk need to be identified. Therefore, adequate risk data warehouses, effective model integration and interactive software for monitoring of risks are required. The role the IT department has to play is key in the implementation process as IT should provide the necessary interfaces for data gathering, running models and reporting through interactive front-ends with end-users (Bessis, 2002:702). Because credit risk information is a complex set of data, the credit risk data warehouse should be a dedicated database for collecting credit risk data in order to analyse it. On-Line Analytical Processing (OLAP) and data-mining allow various analyses to be performed along multiple dimensions relevant to monitoring risk, identifying its sources, detecting patterns across transactions and providing all reports for conducting business.

4.3.3 Sources for Credit Portfolio Management

In the previous paragraph, the data requirements for effective credit portfolio management were identified. The data requirements provided however, can be classified into four main elements or required components, namely probability of default, the recovery rate in the event of default, utilisation (exposure), and the correlation of defaults (Smithson, 2003:41).

The discussion to follow provides an insight regarding the various data sources for these components. It should be kept in mind that the sources provided are external sources, and although not explicitly stated, a credit portfolio risk manager can obtain all the relevant data from internal sources through in-house developments. Furthermore, depending on the market segment being considered, external and internal sources can be combined depending on the circumstance. From the literature consulted in compiling this research, the work done by Smithson (2003) in explaining the various models and approaches, was found to be very comprehensive.

In this regard, the remainder of the discussion relies very heavily on the insights provided by him.

4.3.3.1 Probability of default

Estimates of probabilities of default according to Smithson (2003:42) can be obtained from four major data sources, namely:

- Historical Data;
- Models using Financial Data;
- Probabilities of default implied from Equity Data; and
- Probabilities of default implied from Credit Spread Curves.

4.3.3.1.1 Historical data

If the obligator is publicly rated, historical probability of default data can be obtained from debt rating agencies or from an empirical analysis of defaults. Several sources are available namely (Smithson, 2003:41-47):

- Debt Rating Agencies:
  - Standard & Poor's Risk Solutions' CreditPro[1] ;
  - Moody's Investors Services;
  - Moody's Risk Management Services; and
  - Fitch Risk Management.
- Empirical Analysis of Defaults:
  - Marginal Mortality Rate (Ed Altman).

4.3.3.1.2 Models using Financial Data

According to Smithson (2003:49), all financial statement data models are rooted in Altman's Z-score measure. The various models predict current default probabilities using financial statement data and proceeds predominantly in two steps (Smithson, 2003:47):

- As historical data on defaults is related to observable characteristics (financial data) of individual institutions, the relation between defaults and the financial statement data is obtained using statistical estimation (regression analysis, discriminant analysis, maximum likelihood estimations, probit and logit estimations, neural networks, or proximal support vector machines).

- Using the current values of the observable characteristics of the individual institution as inputs, the relations quantified in the previous step are used to predict the likelihood of default (or credit rating).

Financial statement data models predicting probabilities of default are (Smithson, 2003:49-71):

- Altman's Z-Scores and ZETA®[2] Credit Risk Model – Zeta Services, Inc.;
- CreditModel - Standard & Poor's Risk Solutions;
- Default Filter - Standard & Poor's Risk Solutions (also referred to as IQ Financial's Default Filter initially developed by Bankers Trust Company);
- Credit Rating System (CRS) – Fitch Risk Management purchased from Credit Suisse First Boston;
- RiskCalc for Private Companies – Moody's Risk Management Services labelled as a multivariate probit model of default;
- Private Firm Model – Moody's KMV; and
- BondScore – CreditSights (a hybrid model combining two types of models; a structural model based on Merton's option-theoretic view of institutions, where default would occur if the value of the institution's assets falls below some critical value and a statistical model where financial data on the institution are related to default experience).

The financial statement models are summarised in table 4.1.

Table 4.1 Summary of Financial Statement Models

Model	Theoretical Underpinning	Model Analytics
ZETA Credit Scores	Empirical relation between historical defaults and institution-specific financial statement data	Discriminant Analysis
S&P's CreditModel	Empirical relation of credit ratings (defaults) to industry, region, and financial data	Proximal Support Vector Model 26 industry and region-specific models
S&P's Default Filter	Uses borrower credit information and macroeconomic forecasts	Neural Network Impact of anticipated macro factors through changes in GDP, interest rate, FX
Fitch Risk Management's Credit Rating System	Empirical relation of long-term issuer ratings to financial and market data	Multivariate Statistical Model
Moody's RiskCalc for Private Firms	Empirical relation of default probabilities to financial data	Probit Model
Moody's-KMV Private Firm Model	Similar to CreditMonitor (Moody's-KMV Public Firm Model): Distance to default calculated from estimates of asset value and volatility	Multivariate statistics to determine asset volatility from sales, industry, and asset size

Source: Adapted from Smithson (2003:72)

4.3.3.1.3 Probabilities of default implied from Equity Data

Models where the probabilities of default are implied from equity data are (Smithson, 2003:71-85):

- CreditMonitor and CreditEdge – Moody's-KMV;

  CreditMonitor and CreditEdge (Web-based version) produces estimates of the probabilities of default for publicly traded institutions by implying the current market value of the institution's assets and the volatility of the value of those assets from equity market data. The models use the 'Merton insight', which is that debt behaves like a put option on the value of the institution's assets.

In order to operationalise the Merton approach, three things should be known, namely; the value of the institution's assets, the volatility of those assets and leverage. Implementing the KMV approach (which uses the Merton insight) entails three steps:

- Estimate asset value and volatility of asset value – KMV uses the Black-Scholes insight that equity is equivalent to a call on the value of the institution's assets.
- Calculate the distance to default (DD).
- Calculate the default probability – KMV views as Expected Default frequency (EDF).

➢ Moody's RiskCalc for Public Firms (In 2002 Moody's acquired KMV and the KMV models were re-designated as Moody's-KMV models);

➢ BondScore – CreditSights (see paragraph 4.3.3.1.2);

➢ BondScore derives an empirical relation of default probabilities to financial data and market value/ equity data. The type of statistical model used is a logistic regression, the same as is done in Moody's RiskCalc for Public Companies. BondScore was developed using default data from several sources and statistical of default probability with multiple inputs/ drivers;

➢ CreditGrades – RiskMetrics Group (developed by the RiskMetrics Group and a consortium of financial institutions – Deutsche Bank, Goldman Sachs, and JPMorgan Chase)

CreditGrades was released in 2002 and differs in two respects from the other models:

- The goal of the model is not the same as the model is designed to track credit spreads and to provide a timely indication of when a institution's credit becomes impaired (modelling aims differ: accurate spreads versus accurate default probabilities and estimation data differ: market spreads versus actual defaults); and
- The manner in which the model input parameters are derived also differ, the other a literal interpretation of the structural model

approach while CreditGrades approach is more practical, bypassing strict definitions regarding market observables.

4.3.3.1.4 Probabilities of default implied from credit spread curves

In 1995 Jarrow and Turnbull introduced a model of credit risk that derives the probability of default from the spread on an institution's risky debt (Smithson, 2003:85) called the Jarrow-Turnbull model. The model and subsequent extensions are widely used for pricing credit risk; however, according to Smithson (2003:85) the probabilities derived are not typically used for risk management (except for marking-to-market) because a liquidity premium is included in the probabilities.

Other models available where probabilities of default are implied from credit spread curves are (Smithson, 2003:42&86):

- Kamakura's KRM-cr; and
- Savvysoft's FreeCreditDerivatives.com.

4.3.3.2 Recovery rate in the event of default

External data on recoveries can be obtained from mainly two types of industry studies (Smithson, 2003:92-98):

- Firstly, those that focus on ultimate recovery (the actual recovery after a defaulted obligor emerges – 'emergence' defined as curing a default, completing a restructuring, finishing liquidation, or emerging from bankruptcy.
- Secondly, those based on secondary market prices (Another common definition for recovery is the trading price of the defaulted instrument after default, usually 30-60 days).

4.3.3.2.1 Ultimate recovery data

Sources to obtain ultimate recovery data according to Smithson (2003:92) include:

- Standard and Poor's Portfolio Management Loss Database (PMD); and
- Fitch Risk Management's Loan Loss Database.

4.3.3.2.2 Studies based on secondary market prices

Studies based on secondary market prices according to Smithson (2003:95) include:

- Altman & Kishore data also available in the RiskMetrics Group's CreditManager Model;
- Standard and Poor's bond recovery data as reflected in its CreditPro product; and
- Moody's bond recovery data.

4.3.3.3 Utilisation (exposure) in the event of default

Very little data is available on utilisation in the event of default (Smithson, 2003:98). As departure point, a portfolio risk manager should start with a conservative estimate, which assumes 100% utilisation in the event of default. The assumption can be scaled down as evidence supporting a lower that 100% utilisation is presented, which might include an adjustment for the type of facilities being used as discussed in Chapter 3 (paragraph 3.2.3.2).

As with recovery data, the sources can be characterised as either 'internal data' or 'industry studies' (Smithson, 2003:98-101). Studies on internal data available are:

- Study of Utilisation at Citibank: 1987 – 1991; and
- Study of Utilisation at Chase: 1995 – 2000.

Industry studies include:

- Standard and Poor's Portfolio Management Loss Database (PMD); and
- Fitch Risk Management's Loan Loss Database.

4.3.3.4 Correlation of defaults

Smithson (2003:102) indicates that correlation is not 'something that is loaded into the credit risk model' but rather 'something that is inside the model'. Default correlation, a major hurdle in the implementation of a portfolio approach to the management of credit asset portfolios, cannot be directly estimated. Smithson (2003:102-107) illustrates that two approaches to default correlation are being used, namely; correlation as an explicit input, and correlation as an implicit factor.

4.3.3.4.1 Correlation as an explicit input

Two sub-approaches are used when regarding correlation as an explicit input. These are:

- The KMV approach (asset value correlation where the default correlation is a characteristic of the obligor and not the facility); and
- The RiskMetrics Group (RMG) approach (equity value correlation – similar to KMV but the implementation of correlation is simplified: asset value returns are not directly modelled in a factor structure but are simulated using a correlation matrix of asset returns derived from returns on publicly available equity indices and country and industry allocations).

4.3.3.4.2 Correlation as an implicit factor

According to Smithson (2003:105), implicit factor refers to the phenomena that there is no explicit input for any correlations or covariance matrix in the model but they are regarded to be inside the model all the time. In factor models, the correlation between two institutions is implied by the factor loadings of each institution on a set of common factors, and in some instances, by the correlations amongst the common factors e.g. Moody's-KMV Portfolio Manager.

Two sub-approaches are used when regarding correlation as an implicit factor. These are:

- Factor models; and
- Actuarial models (e.g. CreditRisk+)

4.3.4 Quantitative Credit Screening models

Discussing risk quantification and the models and approaches requires an overview of the existence of certain quantitative screening models, also to be used in deriving probabilities of default. The reason for this is that these models would in many instances provide specific information and data to quantify credit risk. The intention is not to provide an in-depth discussion as to the way these models work. The application and interpretation is regarded as a science by itself. The aim is to provide the types of models used and how they assist in the quantification efforts to credit risk.

Coyle (2000:53) defines credit scoring as a method of credit assessment that uses statistical techniques, which can be based on financial ratio analysis, for measuring the likelihood or probability that an applicant for credit will pay or repay in full and on time.

Caouette *et al.* (1998:158) distinguish between two broad categories of credit risk models: Credit approval models (used in reaching a decision concerning whether to extend credit) and behavioural scoring models (used to improve the profitability of accounts by subjecting them to different treatments with regard to credit lines offered and collection methods used, based on statistical analysis of account use and payment behaviour).

Models used to generate so-called pre-approval lists use ingredients of both credit approval and behaviour scoring models, as well as data regarding account activity that has been reported to credit bureaus by lending institutions.

Mays (1998:v) refers to these models specifically as credit scoring models as a result of the scores generated to assist in the decision-making process. These models are predominantly used to automate the decision process in instances where the decisions required are not complex and which saves on human intervention and the costs thereof. Another reference made to these models is automated underwriting (Mays, 1998:vii).

The importance of credit screening models for credit portfolio risk management stems from the scores generated as the score (a proactive measure allowing future portfolio performance to be quantified today), has become a single number surrogate measure for the quality of a loan or account (Makuch, 1998:8).

Caouette *et al.* (1998:160) states that the presumption underlying credit-scoring models is that there exists a metric that can divide good credits and bad credits into two distinct distributions. The relationship between these two distributions is referred to as the good/bad odds, implying that in the case of a good/bad ratio of 19:1, one account will be bad* out of every twenty scored, over the life-cycle of the account. Important is the fact that the good/bad ratio is derived from the calculated score and can be used as a proxy for default rates (Coyle, 2000:53).

Conversely, the calculated scores can be applied in determining default probability, a key component in the credit risk quantification approach. It should however be noted that the good/bad ratio does not have a specific time horizon. Using it should therefore be to determine default probabilities and should take it into account.

Many generic models are available. Chandler (1998:39) identifies over 30 generic scoring systems containing over 100 different scoring models. These systems are shown in table 4.2.

The table below might not reflect all the different credit scoring systems and models. Others can be added for instance, Probe, Account Management Triad (AMT), Customer Management Triad (CMT), or Credit Bureau models. The table aims to illustrate that many credit-screening models are available and used extensively. These models predominantly focus on the personal segment in banking (individuals).

* Bad in this sense being defined as delinquent and not write-off

Table 4.2 Generic Scoring Models

Scoring System Name	Delivery Institution	Model Developer	Type
Bankcard Usage Score	Equifax	Equifax	Balance
Bankruptcy Risk Prediction Service	Integrated Solutions Concepts, Inc. (ISC) subsidiary of Visa U.S.A	Fair, Isaac/ ISC	Bankruptcy
Bankruptcy Navigator	Equifax	Equifax	Bankruptcy
BEACON	Equifax	Fair, Isaac	Risk
CARcredit	Equifax	Equifax	Risk – auto
Cardholder Risk Identification Service (CRIS)	Visa	Visa	Fraud
Credit Table		Fair, Isaac	Risk
Desktop Underwriter	Fannie Mae	Fannie Mae	Mortgage Risk Assessment
EMPERICA	TransUnion	Fair, Isaac	Risk
Enhanced Delinquency Alert System (EDAS)	Equifax	CCN/ MDS (Part of Experian)	Bankruptcy / Risk
Equis	Equifax	Equifax	Segmentation
Experian Revenue Opportunity Indicator (ROI)	Experian	Fair, Isaac	Revenue
Experian National Risk Model	Experian	Experian	Risk
Experian Bankcard Response Model	Experian	Experian	Response
Experian CollectScore Model	Experian	Fair, Isaac	Collection
Experian/ Fair, Isaac Model	Experian	Fair, Isaac	Risk

Source: Chandler (1998:39)

Table 4.2 Generic Scoring Models (Continue)

Scoring System Name	Delivery Institution	Model Developer	Type
Experian Recovery Model	Experian	Experian	Recovery
FACETS	TransUnion	Scoring Solutions, Inc.	Risk Segmentation
FAST START		CCN/ MDS (Part of Experian)	Risk
General Risk Model	Equifax	Equifax	Risk
HORIZON	TransUnion	Fair, Isaac	Bankruptcy
Loan Prospector	Freddie Mac	Freddie Mac	Mortgage Risk
New Delphi	TransUnion	CCN/ MDS (Part of Experian)	Bankruptcy/ risk
Omni Score	GE Capital Mortgage Insurance (GEMICO)	GEMICO	Mortgage Risk
PATROL	TransUnion	CCN/ MDS (Part of Experian) and Trans Insureco Insurance	Insurance
PORTRAIT	TransUnion	TransUnion	Segmentation
Retail Usage Score	Equifax	Equifax	Balance
REVEAL	TransUnion	TransUnion	Home Market Value
Revenue Evaluator (REV)	Equifax	Fair, Isaac	Revenue
REWARD	TransUnion	Fair, Isaac	Collection
RPM (Revenue Projection Model)	TransUnion	Fair, Isaac	Revenue
SENTRY	TransUnion	Fair, Isaac	Attrition
SILHOUETTE	TransUnion	CCN/ MDS (Part of Experian)	Segmentation (Marketing)
SOLO	TransUnion	CCN/ MDS (Part of Experian)	Segmentation

Source: Chandler (1998:39)

Table 4.2 Generic Scoring Models (Continue)

Scoring System Name	Delivery Institution	Model Developer	Type
SPECTRUM	TransUnion	Scoring Solutions, Inc.	Risk
TIE	TransUnion	TransUnion	Income
TRADE	TransUnion	Credit Strategy Management	Retail Revenue
TRW/MDS Bankruptcy Model	Experian	CCN/ MDS (Part of Experian)	Bankruptcy/ Risk
UniQuote	TransUnion	Fair, Isaac	Mortgage Risk

Source: Chandler (1998:39)

Risks scoring models or credit screening models are also used to assess credit applications of commercial clients. These models are primarily based on financial ratios and other financial information pertaining to commercial clients. The models are used in addition to current assessment techniques as applied by bankers today, as a support tool in the decision-making process. An example of such a tool is Moody's Financial Expert System (FES), which include different customer defined system components e.g. Moody's Financial Analyst (MFA), Moody's Risk Advisor (MRA), Moody's LossCalc, and Moody's RiskCalc.

4.3.5 Summary

In the first section of this chapter specific concepts relating to quantitative approaches and techniques were defined. These included concepts such as model risk (provided again although already defined in chapter three), back testing, model calibration, stress testing, mark-to-market valuation, and mark-to-model valuation. It was stated that the aim of focussing on these definitions was to define the concepts relating to the approaches. Furthermore, it was stated that an understanding of the concepts should further clarify the discussion of the process approach to credit risk management in Chapter 7.

In the second section information technology and the data requirements for credit risk management was discussed. The discussion further addressed credit portfolio risk management as it sensitises the credit portfolio risk manager regarding, (i) The data required, (ii) The building blocks for portfolio risk management, and (iii) The components the process approach needs to cater for in managing credit asset portfolios. The discussion regarding the information technology addressed three main components, namely: Information systems, the data requirements and the credit screening models. The purpose of incorporating the section is not only to illustrate the role IT has to play in providing the required data and information to the credit portfolio risk manager, but also to focus on certain screening models can assist in the process of data and information delivery.

The next section concludes Chapter 4 with a discussion on the approaches or models for credit risk quantification. The discussion aims to create an awareness regarding the different approaches available for credit risk quantification. This awareness is required as the models provide specific outcomes that should be used by the credit portfolio risk manager fulfilling his or her role. The approach followed in managing credit asset portfolios should cater for these deliverables as it forms part of the decision-making process.

4.4 Credit Risk Quantification Approaches

4.4.1 Introduction

Chapter 4 commenced with a few selected and related concept definitions to be aware of from a modelling perspective. This was followed by a broad discussion regarding information technology and the data requirements for credit risk management and also portfolio risk management, followed by an overview of evaluating techniques such as credit scoring in the context of providing specific data as a building block for credit risk quantification. The next section aims to provide an overview of the different approaches or models for credit risk quantification. The discussion on available models is followed by a comparison between the models and finally, a conclusion.

In Chapter 3 (paragraph 3.5.3), several risk quantification approaches were summarised in table 3.2. As stated in the introduction to this chapter, the chapter aims to provide an overview of models and approaches available for credit risk measurement and credit risk quantification. As stated, it is not claimed that all available models are accounted for neither does the discussion intend to cover all available models. Furthermore, a detailed discussion of the different models is felt not to be appropriate given the theme of this research (management focus and not quantitative in nature). However, the credit risk portfolio risk manager cannot be ignorant of the available models and their respective departure points and underlying assumptions. The focus is therefore directed towards the mainstream models being used in the industry.

Before providing an overview of available models, certain aspects of risk measurement should be highlighted. Arguably, the most important aspect to realise when dealing with risk measurement (risk quantification), is the importance of experience combined with common sense. A model should never be allowed to take over the decision-making process (or stated differently, a model is **only** a tool assisting in the decision-making process allowing management to make **better** informed decisions). In this regard, Bessis (1999:53) states that quantitative risk management cannot be a substitute for judgement and that the risk management process should cover both qualitative and quantitative risk assessment.

However, using a model as a supporting tool requires that the 'tool' at least should meet specific criteria of compliance, accuracy and validity. Serfaty (2003:27) states, for example, that any risk measurement system, irrespective of the model selected, must identify possible future outcomes that have a material effect on credit quality of a counterparty or portfolio. The selected risk measure system should therefore remain independent of a subjective or qualitative assessment of future outcomes. In this regard, he proposes a risk measurement framework with four properties ensuring unbiased outcomes, the framework in itself posing a considerable challenge to any credit risk measurement model. The four properties are:

- Forward looking – considers relevant potential risks that effect credit quality;

- Event inclusive – quantifies outcomes that are unforeseeable;
- Objective – input data restricted to observable phenomena; and
- Specific – exclusive to the risk of individual counterparties.

Caouette *et al.*(1998:185) shares this view and state that the ingredients of an effective credit evaluation system should have five key attributes:

- Sensitivity of ratings to real changes in credit quality;
- Lead time with respect to recognised real changes in quality;
- Stability of ratings where no fundamental change has occurred;
- Graduated tiering of risk assessment that facilitates rationality in the pricing of credit and the setting of loan terms; and
- Consistency of ratings across industries, company sizes, and locations.

Smithson (2003:39) notes that banks are the predominant users of credit portfolio modelling, the models being used to accomplish a number of functions:

- Calculation of economic capital;
- Allocation of credit risk capital to business lines;
- Supporting 'active' credit portfolio risk management through loan sales, bond trading, credit derivatives and securitization;
- Pricing transactions and defining hurdle rates;
- Evaluation of business units; and
- Compensation of underwriters.

4.4.2 Approaches in the quantification of credit risk

The following discussion regarding the approaches followed in quantifying credit risk is divided into two sections. The first investigates the different classifications of the quantification approaches, and the second provides a short overview of two such classifications with its components, one the view of Ong (2000) and the other the view of Smithson (2003).

4.4.2.1 Classification of quantification approaches

It appears as if the classification of the different approaches available to credit risk quantification would remain uncertain as the classification of the different approaches differs from author to author. Although each author caters for all the approaches, selecting the approach and associated models remain difficult. Some authors classify the approaches in two broad categories, others again use three broad categories, and those using three broad categories differ in the classification of the three broad categories. This tendency is illustrated by the following discussion:

Serfaty (2003:26) is of the opinion that risk measurement deals with the *probability of distress* events and argues that the specific nature of the distress event, its presence in all credit-related transactions and its primacy in the chain of events makes it the most acceptable indicator and measure of credit risk.

Saferty (2003:26) identifies three common approaches to measuring default risk, being:

- Relative value models;
- Averaged fundamental value models; and
- Specific fundamental value models.

Aguais *et al.* (2003:85) on the other hand, group the above three approaches identified by Serfaty (2003:26) into two categories of common approaches to credit risk modelling: (i) a structural approach originally developed by Merton in 1974 (Weston and Copeland, 1992:436,443) that treats the institution's asset value process and its capital structure as the underlying determinants of expected default rates and (ii) the reduced-form or intensity-based approach which does not specify an underlying model of asset value and capital structure, but instead models default as an unpredictable jump event governed by a stochastic intensity process.

In the structural approach the equity and debt of the institution are seen as options on the underlying institution's value. The models following the structural approach assume that default occurs if the institution's asset value falls sufficiently below the value of its debt. In the reduced-form approach, also referred to as rating-based models (where the reduced form approach has been extended to include multiple, discrete, credit states or ratings), the stochastic intensity processes describing default events or, more generally, credit-state transitions, are directly calibrated to market prices. In defining recovery rates in the event of default exogenously, no particular assumptions on the capital structure of the institution or the priority in bankruptcy is required (Aguais *et al.*, 2003:85).

This difference between the two approaches as discussed, is shared by Cossin and Pirotte (2001:15&85). Although a clearer explanation regarding the probability of default in the reduced-form approach is provided as they state that the calibration of the probability of default is made with respect to rating agencies' data or to financial markets series acting as state variables.

Bessis (2002:459&479) uses a different classification from the above as he differentiates between three types of models for credit risk, namely statistical models, econometric models and the option approach. Statistical models are defined as linking observable attributes of borrowers to actual ratings or to observed default or no default events (Bessis, 2002:459). Econometric techniques allow the modelling of default rates of portfolio segments or subpopulations of institutions by risk class, from time series of default rates and economic factors (Bessis, 2002:460). The options approach allows default modelling to follow the principles set up by Merton in 1974 where default is viewed as an 'economic' event triggered by a market value of assets lower than the debt value (Bessis, 2002:479 and Weston and Copeland, 1992:436, 443).

Crouhy *et al.* (2001:426) use the following classification for credit risk quantification models:

- Credit Migration approach (CreditMetrics and CreditPortfolioView);
- Contingent claim approach (KMV);
- Actuarial approach (CreditRisk+); and
- Reduced-Form approach (Kamakura).

4.4.2.2 Credit Portfolio Models

The next two sections provide a comparison between two authors' credit risk model classifications, and which components or models are assigned to each classification. The comparison is done to illustrate that although named differently, the essence remains the same. The first classification methodology is that provided by Ong (2000), and the second is that provided by Smithson (2003).

4.4.2.2.1 Classification according to Michael Ong

Ong (2000:70) deviates from Bessis' classification as he states that three general classes of credit risk models can be identified, namely:

- "Value of the institution" models (contingent claims on a institution's assets);
- "Recovery of promised payoff" models; and
- "Instantaneous risk of default" models.

4.4.2.2.1.1 "Value of the firm" models

According to Ong (2000:70), this model class views the institution's liabilities as contingent claims issued against the institution's underlying assets. The view is taken that the institution's default risk increases as the book value of an institution's liabilities approaches the value of its assets. The institution defaults when the market value of the assets is no longer sufficient to repay the liabilities. Ong (2000:20) further states that default, in this model class, is determined by the time evolution of the institution's assets in relation to the various debt covenants or liability structures. Taking the contingent claims (options) on the institution's assets as underlying framework for the default process, the probability of default can be calculated using certain assumptions.

Difficulty in using these models stems from those assets, which are neither traded nor readily observable in the market. Also, since the 'point of default' is triggered by the evolution of the institution's assets, publicly available credit ratings information is not used which might lead to inconsistency with the imputed default probabilities in the derived model.

Models developed falling in this model class are those developed by:

- Merton in 1974;
- Black and Cox in 1976;
- Shimko, Tejima and van Deventer in 1993.

KMV Corporation's implementation of combining theory with practice in their KMV model also follows this approach.

4.4.2.2.1.2 "Recovery of promised payoff" models

Ong (2000:71) states that this model class in comparison with the 'value of the firm' model class redefines the default process as occurring when the institution's asset value breaches some exogenously specified absorbing boundary. This model class hypothesize that only a fraction of the risky debt known as the 'recovery rate' can be recovered in the event of default.

This model class simplifies the default process of the 'value of the firm' models by making the cash flows to the promised payoff of the risky debt contingent on whether or not default occurs prior to the maturity of the debt. The trigger point for default is still dependent on the value of the institution's assets, so these models also do not use publicly available credit ratings information.

Models developed falling in this model class are those developed by:

- Hull and White in 1995;
- Longstaff and Schwartz in 1992; and
- Nielsen, Saá-Requejo and Santa-Clara in 1993.

4.4.2.2.1.3 "Instantaneous risk of default" models

Ong (2000:71) states that this model class combines both the 'value of the firm' and 'recovery of promised payoff' model classes as this model class also consider a fractional payoff of the promised debt in the event of default. However, the time of default is exogenously modelled by assuming that when the identical but unlevered institution's asset value hits some exogenous boundary, default can occur at any time in the levered institution, paying off a fraction of the promised payoff. The default process is assumed to be independent of the capital structure of the institution.

Models developed falling in this model class are those developed by:

- Litterman and Iben in 1991;
- Jarrow and Turnbull in 1995; and
- Blauer and Wilmott in 1998.

4.4.2.2.2 Classification according to Charles Smithson

Smithson (2003:109) states that three types of credit portfolio models are currently in use, namely:

- Structural models;
- Macro factor models; and
- Actuarial or "reduced form" models.

Smithson however states that in addition to publicly available models (as noted above), many proprietary models have been developed.

4.4.2.2.2.1 Structural models

Smithson (2003:110) elaborates that structural models, also referred to as 'asset volatility models', have a 'structural' aspect to the models based on the fact that there is a story behind default - something happened to trigger the default. Structural models are rooted in the Merton insight as discussed in paragraph

4.3.3.1.3, namely that debt behaves like a put option on the value of an institution's assets.

Default occurs when the value of an institution's assets falls below some trigger level; default is thus determined by the structure of the individual institution and its asset volatility. It follows that default correlation must be a function of asset correlation (Smithson, 2003:110).

Vendor-supplied credit portfolio models of this type include:

- Moody's-KMV Portfolio Manager released in 1993; and
- RiskMetrics Group's CreditManager released in 1997 (also refer to CreditMetrics methodology incorporating both CreditServer and CfeditManager).

4.4.2.2.2.2 Macro factor models

In a Macro Factor Model, defaults depend on the level of economic activity. Macro Factor Models operates on the following methodology (Smithson, 2003:133):

- The state of the economy is simulated;
- The default rate is adjusted to the simulated state of the economy – a higher probability of default rate in contractionary states than in expansionary states;
- Based on the simulated state of the economy, assign a probability of default for each obligor;
- Value individual transactions (facilities) depending on the likelihood of default assigned to the obligor previously;
- Calculate portfolio loss by summing the results for all transactions; and
- Repeat the previous steps a number of times to map the loss distribution.

In factor models, according to Smithson (2003:134), correlation in default rates is driven by the coefficients on the various factors – the state of the economy causes all default rates and transition probabilities to change together.

The first widely discussed macro factor model was introduced in 1998 by McKinsey & Company and was called CreditPortfolioView (Smithson, 2003:134). In order to be able to compare a Macro Factor Model with the other credit portfolio models, Rutter Associates produced a Demonstration Model (a simplified version of a multifactor model) that is similar to the McKinsey model (Smithson, 2003:134).

4.4.2.2.2.3 Actuarial models

Smithson (2003:141) states that the type of model referred to as an actuarial model, could also be referred to as a 'reduced form' model of default. Actuarial models ignore economic causality – a story to explain default is totally absent, and consequently, specific asset values and leverage details for specific institutions are irrelevant. Actuarial models specify a distribution for the default rate and apply statistics to obtain a closed form expression for the joint distribution of loss events. By extension the expected severity can be incorporated to arrive at a distribution of losses.

The best known of the actuarial models is CreditRisk+, introduced in 1997 by Credit Suisse First Boston.

4.4.3 Comparisons

Tables 4.3, 4.4a and 4.4b, provide a comparison between the four mainstream models being used today.

Table 4.3 provides a design comparison between the McKinsey CreditPortfolioView, the Credit Suisse First Boston CreditRisk+, the Moody's-KMV Portfolio Manager, and the RiskMetrics Group's CreditManager models.

Table 4.3 Comparison of Credit Portfolio Models - Design

	McKinsey CreditPortfolioView	**CSFB CreditRisk+**	**Moody's-KMV Portfolio Manager**	**RMG CreditManager**
Model Classification	Factor Model	Actuarial	Structural	Structural
<u>Types of Exposures</u>				
Loans/ Bonds	Yes	Yes	Yes	Yes
Guarantees	Yes	Yes	Yes	Yes
Asset Backed Securities	Yes	Yes	Yes	Yes
Std. Derivatives	Yes		Yes	Yes
Credit Derivatives			Yes	Yes
Contingent Exposures	None	None	Parent/Sub – Yes Guarantor - Yes	Parent/Sub – Yes Guarantor - Yes
Credit Support		Via Loss Given Default	Yes	Yes
Risk Measured	M-t-M or Default	Default Risk	M-t-M or Default	M-t-M or Default
Return included	No	No	Fees and Spreads	All-in Spread
Losses present value	Yes	No	Yes	Yes
Calculation method	Simulation	Analytical	Simulation	Simulation

Source: Smithson (2003:149)

Tables' 4.4a and 4.4b provide an economic structure comparison between the models. Table 4.4a compares McKinsey CreditPortfolioView and Credit Suisse First Boston CreditRisk+, table 4.4b compares Moody's-KMV Portfolio Manager and RiskMetrics Group's CreditManager while table 4.4a and table 4.4b compare the first with the latter.

Table 4.4a Comparison of Credit Portfolio Models – Economic structure

	McKinsey CreditPortfolioView	**CSFB CreditRisk+**
Default rate distribution	Logistic	Poisson for events Gamma for mean default rate
Expected default frequency	Derived from historical data	User input
Default rate volatility	Derived from historical data	User input
Is default rate conditional on the 'state' of the economy	Yes: Expected defaults conditioned on levels of user-defined macro-variables and an institution-specific shock.	Yes: The mean of the default distribution is assumed to follow a Gamma distribution. This approximates a single-factor model.
Contingent exposures	Not specified	Not available
Distribution	Beta	Fixed
Mean recovery	User defined	User defined
Recovery volatility	Not specified	Defined as Zero
Source of correlation	Mean default rates vary with fitted exposure to macro factors	Mean default for all obligors is Gamma distributed. Segments mimic a factor model structure.

Source: Smithson (2003:151)

4.4.4 Summary

The previous section aimed to provide an overview regarding the approaches or models for credit risk quantification. The available models were discussed, followed by a comparison between the models and approaches.

The models and approaches predominantly focussed on the commercial and corporate market segments due to readily available financial data. Developed countries have rules and regulations to which institutions conducting business in those countries need to abide by. The regulations governing the different stock exchanges, for instance require listed companies, to provide regular and updated financial information to the exchange and to the listed institution's shareholders. These requirements in itself enable the application of the different approaches and techniques. The financial and other data available in developing and underdeveloped countries however, remains a major challenge. As stated previously, the quantification of credit risk is a massive challenge – as reflected in the absence of credit portfolio models for the consumer market segment.

Table 4.4b Comparison of Credit Portfolio Models – Economic structure

	Moody's-KMV Portfolio Manager	**RMG CreditManager**
Default rate distribution	Default risk derived from lognormal model of asset values	Default risk derived from lognormal model of asset values
Expected default frequency	As implied by a Merton-style asset volatility model.	Transition matrix supplied by user.
Default rate volatility	Implied by proprietary asset volatility model.	Implied by ratings transition matrix.
Is default rate conditional on the 'state' of the economy	Yes: Asset values are conditioned on equity index factors. Default risk is a function of asset value.	No: Default rates and transition probabilities are static.
Contingent exposures	Changes correlation and/ or default rates	Changes default rates
Distribution	Beta	Beta
Mean recovery	User defined	User defined
Recovery volatility	KMV defined	RiskMetrics defined
Source of correlation	Asset values linked to a global factor model of equity indices.	Asset values linked to country/ industry equity indices.

Source: Smithson (2003:151)

Irrespective of the availability of specific approaches and models for credit risk management and whether models have been developed in-house, experience should always dictate decision-making behaviour. To reiterate, a model should never be allowed to take over the decision-making process (a model remains **only** a tool assisting in the decision-making process allowing management to make **better** informed decisions).

4.5 Conclusion

In Chapter 3 the most prominent and widely used quantification models on credit risk in the banking industry were broadly discussed. The models enable and assist the portfolio risk manager. This should however be applied in conjunction with business sense and experience, and the ability to manage any selected portfolio as the measurement of different aspects in the credit risk equation.

The quantification of a portfolio's credit risk allows for pro-active decision-making in terms of the risk/reward profile on the one hand and in terms of possible opportunities to balance this profile in establishing an optimum asset portfolio composition within the constraints inherent to the larger entity and its strategies on the other hand. As stated in the introduction to this chapter, the aim is to provide an overview of models and approaches available for credit risk measurement and credit risk quantification. It is not claimed that all available models are accounted for neither does the discussion intend to cover all available models. A detailed discussion of the different models is felt not to be appropriate given the theme of this research (management focus and not quantitative in nature). However, the credit risk portfolio risk manager cannot be ignorant of the available models and their respective points of departure and underlying assumptions. The focus was therefore directed towards the mainstream models and approaches to credit risk quantification being used in the industry.

As part of the strategic intent of the portfolio approach, a key aspect and responsibility of portfolio risk management is the mitigation of credit risk. In many instances, the portfolio risk manager is confronted with an optimum portfolio (a portfolio which is not diversified optimally given its construct and composition and can not be diversified further except over an extended period of time), where hedging techniques are to be used to balance the portfolio's risk profile to be aligned to the strategic risk appetite as determined by the board of directors. From this perspective, it is a requirement that the portfolio risk manager is aware of existing risk mitigating strategies, which will enable and support the establishment of the optimum asset portfolio.

The next chapter aims to provide an overview of the most prominent hedging techniques to mitigate credit risk. Risk mitigating strategies, in context refers to hedging technique. Traditional techniques include credit enhancements, bond insurance, guarantees, letters of credit, collateralisation and netting. Recently many additional mechanisms came into affect for example portfolio diversification, risk based pricing, structural hedging, credit derivatives and securitisation. These and other techniques form the basis of Chapter 5 and are therefore discussed in more detail.

CHAPTER 5

CREDIT RISK HEDGING TECHNIQUES

5.1 Introduction

The previous chapter gave a broad overview of the most prominent and widely used quantification models on credit risk in the banking industry. The models, in addition to his or her experience will enable and assist the portfolio risk manager to manage any selected portfolio.

Being able to quantify a portfolio's credit risk allows for pro-active decision-making in terms of the risk/reward profile of the identified portfolio. This is done in terms of possible opportunities to balance the profile and in establishing an optimum asset portfolio composition within the constraints inherent to the larger entity and its strategies. As such, tranches can be compounded to entice the potential investor who is always seeking for opportunities to earn above average returns (given a specific risk profile), to convince him or her to buy or sell part of a portfolio's credit risk thereby enhancing the associated investment yield through the secondary market.

As part of the strategic intent of the portfolio approach, a key aspect and responsibility of portfolio risk management is the mitigation of credit risk. In many instances, the portfolio risk manager is confronted with an optimum portfolio (a portfolio which is not diversified optimally given its construct and composition and can not be diversified further except over an extended period of time), where hedging techniques are to be used to balance the portfolio's risk profile to be aligned to the strategic risk appetite as determined by the board of directors. From this perspective, it is a requirement that the portfolio risk manager is aware of existing risk mitigating strategies, which will enable and support the establishment of the optimum asset portfolio.

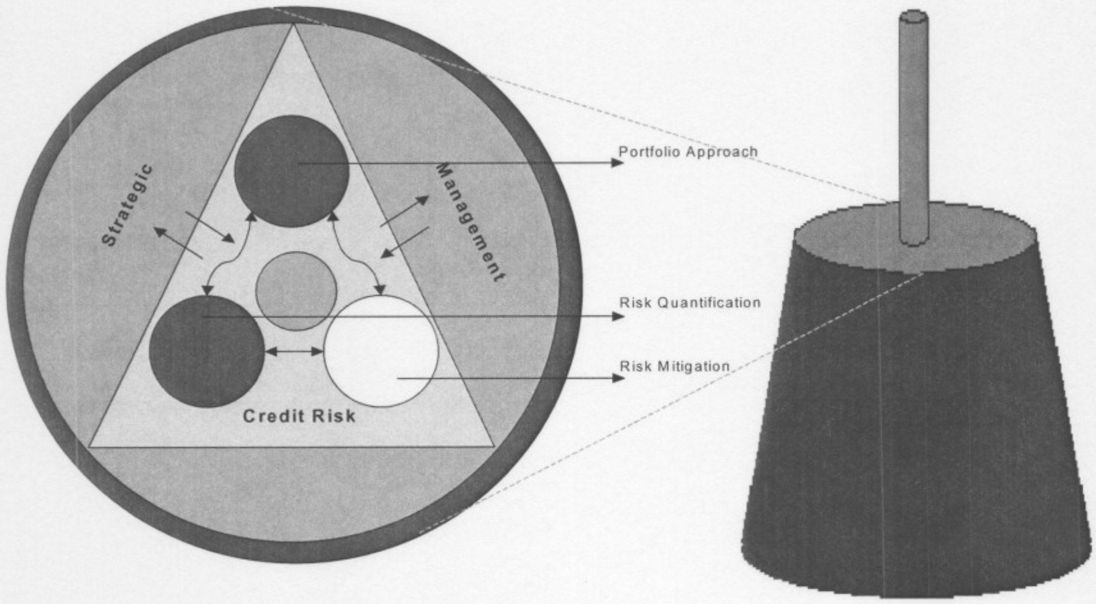
Traditionally, several techniques are used to manage credit risk. Shimko (1999:215) identifies four approaches. The first and most obvious method is diversification whereby those who own portfolios of risky bonds avoid over-concentration in particular credits and ensure that they have investments in a large universe of securities. The second approach identified is the insurance or guarantee applied to individual bonds. A more recent approach is an insurance contract on a portfolio of risky bonds. A fourth approach, inspired by the option pricing theory, provides hedges for portfolios of bonds by short-selling stocks of the corresponding companies. In the spirit of the third and fourth approaches, a market began to develop for credit derivatives (instruments whose payoffs are contingent on credit-related events).

Other hedging techniques, by no means of lesser importance, are securitisation, credit enhancement, risk adjusted loan pricing and collateralisation. This chapter discusses these and other hedging techniques, all methods to optimally balance the credit portfolio's risk profile within the framework of a given asset portfolio composition. It is necessary to note that in many instances, the concepts of credit risk mitigating strategies and hedging techniques are used interchangeably. However, a clear distinct difference is that hedging techniques refer to the mechanism used to hedge the risk implicitly while credit risk mitigating strategies include the application of one or more hedging techniques in addition to other strategic imperatives such as market growth, concentration, risk appetite, market penetration, and regulatory issues.

This chapter aims to provide an overview of the most prominent hedging techniques to mitigate credit risk. When reference is made to risk mitigating strategies, it is in context of the hedging technique and not the broadly defined context as defined above. Traditional techniques used include credit enhancements, bond insurance, guarantees, letters of credit, collateralisation and netting. Recently many additional mechanisms came into affect for example portfolio diversification, risk based pricing, structural hedging, credit derivatives and securitisation. These and other techniques form the basis of this chapter and are therefore discussed in more detail.

Referring to the thesis framework provided in Chapter 1, figure 5.1 provides the reader with a graphic illustration regarding the component being discussed.

Figure 5.1. Literature study: Chapter 5 – Risk Mitigation



Source: Author 2003

5.2 Credit Enhancement

Traditionally, many techniques have been used to mitigate credit risk. The first group, called credit enhancement, encompass a wide variety of mechanisms for hedging purposes. These include bond insurance, guarantees, letters of credit, collateralisation also known as asset-based lending, and on-balance sheet netting. These hedging techniques are also known as structural hedges.

Svoronos (2003:2) defines the main purpose of credit enhancements as the enhancement of credit quality because a broader range of securities/assets receives AAA/AA ratings. He furthermore distinguishes between external and structural credit enhancements, the first where the hedge is provided by the seller or third party and the latter where the hedge is embedded in the transaction/ provided by the originator.

Types of structural credit enhancements include:

- Over collateralisation - Special Purpose Vehicle's (SPV) asset pool exceeds the face value of the assets implying that the amount in the SPV is greater than the amount provided to investors thereby creating excess cash flows to absorb pool losses which might occur;

- Excess spread – The obligors pay higher interest than required. If losses occur in the underlying asset pool, the excess amount decreases (excess spread decreases);
- Spread account – excess spread flows into a spread account. The spread account is held by a trustee who oversees the funding from the spread account in instances where the interest on assets collected from the obligors are insufficient for security coupon payments. The spread account funds make up the shortfall;
- Cash-collateral account – cash are held by a trustee to cover losses after the excess spread and the spread account are exhausted. The cash-collateral account is funded by a third-party bank loan at the beginning of securitisation; and
- Senior/subordinated structure – most common structure of all. Cash flows are allocated to classes of securities, each class with its own coupon and maturity, based on seniority. Subordinated classes protect senior classes against losses, which might occur. It is often referred to as a waterfall structure as cash flows are cascaded from most senior to most subordinated classes.

Types of external credit enhancements include recourse obligation where the seller guarantees the first losses up to a predetermined amount, letter of credit, other direct credit substitutes, collateral/pool insurance/surety bond and credit derivatives.

5.3 Bond insurance, Guarantees and Letters of credit

A popular technique used in the United States of America (USA) to hedge credit risk is municipal bond insurance, taken over a registered bond. It is not the individual who registered the bond who took out the insurance but rather the institution in favour of the person who registered the bond. In this municipal bond market, the issuer therefore purchases insurance. Note that in the corporate debt market, the lender usually buys protection against a possible default.

Guarantees and letters of credit are a form of insurance contract. In both instances, there is recourse in the event of default. For effective credit hedging (e.g. reducing the credit risk of an exposure or transaction), when using guarantees and letters of credit from a third party, the third party should be of higher credit quality than the counterparty. In cases where the third party's credit quality is on par or even lower than the counterparty, the credit risk of the counterparty may still be effectively hedged depending on the existing diversification opportunity.

Letters of credit are being used extensively in international trade and has been known for many years. Domestic banks issue letters of credit thereby guaranteeing the payment obligations of domestic importers (their clients) to foreign exporters. Foreign exporters usually require some form of guarantee before goods are shipped to an importer.

5.4 Collateralisation (Asset based lending)

In situations where the risk of a counterparty is unacceptable, counterparties are asked to pledge some form of security (collateral). This security (in the form of liquid assets) may be pledged in one of the following forms (Crouhy *et al.*, 2001:445):

- Up-front to the transaction to be held for the duration of the relationship;
- Once a covenant is broken or a threshold is passed, for example once the agreed marked-to-market value for all transactions have been crossed;
- When the risk rating of the counterparty deteriorates e.g. the counterparty is downgraded; and
- In real time, as a percentage of the marked-to-market value of the transaction.

The calling for liquid security remains one of the most popular and practical hedging techniques in the banking industry when loans are granted.

Collateralisation in the credit derivative environment refers to a type of "cash cover" where the counterparty will post a margin in cash with the dealer (OTC-desk) to cover costs in the event of default. Although not popular with companies as they would rather use the cash elsewhere, collateralisation is a required part of the derivative transaction.

5.5 Netting

The current replacement value of a derivative is its liquidation value or marked-to-market value. Marked-to-market implies that the net present value (NPV) of future expected cash flows are calculated. The NPV calculated in such a manner could either represent a positive or negative position. However, only positive replacement values impose a credit risk exposure on non-defaulting parties (Crouhy *et al.*, 2001:444).

Replacement values have two aspects, namely a gross replacement value and a net replacement value. The gross value represents the cumulative total of the value of all outstanding positions. The net replacement value represents the value after any positive and negative positions have been set against each other.

Where a counterparty has entered into several transactions with the same institution, some with positive and other with negative replacement values, the net replacement value represents the true credit exposure provided that the two parties have valid, legally enforceable netting agreements in place. Netting not only reduces the overall replacement value, but also reduces the capital charge for credit risk as required by the Bank of International Settlements (BIS). A prerequisite for netting is that an agreement must be in place, which is legally enforceable.

Caouette *et al.* (1998:61) define netting as the practice of setting off payments in one direction against those in the opposite direction, the primary risk management technique of a clearinghouse or exchange.

5.6 Hedging Operations versus financial position hedging

The active decision to hedge implies that various aspects of the hedging strategy have been considered. One such aspect is the choice between the hedging of operations and hedging financial positions. In this regard, the components of risk need to be well understood. From a credit risk perspective, the ability of a institution to hedge activities related to its operations will have an indirect impact on the credit risk associated with the institution's lending activities - the effort has clear implications on the institution's ability to compete in the market place. Should the institution decide to hedge its financial position using its balance sheet, the impact on credit risk of the lending activities might be quite extensive. Institutions must make risk management decisions, even though it might mean that a decision is made not to hedge. This ultimately, to do nothing, remains a decision.

5.7 Other credit enhancement techniques

Other credit enhancement techniques include embedded put options (where investors are provided with default protection by way of a right to force early redemption at a predetermined price of corporate debt securities), marking-to-market (the equivalent to a margin call whereby at the end of each trading day, counterparties exchange in cash the change in market value of their positions – a zero-sum transaction), termination (early termination of a contract based on a pre-agreed event occurring e.g. a credit downgrade), reassignment (a clause in a contract that conveys the right to assign one's position as a counterparty to a third party, in the event of a ratings downgrade), factoring (the practice of purchasing a company's receivables - debtors book, valuing it by subtracting the expected losses and carrying cost from its face value) and credit insurance (buying insurance thereby providing protection against the risk that a customer will become bankrupt) (Absa, 2002c and Crouhy *et al.*, 2001:445).

In the same manner, the implementation of scoring systems can for instance be regarded as a risk hedging mechanism as the automated and standardised decision will impact credit risk positively.

5.8 Risk adjusted loan pricing

Risk adjusted loan pricing is another mechanism to hedge credit risk. The concept entails that the price of a loan reflects a credit premium or credit risk spread derived from the credit loss propensity of similar transactions. The mere fact that the loan's price is adjusted to take credit risk into account can be regarded as a hedging technique. It forces the portfolio risk manager to assign a value (arbitrary or scientific) to a perceived risk component, the practice of thought, in itself leading to premeditated risk mitigation (Absa, 2000b).

5.9 Portfolio Diversification

Portfolio diversification mitigates risk. The portfolio risk manager strives to identify and explore diversification opportunities in any given asset portfolio. Not only does the focus on possible portfolio diversification assist in lowering the concentration risk of such a portfolio, but also the credit risk associated with the transactional component, the add-on risk can be hedged (Absa, 2001f).

5.10 Credit Derivatives

5.10.1 Credit derivatives defined

A credit derivative is an instrument where the credit risk of a product is separated from the asset value of the product. This definition is supported by Beder and Iacono (1999:269) who define credit derivatives as a derivative product that makes payments based on the credit performance of some credit-sensitive instrument or instruments. Credit performance is typically measured by yield or price spreads relative to benchmarks, credit ratings or default status.

Another definition of a credit derivative is any contract whose economic performance is primarily linked to the credit performance of the underlying asset. However, such a definition would technically rule out Total Return Swaps as their performance is only partially linked to the credit quality of the underlying and mostly linked to the market risk of the underlying asset. In this regard, Walter Gontarek, director of the CD group at Toronto Dominion Bank in London (Super Computer Consulting Corp., 2000:16) defines credit derivatives as "over the counter products whose value is derived from the price of a credit instrument. Credit derivatives permit credit risk and occasionally other forms of risk, to be transferred from a hedger to an investor. Total return swaps are clearly in the family of credit derivative products." The use of Total Return Swaps in pure financing transactions thus provides the same transfer of economic performance between counterparties that in a classic repo is achieved by other means.

According to Crouhy *et al.* (2001:448) credit derivatives are over-the counter financial instruments that have payoffs contingent on changes in the credit quality of a specified issuer. This specific issuer is typically not a party to the credit derivatives contract.

The most comprehensive definition for a credit derivative instrument is provided by Caouette *et al.* (1998:304) stating that these instruments are used to trade credit risk, and in the process of doing so, are separated from the other features of a financial instrument. It is so named because it is derived from the existence of an underlying asset and can be tailored in such a way that any part of the credit exposure can be layed off: amount, recovery rate, and maturity. These instruments can be constructed for events such as a rating downgrade that do not involve default. Important to note is the fact that credit derivative instruments resemble traditional credit insurance products such as standby letters of credit and loan guarantees.

5.10.2 History of Credit derivatives

Credit derivatives arose from the needs of the investment banks during the early 1990s (Crouhy *et a.*,2001:449) when Wall Street began developing and marketing over-the-counter derivative products. Since then, the structured note market has mushroomed. For instance, in Hong Kong in 1995, 83 325 million derivative contracts were traded, which were 55 times as many derivative contracts as traded in 1990 (Nelken, 1999:14). A poll conducted by CIBC Wood Gundy in May 1996 (Crouhy *et al.,* 2001:449), the size of the credit derivatives market was approximately US $40 billion.

The sheer volume of products which exponentially swamping the market since then meant that derivative houses had to find new management techniques as the traditional methods e.g. taking collateral, making loss provisions and actively managing credit exposures, simply did not work anymore. Furthermore, many investors who took on the market risk of structured notes simply were not prepared to be exposed to the credit risk as well. Subsidiaries in the form of special purpose vehicles (SPVs) to originate the structures were created.

In 1993 Bankers trust offered their clients swaps where they in return for above-average payments, would undertake to cover the bank against any losses it might incur from a basket of predetermined creditors going bankrupt. So, if any of the predetermined creditors went bankrupt, the clients promised to reimburse the bank. This type of transaction allowed Bankers Trust to buy protection against a portion of their asset portfolio, which they felt uncomfortable with – protection was bought against these creditors defaulting (Nelken, 1999:14). Credit derivatives are increasing in its popularity as more and more secondary markets are being established.

5.10.3 Structure forms of credit derivatives

The credit derivative market can be divided into three main categories namely;

- Forwards;
- Swaps; and
- Options.

The types of credit derivatives commonly used, although many other structures are continuously being developed, according to Caouette *et al,* (1998:307), as well as other authors on credit derivative instruments, are as follows:

- Credit Swap;
- Total return swap;
- Credit-linked note;
- First-to-default swap; and
- Index swap.

These structures are discussed further in the next sections.

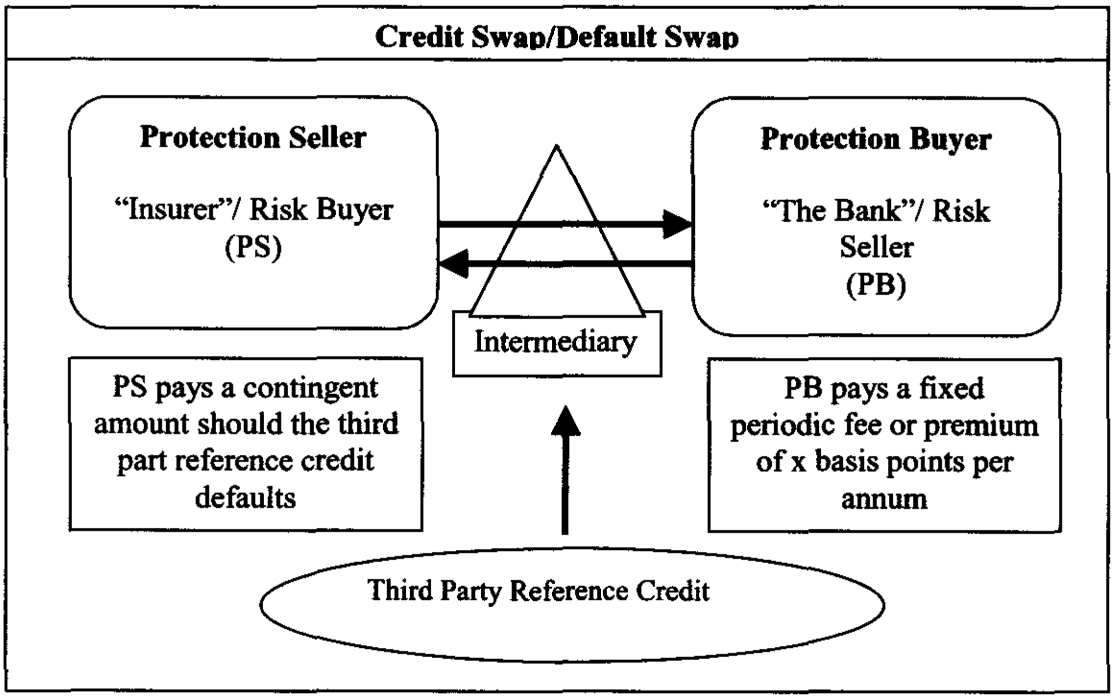
5.10.3.1 Credit Swap

The credit swap is also known as a default swap or the "plain vanilla" of credit derivatives. In this structure, the bank on the one side wishes to sell off a portion of its credit risk. The bank wants to buy protection against the probability that some or all of its creditors default. The bank is willing to pay a "premium" for the protection gained.

Conversely, a corporate institution is for example willing to sell protection against a margin. This institution buys risk for which the risk seller pays a fee (for the risk in the event that the risk seller's (the bank) creditors default). The institution acts as "insurer" against losses that might occur should some or all the "bank's" creditors default depending on the transaction. The corporate institution therefore sees the potential loss as a contingent liability, to be paid in the event of default. An intermediary may facilitate this transaction.

Caouette *et al.* (1998:307) defines the credit swap as a protection buyer paying a fixed recurring amount in exchange for a payment contingent upon a future credit event. The credit swap structure is illustrated in Figure 5.2 below.

Figure 5.2 Credit Swap



Source: Adapted from Caouette *et al.* (1998:307)

In the above context, the precise definition of default varies from protection buyer to protection buyer and trade to trade. Default can mean bankruptcy, insolvency, failure to meet a payment obligation when due, failure to comply with a specific covenant or even a specific event in the account life cycle for instance, when focus is directed towards legal action and the recovery of outstanding debt. In other instances, the credit event does not necessarily constitute default. For instance, settlement can be achieved when a fall in market value of the reference security takes place.

Parties to a credit swap often incorporate a materiality clause to ensure that the default event and subsequent payment is not triggered by minor, nonmaterial, or staged events. The size of the contingent payment is normally the notional value of the loan minus the recovery value, or the amount that was actually lost. Depending on the way again of how default is defined, the protection buyer does not actually have to suffer a loss in order to trigger a credit swap. In this regard, a credit swap cannot be seen as an insurance claim because under an insurance policy, the insured party must suffer a loss to trigger the activation of the policy.

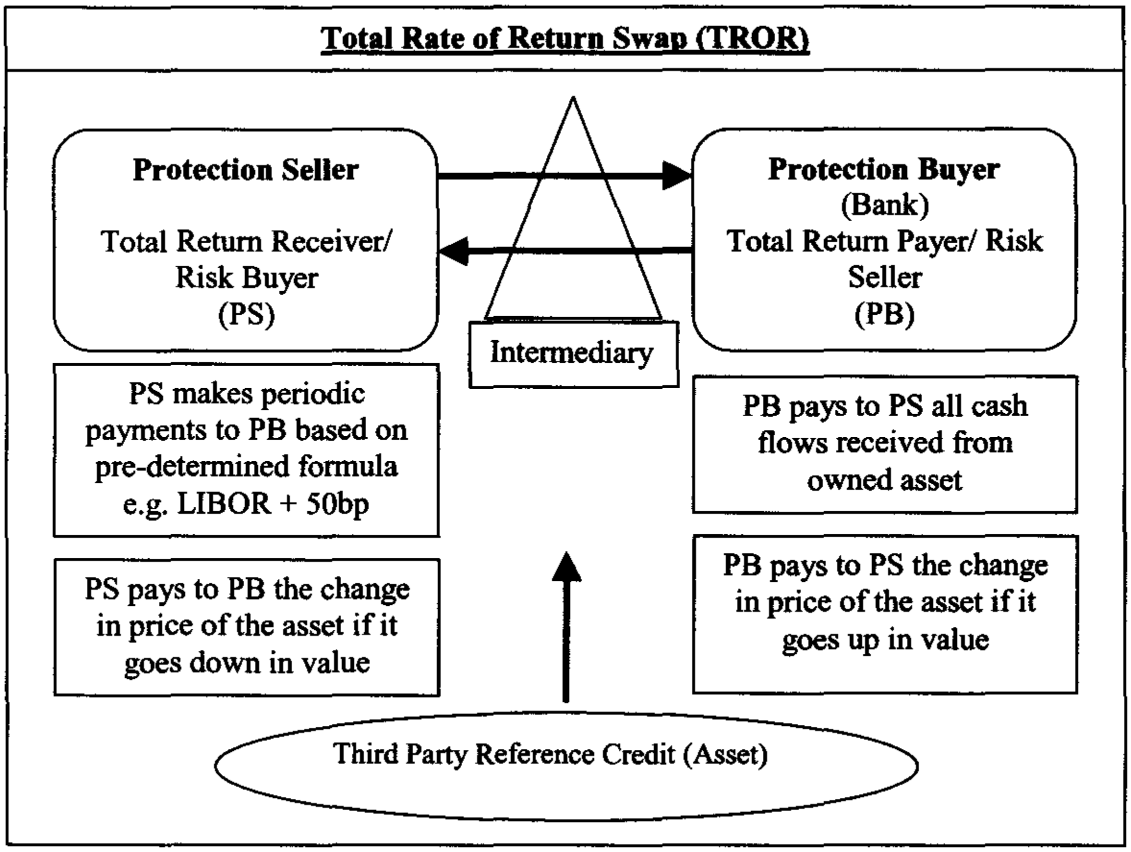
5.10.3.2 Total return swap

The total return swap, also known as the Total Rate of Return Swap (TROR), is one of the most popular structures in credit derivatives. It has the effect of completely removing the economic risk of an asset without the actual sale of the asset.

With reference to figure 5.3, we have on the one side the total return payer or protection buyer (again the bank wishing to sell some of its credit risk in our example), who strips out all of the economic exposure and credit risk of the asset without having to sell it in the open market. For stripping out the economic exposure and credit risk, the protection buyer receives periodically, a fixed amount based on a pre-determined formula (London Inter Bank Overnight Rate (LIBOR) plus spread).

It should be noted that the protection buyer pays over to the protection seller, the total return on the asset (the total cash flow generated by the asset which include the coupon, all fees and interest payments and any capital appreciation in the value of the asset when it is marked to market). Should the price of the asset increase as the asset increases in value, the total return is still paid over to the protection seller. However, should the price of the asset change as it declines in value, the protection seller is required to pay the difference to the protection buyer along with the pre-determined spread originally negotiated. It is necessary to remember that the ownership of the loan in all instances remains with the protection buyer or total return payer.

Figure 5.3 Total Rate of Return Swap



Source: Adapted from Caouette *et al.* (1998:308)

On the other side, the protection seller or total return receiver, gains economic exposure to the asset without having to buy the asset in the open market. For instance, if a BB-company wishes to gain exposure in a certain asset class. However, due to the company's credit rating being BB, its cost of funds is higher compared to a AAA-company when raising funds in the open market to acquire the desired asset exposure. The BB-company or total return receiver can by using a total return swap, be able to get exposure to the underlying asset at a financing rate that will be much lower than the funding rate in the market. The spread that the total return receiver or BB-company in this instance pays may be less than the spread at which it can raise funds in the open market. This transaction can best be described by quoting the following example. Consider a commercial bank and a hedge fund. The commercial bank takes on many mortgage loans in its normal business due to its infrastructure. The hedge fund however does not have the means to make mortgage loans as huge amounts of capital is required, services need to be marketed as a loan provider, and the loans need to be administered and managed.

An alternative for the hedge fund to acquire the asset exposure is to sort of rent the commercial bank's balance sheet in a way. Rather than buying the loans from the commercial bank, the hedge fund does a TROR with the commercial bank and gains the desired exposure to the loans. With the TROR, the loan is not bought outright, the total performance and benefits of the loan is only received – all the fees and all the returns. These structures have benefits from both a regulatory capital and economic capital point of view due to the impact it has on the balance sheet composition.

Eminent from the discussion above, is that the total return payer (bank) takes on huge credit risk. Should the reference asset decline, the total return receiver needs to make two payments – one payment based on the pre-determined formula and the other based on the decline in the index due to the value of the asset, which declined. If the total return receiver defaults at this stage, the total return payer (bank) will lose a lot of money. Therefore, the total return swap is not a suitable product for the retail market as the bank would prefer not to "chase" counterparties down to claim their debts.

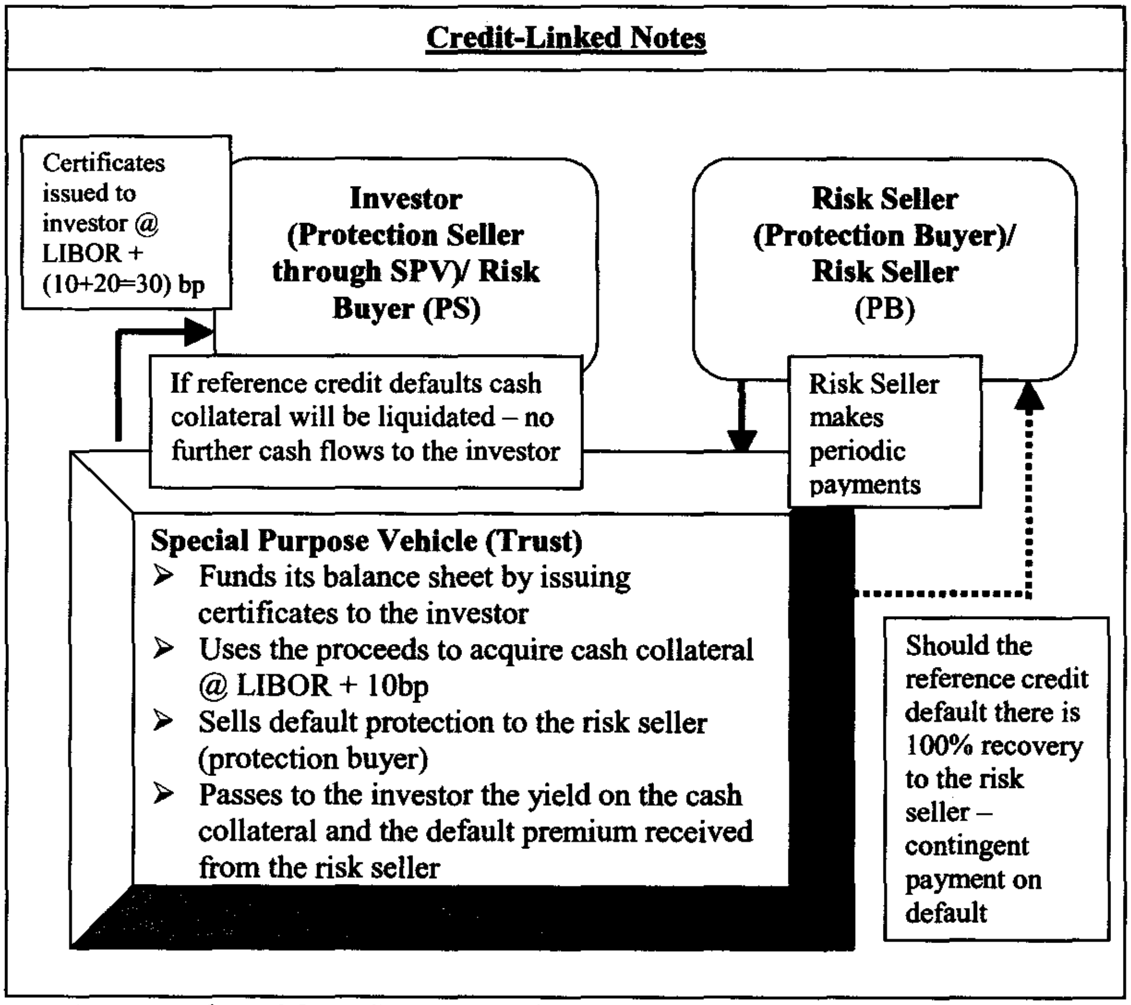
5.10.3.3 Credit-linked note

The credit-linked note structure (illustrated in figure 5.4) utilises a special purpose vehicle (SPV) to issue notes and/ or certificates.

The credit-linked note overcomes the problem as discussed in the previous section, namely that the total return payer (the bank) still has to deal with the credit exposure. Credit-linked notes enable a total return payer or bank to avoid the credit exposure altogether.

Considering figure 5.4, the structure can be best explained by the following example. A commercial bank or protection buyer requires R1 billion protection against a specific asset class or group of assets. The special purpose vehicle (SPV) sells certificates to investors to the value of R1 billion rand. The SPV manages to invest the R1 billion received from the investors at LIBOR plus 10 basis points.

Figure 5.4 Credit-Linked Note



Source: Adapted from Caouette *et al.* (1998:309)

The R1 billion invested is used as collateral against the required protection of the protection buyer. For the protection received, the protection buyer (bank) pays a premium of LIBOR plus 20 basis points. The SPV pays to the investors the yield from the collateral (LIBOR + 10bp) plus the fees paid by the protection buyer (LIBOR + 20bp). The amount paid to the investors equals LIBOR + 30bp.

In the event of default occurring, the cash collateral is liquidated to satisfy the protection buyer or bank and the remaining proceeds are distributed to the investors. The investor thus receives a coupon and principal redemption at maturity, unless there is a credit event.

5.10.3.4 First-to-default swap

According to Caouette *et al.* (1998:309) several assets are bundled together in a basket under a first-to-default swap. A normal credit swap (as discussed previously) is then created on the whole basket. The default event is defined as a default happening on any one of the assets in the basket.

5.10.3.5 Index Swap

An index swap is a combination of a bond and a credit option. The bond coupon payments and/or the principal payments are recalculated based on the provisions of the credit option. If the provisions of the credit option stipulates that the applicable interest rate on a bond will decrease as the delinquency rate of consumers increase, a deterioration in credit standing will result in a lower interest rate being payable on the issued bond. It thus serves the purpose of "insurance" in the form of a credit option.

5.10.3.6 Other structures

Other structures being used in practice, not discussed in this document are *inter alia* the following:

- Downgrade options;
- Credit Intermediations swaps; and
- Default substitution swaps – credit spread options and forwards.

Structures as mentioned previously are continuously being developed and as long as a specific need exists will continue to be developed to address the needs of the market players.

5.10.4 Advantages and applications

The utilisation of credit derivatives to mitigate credit risk has several advantages and applications in managing the credit portfolio. Credit derivative instruments allows:

- The isolation of credit risk from interest rate risk ("market risk");
- The separation of "maturity" from "duration";
- Achieving specific risk/return profiles, tailored to the investor's view with minimal administrative cost;
- Investors to gain value by taking risks on scenarios thought to be particularly unlikely;
- The transfer and hedging of credit risk;
- Increased participation (encourages more participants) in many markets such as the high yield debt market, bank loans market and credit enhancement products;
- Credit risk to be diversified across a wider spectrum of institutional investors – the banking sector until recently borne the majority of credit risk of commercial lending;
- More players to alter their returns by absorbing or reducing the credit risks of loans; and
- The pricing of loans to become more competitive resulting in cost savings for the borrowers. The pricing of letters of credit, guarantees, insurance and capital market spreads will become more aligned.

In conjunction with the above, a key advantage of credit derivative instruments is portfolio diversification. Banks buy and sell credit derivatives to create diversification opportunities in their asset portfolios, by changing the composition ratio in terms of expected return and unexpected losses. Utilising credit derivatives allows for either reducing those assets with lower returns and higher unexpected losses or adding other assets with higher returns and similar or lower unexpected losses.

Caouette *et al.* (1998:310) identify additional advantageous features of credit derivatives:

- Banks can use credit derivatives to acquire exposures without a loan origination or loan syndication structure being in place.
- Certain mitigating strategies cannot be implemented through the sale or purchase of loans (the hedging of commitment risk and selective tenor risk),
- Credit derivatives allow banks to utilise arbitrage opportunities in terms of pricing differences as liquidity increases in the secondary market.
- Credit derivatives are confidential instruments and both an investor and a bank who owns risky assets can obtain credit protection against its defaulting without the obligor knowing about is – the credit paradox can be overcome.
- A buyer can obtain exposure in an asset class without having to fund a loan or having to create an origination capability.

5.10.5 Summary

Credit derivatives are a special class of event derivatives implying that a contingent liability exists until such time that a pre-determined event occurs. Using credit derivatives allow the portfolio risk manager to mitigate part of the portfolio's credit risk and to strive at achieving an optimal portfolio composition. Credit derivatives are not only a new generation of financial products, but the utilisation thereof is a cost effective way to hedge or position pure credit risk.

Credit derivative instruments are the fastest growing segment of the derivatives market as the concept can be applied to many sectors of the fixed income market: High yield, investment grade, and emerging market. Credit derivative instruments are applicable to a diverse group of market participants: Investment funds, Hedge funds, Banks, Issuer, and Swap counterparties. It is a versatile mechanism to mitigate credit risk and can be used in combination with other mitigating strategies or on its own.

5.11 Securitisation

5.11.1 Securitisation defined

Securitisation is a technique whereby balance sheet assets are sold to outside investors. The technique is based on the principle where the assets to be sold generate future flows (interest, capital repayment, prepayment of existing loans) that are used to provide a return to the investors who buy the securitised assets. Uncertainties exist in the form of defaults, payment delays and loan prepayments, which can happen at any time. The risk, which the investor takes, is made more acceptable by means of controlling the uncertainty of the associated flows to be rerouted to the investors. Several techniques are available to fine-tune the risk for investors and to enhance the attractiveness of the investment, such as over-collaterisation (a form of self-insurance), third party credit enhancement, and the creation of credit tiers (tranches) with differentiated pricing.

Securitisation essentially implies the creation of securities. This definition, as cited by Kothari (date unknown) implies the inclusion of securities created out of a pool of assets, normally receivables, which are placed under the control of investors using a special purpose vehicle. The securities are liquidated on the primary strength of the assets in the pool, but may be supported by credit enhancements.

The original concept of securitisation was to create securities based on financial assets such as mortgage loans, auto loans, credit cards. Later it was extended to non-financial assets such as aeroplanes, buildings and even risk, such as weather risk, and insurance risk.

Skarabot (2002:3) defines asset securitisation as a method of issuing securities collateralised by cash flow generating assets. The primary uses of securitisation are for funding purposes as well as risk management purposes.

The concept of securitisation is often referred to as collateralised debt obligations (CDO), and when quoted in this context, refer to two main sources of underlying assets namely, collateralised loan obligations (CLO) or collateralised bond obligations (CBO), both dealing with the credit risk of the borrowers.

The securitisation process can be summarised as follows:

- Assets are identified, pooled and transferred to a pre-selected special purpose vehicle (SPV) created for securitisation purposes.
- The SPV can take the form of a securitisation trust. The SPV is structured as an entity that cannot become the subject of a bankruptcy case.
- The pooled assets and the original owners are separated to ensure that the investors in asset-backed securities are not exposed to a credit deterioration of the original owner.
- The SPV issues securities to investors.
- The payments attributable to investors on the securities are dependent on the cash flows generated by the pooled assets.
- The pooled assets and the original owner are separated.
- Through credit enhancement techniques, the rating on the senior tranches can be improved to exceed that of the original owner.
- The difference between corporate bonds and asset-backed securities is that the capital raised is based on the specific pooled assets (ring fenced) and not on the general paying ability of the company as is the case with corporate bonds.

The process of securitisation is similar to several other financing methods although it might be that only certain aspects share common ground.

5.11.2 History of asset securitisation

Skarabot (2002:4) notes that early examples of asset securitisation could be tracked back to medieval times and the city-states in Northern Italy. The basic transaction was pioneered by the city of Genoa when the city needed to finance a major expenditure. They formed a syndicate (*compera*) of investors to provide the capital. Tax revenues were used to fund the interests and repayment.

A well-documented example from 1432 is when Genoa formed a *compera* to finance a war fleet of twelve galleys. This *compera* was given control of a new excise tax imposed on maritime insurance contracts. Genoa's *compera* is the first recorded example of Securitisation (Skarabot, 2002:4).

According to Caouette *et al.* (1998:362) the first widespread application of structuring technology occurred in the residential mortgage market in the USA in 1938, when the federal government established the Federal National Mortgage Association (Fannie Mae) with the purpose to ensure that mortgage capital would be readily available to large numbers of American homebuyers. Fannie Mae bought qualified mortgages and issued its own securities. In 1968, the Government National Mortgage Association (Ginnie Mae) was split off from Fannie Mae and authorised to guarantee the principal and interest on mortgage securities from other issuers (Caouette *et al.*, 1998:362).

The process of modern asset-backed securitisation emerged during the late 1970s and early 1980s as a development based on mortgage-backed securitisation. Caouette *et al.* (1998:358) cited that the process was started with when Ginnie Mae issued the first publicly traded mortgage-backed securities, the Ginnie Mae Pool #1. Since then the issuance of mortgage-backed and asset-backed securities expanded exponentially.

Smithson (2003:225) concludes that the Federal Home Loan Mortgage Corporation (Freddie Mac) issued the first collateralised mortgage obligation (CMO) in 1983 which was followed by the securitisation of auto loans (1985), and credit cards and other consumer loans (1987).

The first collateralised loan obligation (CLO) appeared in 1990 and the first Collateralised bond obligation (CBO) appeared in 1998. Nelken (1999:178) notes that Drexel Burnham Lambert created CBOs as early as 1980, which were sold to Drexel-managed mutual funds. As Drexel was implicated in the Ivan Boesky insider trading scandal soon after, Drexel had to close his doors.

The CMO was developed as a way of dealing with interest rate risk, auto loan securitisation was a result of weak credit ratings of sellers, credit card and other consumer debt was a response to bank capital requirements while in contrast, as stated previously, CLOs and CBOs appeared as a way of dealing with the credit risk of borrowers.

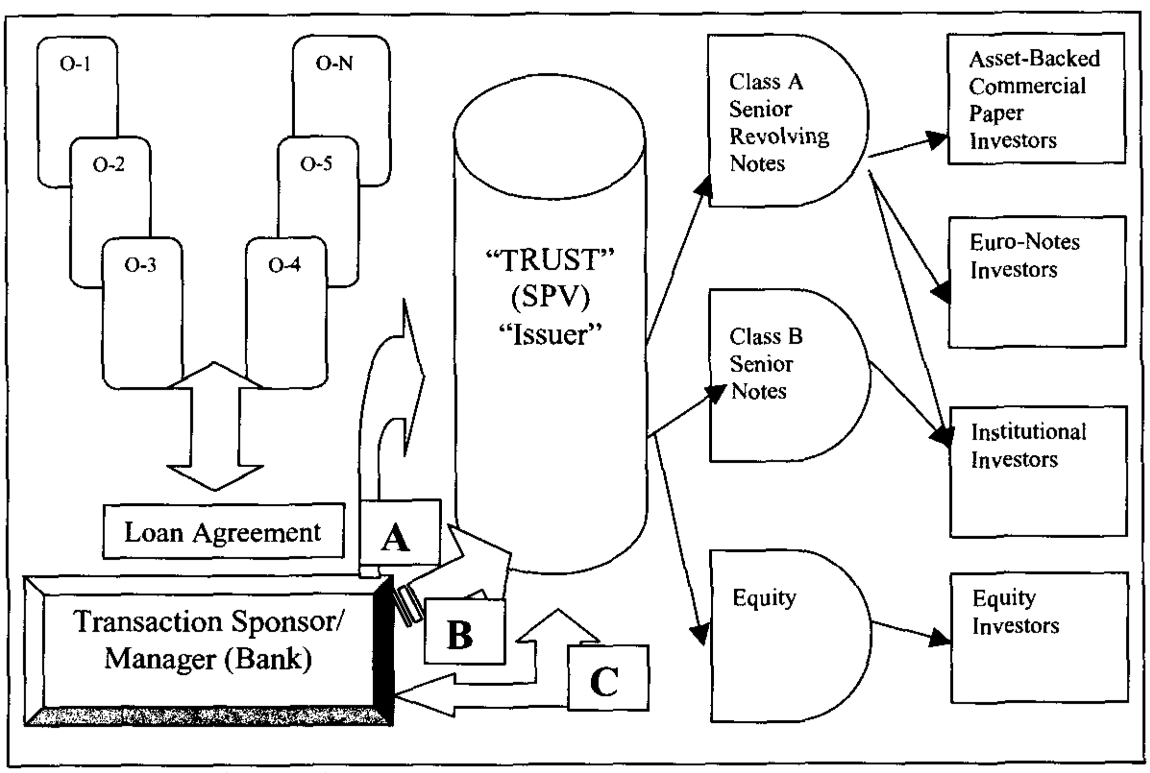
5.11.3 Types and basic structures of securitisation transactions

Collateralised debt obligations (CDOs) can be grouped in two main categories namely traditional CDOs and synthetic CDO's.

5.11.3.1 Traditional Collateralised Debt Obligation

In the traditional CDO also known as cash-funded CDO structure, shown below, the ownership of the assets is legally transferred from the transaction sponsor (i.e. bank that owns the loans or other credit assets) to a bankruptcy-remote trust or special purpose vehicle (SPV) acting as issuer.

Figure 5.5 Traditional CDO



Source: Smithson (2003:229)

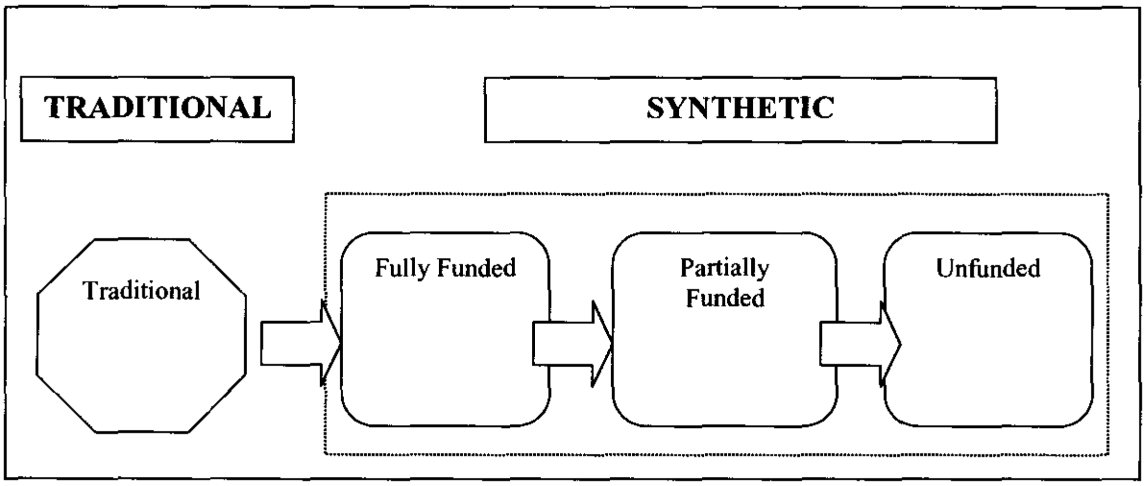
Loan agreements exist between the obligors (O-1, O-N) and the transaction sponsor. The transaction sponsor has an assignment agreement (A) with the special purpose vehicle and a management agreement (B) between the parties is established. The special purpose vehicle issues subordinated notes (C) to the transaction sponsor and class A senior revolving, class B senior and equity notes to investors. Securities are thus issued backed by the credit assets.

In a traditional collateralised debt obligation, the credit assets are fully cash funded with the proceeds of debt and equity issued by the SPV, with repayment of the obligations directly tied to the cash flow of the assets.

5.11.3.2 Synthetic Collateralised Debt Obligation

Synthetic CDOs, the second category, is further divided into three distinct types, namely fully funded synthetic CDOs, partially funded synthetic CDOs, and unfunded synthetic CDOs. The evolution from traditional CDOs to synthetic CDOs is illustrated in figure 5.6. A synthetic CDO utilises credit derivative instruments to influence the risk transfer without a legal change in the ownership of the credit assets. The sponsoring institution transfers the credit risk of a portfolio of credit assets to the SPV by means of a total return swap, or credit linked note, while the assets themselves remain on the transactional sponsor's balance sheet.

Figure 5.6 Evolution of CDO structures

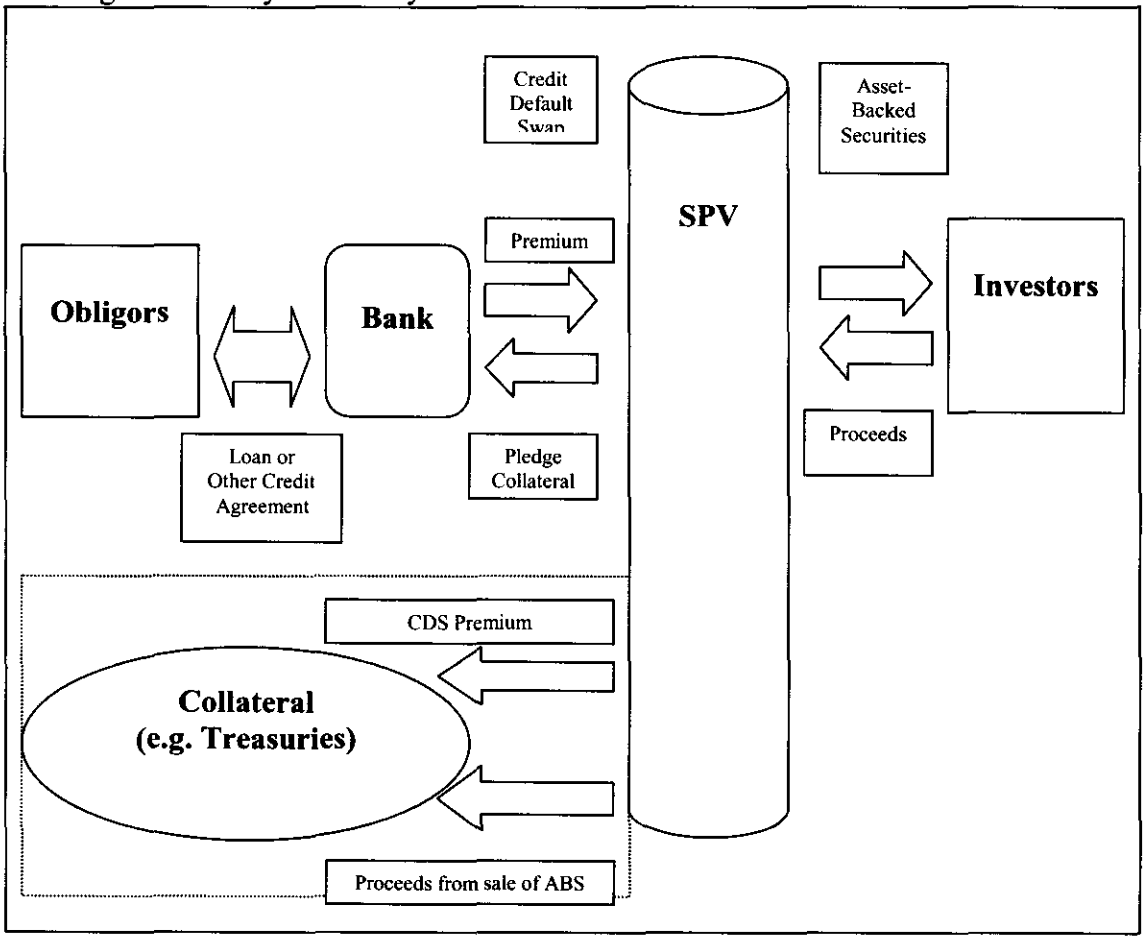


Source: Smithson (2003:229)

5.11.3.2.1 Fully Funded Synthetic Collateralised Debt Obligation

The fully funded synthetic CDO structure is illustrated in figure 5.7. The term fully funded refers to the characteristic that ALL the credit risk of the credit asset pool is transferred to the SPV and the transferred credit risk is fully cash funded with the proceeds of the securities issued by the SPV.

Figure 5.7 Fully Funded Synthetic CDO Structure



Source: Smithson (2003:231)

Referring to figure 5.7, the credit risk is transferred to the SPV. This is done by means of the SPV selling credit protection to the bank using a credit default swap. This implies that the SPV will receive a premium income or fee income from the protection buyer or bank (in this case the transaction sponsor) on the credit default swap. The SPV issues one or more tranches of securities with repayment contingent upon the actual loss experience relative to expectations.

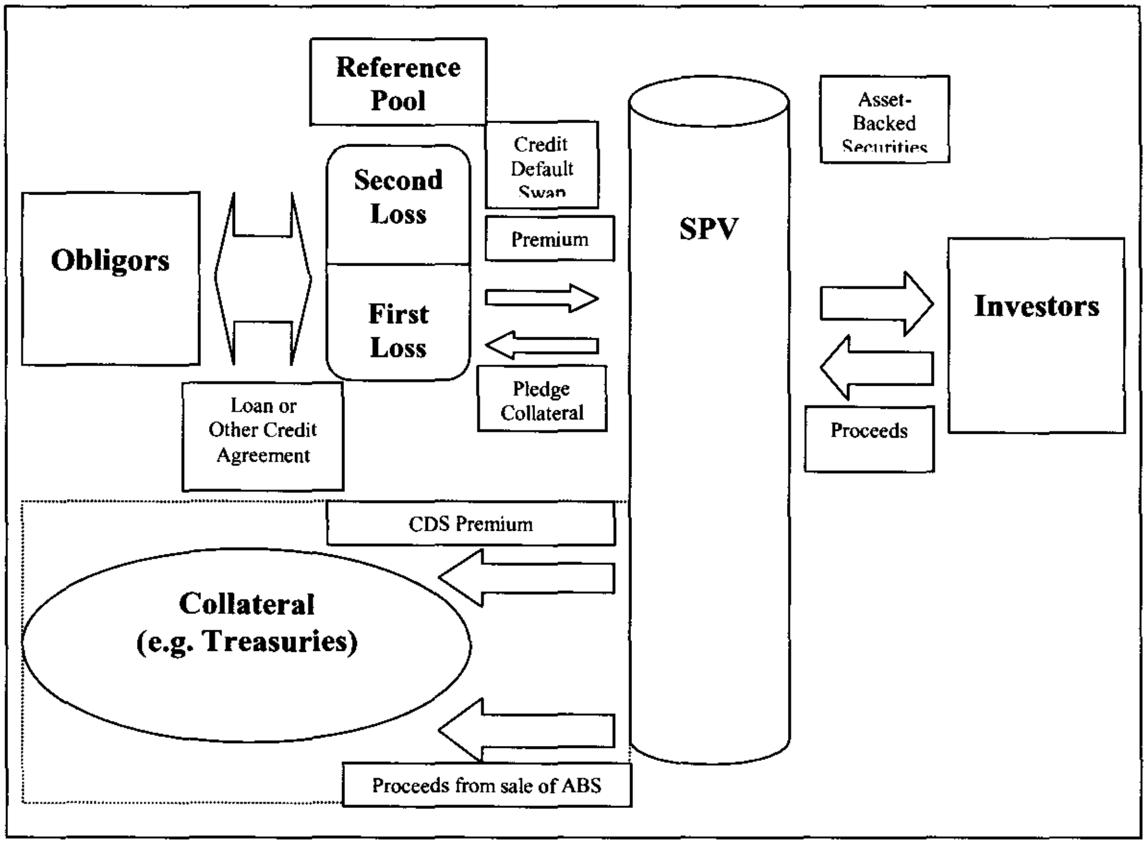
The investors have a contingent liability in terms of the possible default which might occur.

The SPV invests the proceeds from the sale of the securities and the premium income from the credit default swap in highly rated, liquid collateral. A more detailed discussion on credit derivatives is provided earlier in this chapter. The SPV pledges the collateral to the bank in order to be an acceptable counterparty in the credit default swap.

5.11.3.2.2 Partially Funded Synthetic Collateralised Debt Obligation

The partially funded synthetic CDO structure is illustrated in figure 5.8 below.

Figure 5.8 Partially Funded Synthetic CDO Structure



Source: Smithson (2003:232)

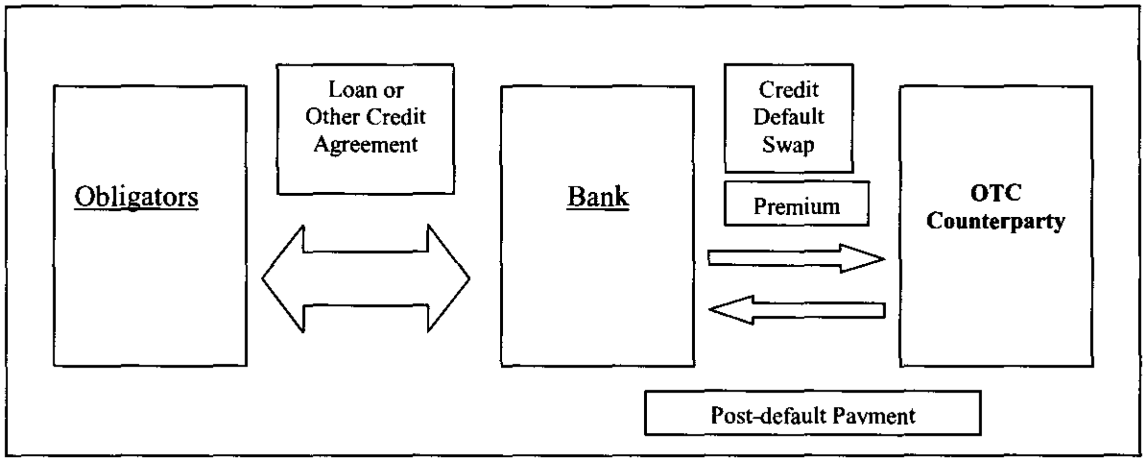
Only part of the credit risk arising from the pool of credit assets is transferred to the special purpose vehicle. The remainder of the credit risk is either retained by the originating bank or transaction sponsor or transferred to a third party in the over the counter market (OTC) by means of credit derivative instruments.

5.11.3.2.3 Unfunded Synthetic Collateralised Debt Obligation

The unfunded synthetic CDO structure is illustrated in figure 5.9 below. In the case of an unfunded synthetic CDO none of the credit risk in the pool of credit assets is transferred to an OTC counterparty using credit derivative instruments.

In terms of the categories and types above, further distinction is made in terms of the applications of CDOs. In this regard, a distinction is made between balance sheet CDOs (used primarily by banks for managing economic capital) and arbitrage CDOs (used to exploit the spread between the yield of the underlying assets and the lower cost of servicing the CDO securities). In terms of the balance sheet CDOs the types are traditional and synthetic as discussed above. In terms of arbitrage CDOs, the types identified are traditional cash flow, traditional market value and synthetic.

Figure 5.9 Unfunded Synthetic CDO Structure



Source: Smithson (2003:233)

5.11.4 Advantages and applications

Caouette *et al.* (1998:358) identify several applications of structured finance, which include credit asset securitisation. Firstly, the four core functions of financial markets are enhanced, namely, the depository function (people need a place to store their money), investment function (people need ways to grow their capital), the credit function (people need a place where they can borrow money), and the risk management function (people need a way to transfer risks that they are uncomfortable taking). Secondly, the wide variety of role players like banks and insurance companies use securitisation to improve their own efficiencies. The asset supplier is able to raise funds to support more originations while still maintaining a spread.

The following benefits of securitisation are among the key reasons why issuers choose to securitize assets. Caouette *et al.* (1998:361) summarise the benefits:

- Liquidity – banks and other issuers can convert their illiquid assets into cash.
- Reduced borrowing cost – Independent and captive finance companies have securitised assets to obtain capital at attractive rates.
- Tax management – Some jurisdictions charge taxes based on asset size.
- More efficient use of capital – securitisation can be used to multiply the assets created without increasing leverage.
- Regulatory capital arbitrage – Because of high regulatory capital charges for loans to high quality borrowers, lenders are unable to earn an attractive return on equity when they hold these loans. It is advantageous to securitize these assets, taking them off balance sheet and placing them in a nonbank SPV.
- Assets which are sold to investors generate savings in required capital since they are no longer part of the bank's balance sheet
- In cases where the rating of the issued securities are better than that of the originating bank, potential economy exists in the cost of funding the assets. It should be noted that the total cost of funding the assets includes the direct cost of securitisation as well as the costs to insure the risk of securitised assets.
- As a hedging mechanism, securitisation can be used to mitigate credit risk, either selling off or buying in risk, based on the bank's risk profile.
- Enhance ROE resulting from the lower level of equity combined with the reduced cost of funding.

5.11.5 Prerequisites of securitisation

Absa (2000b:6) identifies the following prerequisites of securitisation in a document compiled during an investigation for a securitisation proposal:

- A sufficiently risk-return profile is present;
- Sufficient future cash flows need to be generated to provide a return to investors;
- In order to reduce risk, high quality assets need to be securitised;
- Assets should be pooled in such a way that uncertainties can be statistically captured, based on Portfolio Risk Management techniques;
- Systems should be in place to quantify the associated risk of the asset pool or portfolio;
- The risk must be made explicit for the investor – a rating from a specialised rating agency is required;
- Segmentation of cash flows into common risk buckets;
- A rating agency needs to be active in the market with the necessary experience to underwrite and rate the securitised portfolio; and
- The ability to determine the asset margin, to enable risk-based pricing, is required.

5.11.6 Summary

Considering securitisation as mitigating strategy for credit risk, developments in the local secondary market should be investigated as well as regulatory restrictions placed on the trading activities of such a market. In this regard, the following aspects should be considered:

- Lending areas/ products:
    - Grading methodology used in terms of lending areas/products; and
    - Monitoring of mortgage lending areas.
- Assessment of assets/ property:
    - Methodology used;
    - Validity of the assessment; and
    - When should reassessments be scheduled and updated.
- How will transfers of the accounts be addressed?

- What will be regarded as an acceptable property type?
- What other risk mitigation action will be mandatory e.g. insurance?
- What pricing mechanism will be used?
- How will the credit risk premium be calculated?
- What will be the qualifying criteria of the borrower?
- What other restrictions, limitations or conditions will apply?
- Will the borrower be credit scored? What scorecard will be used?
- Are the costs identified which might be debited to the applicable loan account? What will be the impact on the investor?
- How will this product be identified?
- What about non-residents?
- What infrastructure needs to be in place?
- What are the expected volumes to be involved?
- What restrictions are considered to be imposed on the loans granted to ensure sufficient cash flows to pay investors?
- How is the underlying risk of the portfolio to be quantified, due diligence?

As illustrated in the preceding section, securitisation facilitates the use of credit derivative instruments and is complimentary to a wide variety of credit risk mitigating strategies.

5.12 Conclusion

The use of risk mitigating strategies to obtain a balance between risk and return, thereby maximising the return on credit risk adjusted capital, an ultimately shareholder wealth, is both a challenge and an opportunity. Hedging, a specialised risk-field in its own right, is executed and implemented by dedicated teams and consist of representatives from treasury, OTC dealers, business and credit.

In this regard, the portfolio risk manager's focus and role is directed towards the identification and composition of "saleable" tranches or hedging product and the selection of the most appropriate strategy or combination of strategies to be followed.

Understanding the construct and philosophy of hedging mechanisms becomes essential to give affect to this key aspect and responsibility of portfolio risk management. Chapter five attempted to provide this understanding. The various risk mitigating strategies or hedges were discussed with a more prominent focus on the modern hedges such as credit derivatives and securitisation.

In the next chapter, the use of credit risk management as well as these risk-mitigating techniques in practice will be investigated as part of an industry research exercise, to determine the extent and application thereof in the banking environment. The research takes the form of combining the results of a structured questionnaire and a structured interview, and from analysis, determine what the current state and application of credit risk management and specifically the portfolio approach together with its components, are in the banking industry, with specific attention on the managerial approach followed.

CHAPTER 6

EMPIRICAL STUDY OF CREDIT RISK MANAGEMENT IN PRACTICE

6.1 Literature Study Overview

The first component of the study contains a literature study on credit risk management. The second component entails an empirical study regarding the credit risk management practices applied in practice in the South African industry. The third component provides a process approach to the management of credit asset portfolios in a South African bank.

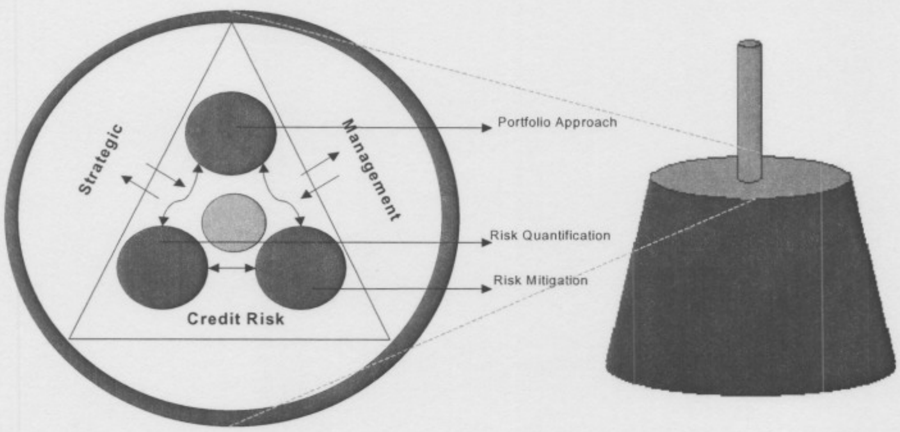
The previous four chapters presented a literature overview by way of a literature study regarding credit risk management in general, and the portfolio approach to credit risk management specifically. The format in which the discussion was presented was to provide four building blocks, each building block a specific component of a puzzle. These four chapters completed the theoretical aspects of credit risk management and also provided different author's views on terminology together with an explanation of the portfolio approach and theory.

Chapter 2, the first building block, presented insight into the management function, the managerial role and functional activities. The discussion evolved to include the strategic focus of the credit decision and the role the credit portfolio risk manager needs to play as 'executioner' and 'advisor' to give affect to the credit strategy.

Chapter 3, the second building block, provided a discussion of the portfolio approach to credit risk management, addressing the modern portfolio theory, the application of the modern portfolio theory to credit asset portfolios, the evolution of credit risk management practices, and the credit portfolio approach. The risk-adjusted performance measures to be used from a credit risk management perspective were discussed together with related concept definitions.

The third building block (Chapter 4), presented the credit risk quantification approaches and models. The discussion included an overview of the role the information technology department should play in the provision of the required data elements as a key component to effective credit portfolio risk management. Furthermore, insight has been provided regarding the specific data and reporting requirements, approaches and model classifications, vendor models available for the respective data issues and a comparison between the credit portfolio models.

Figure 6.1. Literature study components: Chapters two to five



Source: Author (2003)

Chapter 5, the fourth building block, concluded the literature study and provided insight into the risk mitigation strategies or credit risk hedging techniques available to the credit risk portfolio manager to ensure an optimum trade-off between risk and reward. The discussion presented included an overview of the various techniques available and focussed specifically on credit derivatives and securitisation. In this regard, discussions on the principles, types and mechanics were provided.

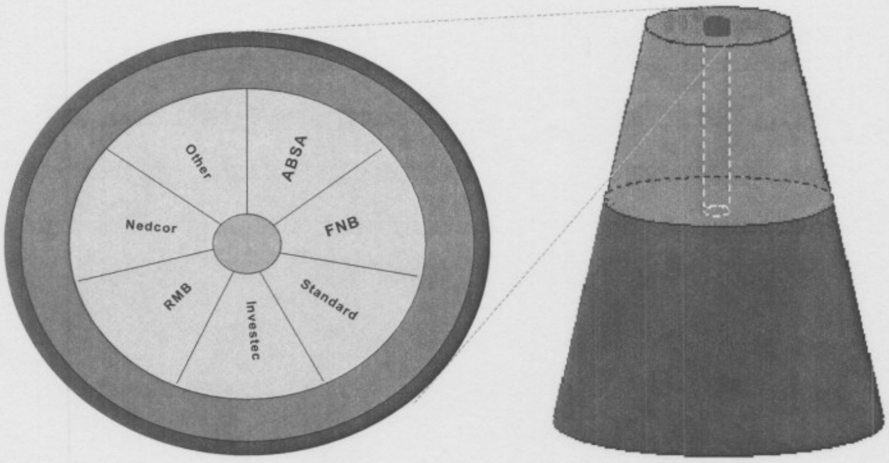
The preceding schematic illustration represents the components of the literature study and is provided for orientation and easy reference.

6.2 Empirical Study: Introduction

6.2.1 Chapter layout

The next component in the research study entails an empirical investigation regarding the credit risk management practices applied in practice by the South African banking industry. The schematic view, presented in Chapter 1, is broadened and enhanced to reflect the empirical study in figure 6.2.

Figure 6.2 Empirical Study – Chapter six



Source: Author (2003)

Before the discussion on the empirical study can commence, the problem statement and the research objectives should be presented to recap the purpose of the research.

6.2.2 Problem statement

The basic hypothesis or central theoretical argument can be summarised as follows:

The operating environment in which banks conduct their business showed significant changes and increase in complexity since the latter half of the previous decade. This is especially relevant in the credit risk environment, the tools and techniques used as well as the application of the portfolio theory in the quantification of credit risk. Development in these aspects of credit risk received high priority, focus and resources, while the management approach associated with managing the credit risk in portfolio context has not kept pace with these developments and enhancements. The requirements of the Basel II Capital Accord assisted in banks adopting best of breed credit risk management practices as it not only provided a benchmark for credit risk management, but also provides the building blocks for credit portfolio management.

Recent developments have resulted in a bombardment of quantitative and qualitative credit risk information and data on the one hand, and on the other the absence of a clear focus and management approach and philosophy, which is applied to effectively manage credit risk. The changes in the credit risk management environment dictate a need for a new management philosophy: A paradigm shift to apply the data and related information to the strategic decision making process. In this context, it is believed that the contribution lays in the formulation of a process approach for managing credit asset portfolios. This leads to the question: Given the outcomes of quantification models and techniques, how are these outcomes used in credit risk management?

Given the above scenario, the South African financial industry is confronted with the following dilemma in managing credit asset portfolios:

- How are the different outcomes of quantification techniques and models incorporated in the credit management process?
- How should the transition be managed from relationship banking and transactional analysis to a portfolio approach in credit risk management?
- How does the portfolio risk manager ensure shareholder value creation and maximisation while having to deal with an optimum portfolio composition?
- International best practices as depicted in the Basel II Capital Accord proposals (Basel, 2003b), as well as the King report (Ernst & Young 2003a-c and Myburg 2003), demand that the portfolio approach to credit risk must be

adopted by all banks that want to conduct business in the global arena. It therefore becomes an imperative; and

- A universally accepted, current and documented management process is absent in the South African context.

6.2.3 Research objectives

The research is closely linked to the dilemma facing the South African financial industry. It is becoming increasingly important in the immediate operating environment where performance is driven by the value generated for shareholders in context of the requirements and constraints as determined by the regulatory, statutory and accounting standards bodies.

The primary objective of the research is to formulate a management approach for applying the portfolio approach in the management of credit risk in credit asset portfolios.

Other objectives defined are:

- To determine the status of South African financial institutions regarding the evolution towards a portfolio approach for credit risk management.
- To determine the management techniques, processes and approaches being used by South African financial institutions in the management of credit risk.
- To determine international best practice methodologies in the management processes as it relates to credit risk and incorporate them in a proposed management approach.
- To develop a thorough knowledge of the portfolio approach to credit risk management.

The discussion presented in the following paragraphs is divided into three sections: first a discussion on the procedures and methods followed to obtain the required information, secondly a section discussing the results obtained from the participating banks and thirdly, a conclusion focussing on a short interpretation of the results.

6.3 Empirical Study: Procedures and Methodology

6.3.1 Research process

Daniel and Terrell (1989:3) state that special studies should be designed to meet specific predetermined objectives as efficiently and effectively as possible. With any study proposition, two questions need to be answered: (i) "can it be of real value?" and (ii) "Is it feasible?" In both cases, the answer in context of this research is YES! The study provides value in terms of the objectives as stated and is feasible, implying that it can be done.

Steyn *et al.* (1994:3) state that the research process consists of five clearly defined steps or phases. These steps are:

- Planning and design;
- Data collection;
- Editing and Coding;
- Data analyses; and
- Interpretation and conclusion.

Daniel and Terrell (1989:5) argue that the research process has two distinct phases; a planning phase and an accomplishment phase. Each of these two phases has several steps to be executed, being:

- Planning Phase:
    - Prepare a clear and concise statement of purpose;
    - Develop a set of meaningful, measurable, specific objectives;
    - Determine the analysis necessary to achieve the specific objectives;
    - Determine what data are required in order for the analyses to be performed; and
    - Specify in detail the data collection plans.
- Accomplishment phase:
    - Collect the data;
    - Edit and organise the data;
    - Perform planned analyses of data;
    - Achieve each specific objective based on planned analyses; and

- o Evaluate general study objectives based on results of efforts to achieve specific objectives.

According to Steyn *et al.* (1994:7), two types of data can be defined, namely quantitative and qualitative data. Quantitative data can be numerically measured and is classified as discrete variables or continuous variables. Daniel and Terrell (1989:12) state that quantitative data or variable is one whose values are expressible as numerical quantities, such as measurements or counts. A measurement taken on a quantitative variable conveys information regarding amount. They go on to state that a discrete variable is one that can assume only certain values within an interval, characterised by 'interruptions' between the values that the variable can assume (e.g. only 1 or 2 customers entering a store and not 1,5 customers entering the store). With continuous variables, the interruptions or gaps that are characteristic of a discrete variable do not occur (Daniel and Terrell, 1989:12).

Qualitative data on the other hand cannot be presented in numerical format e.g. a value (Steyn *et al.,* 1994:7). Qualitative data is classified as being either ordinal data (presenting qualitative data in a quantitative manner) or nominal data (pure qualitative data e.g. colour of a person's eyes). Daniel and Terrell (1989:12) define a qualitative variable as one that is not measurable, in the sense that height is measured, or countable, as are people entering a store. Many characteristics can be classified only. A measurement taken on a qualitative variable conveys information regarding attribute. Welman and Kruger (2001:132) state that in the case of a nominal measurement, the numbers assigned only serve to distinguish the measurable variable in terms of the attribute being measured. The variable being measured is placed in different, mutually exclusive and exhaustive categories in respect of the specific characteristic. In the case of ordinal measurement, the numbers assigned not only reflect differences in the variable being measured, but also rank order.

The importance of differentiating between the types of data lies in the technique to be used in the analysis process. The above concepts as it relates to this research are discussed in the following sections of this chapter.

6.3.2 Research methodology

6.3.2.1 Description of the Population

The population researched entailed all banking institutions listed on the Financial Sector of the Johannesburg Stock Exchange.

Banking institutions were selected for the research due to the fact that credit risk management practices features more prominently in these companies, as they are the major players in providing loans. Furthermore, this research focuses on a South African bank thereby excluding all other financial institutions and retail companies providing any form of credit.

6.3.2.2 Sources of Data

Leedy (1993:122) states that there are four discrete research methodologies, which are dictated by the type of data required, namely:

- The descriptive survey method – appropriate for data derived from simple observational situations, e.g. physical observations or observations by means of questionnaires or poll techniques;
- The historical method – appropriate for primary data that are primarily documentary or literature in form;
- The analytical survey method – appropriate for quantitative data that require statistical techniques to extract their meaning; and
- The experimental method – appropriate for data derived from an experimental control situation or a pre-test/post-test design in which two separate groups, or one group, from which data are derived at two separate intervals, are involved.

Welman and Kruger (2001:158-160) argue that personal interviews and therefore also structured interviews entail both advantages and disadvantages. These are:

- Cost and ease of application:
  - Advantage – flexibility and adaptability; and

- Disadvantage – high costs in preparation and application.

- Control over responding:
  - Advantage – complete control of the interview situation; and
  - Disadvantage – none.
- Anonymity; and
- Response rate – less chance of eluding the interview (higher response rate).

The structured interview is closely related to the questionnaire, which is, according to Leedy (1993:192), a data-gathering technique that needs careful planning. Zikmund (1997:232) lists the following advantages and disadvantages of interviews:

- Advantages
  - The opportunity for feedback to the respondent exists where feedback is required in clarifying questions or instructions;
  - Complex answers can be clarified with the respondent;
  - A lengthy questionnaire may be dealt with in more detail during an interview;
  - Responses to all the questions may be generated ensuring the completeness of the survey; and
  - The presence of an interviewer generally increases the percentage of people willing to complete the interview.
- Disadvantages
  - Respondents are not anonymous and therefore may be reluctant to provide confidential information;
  - Demographic characteristics of the interviewer may influence respondent's answers;
  - Differential interviewer techniques may be a source of interviewer bias;
  - Personal interviews are generally more expensive than mail interviews; and
  - Interviews can be time consuming.

Zikmund (1997:380) states that two basic types of questions exist based on the degree of freedom respondents are allowed to exercise when providing answers, namely:

- Open-ended response questions that allow respondents to answer the questions in their own words; and
- Fixed-alternative questions (closed questions) that give respondents specific and limited alternatives of choice and request respondents to choose the one closest to their own viewpoint.

The information used in this study has been obtained through structured interviews (based on a questionnaire) held with the identified participating banks in the sample selection. The questionnaire has been electronically distributed prior to the scheduled interview. The sources of data are classified as primary data as data is collected directly from the respondents (Steyn *et al.* (1994:8)). The questionnaire consists of both open-ended and fixed-alternative questions (Zikmund, 1997:380).

6.3.2.3 Sample selection

The sample selection consists of the 'Big Five' banking institutions in the South African banking industry. These banks are (in alphabetical order):

- Absa Bank Limited.
- FirstRand Bank Limited.
- Investec.
- Nedcor.
- Rand Merchant Bank (part of the FirstRand Group).
- Standard Bank of South Africa.

The main reason for the sample being selected as above is the market capitalisation and total asset composition these banks represent in the South African industry. A broad description of these institutions is provided later in the discussion (paragraph 6.4.2.2). Underlying the sample selection is the assumption that the larger banking institutions would be more inclined towards best-of-breed credit risk management practices because of their global participation, larger budgetary resources, and system capabilities and the costs associated therewith.

6.3.2.4 Questionnaires

The questionnaire (Annexure A) has been forwarded to the sample selection prior to the scheduled structured interview. The questionnaire consists of thirty-one questions divided into seven sections or categories. Some questions required the respondent to indicate on a scale of one to seven, the option applicable in his or her specific situation. Other questions are closed-ended with either a yes or no answer. Finally, the respondents were requested to explain why they were of the opinion that the views/options selected were appropriate.

The first category of questions reflects the respondent's credit risk management operating model. This was required as it provides a frame of mind from which the remainder of the questionnaire could be evaluated. Insight is gained regarding the degree of centralisation or lack thereof as well as the interrelationships that prevails in the credit department. Two questions were devoted to this category.

The second category focused on the reporting structures from both an overall risk and a credit risk perspective. The category provides insight into the importance assigned to the various risks from an organisational perspective and where the credit risk functionality is positioned in terms of importance, significance and influence sphere. A view regarding corporate governance as it manifests within the organisation is also obtained. Two questions were devoted to this category. In the discussion on the results and findings later in the chapter, the first two categories will be addressed simultaneously because of the interwoven relationship between operating model and management structure.

The third category focused on strategy and credit risk management. Questions dealt with the presence or existence of the portfolio approach on the one hand and the organisation's current positioning in the evolutionary stages of credit risk management on the other. Regarding the evolutionary stages, a standard measure is provided whereby the respondent needs to self-assess his or her institution's progress and what is still required to reach the optimal stage. The evolutionary stages were discussed in the interview based on the overview provided in Chapter 3 (paragraph 3.3.4). The questions also aim to provide information regarding the strategic importance the respondent considers to be assigned to reaching the optimal stage. The possible benefits it can derive from the Basel Capital Accord, are also investigated. Eight questions were devoted to this category.

The fourth category of questions has bearing on the portfolio approach specifically and established the context in which the portfolio approach is applied. Questions were directed towards the respondent's definition of the portfolio approach, it's perceived importance in the organisation, as well as the approaches followed in designing, developing and implementing the portfolio management approach. The category was concluded with a question on the perceived 'ideal' approach to be followed in adopting a portfolio approach to credit risk management. The aim of the question is to determine whether the respondent (having an opportunity to design, develop and implement the portfolio approach all over), would follow a similar approach and if any lessons have been learnt from experience. This category consists of seven questions.

The fifth category of questions investigated data requirements and constraints experienced. The category also includes two questions directed towards the credit-scoring or credit-screening tools used by the respondent to assist in the decision-making process. Four questions were devoted to this category.

The sixth category focused on the quantification of credit risk. The questions were formulated to extract the respondent's view regarding the perceived importance of the credit risk quantification models and the models and approaches deployed in the organisation. The progress made in terms of Basel II as well as the level of portfolio risk management can be derived from the insight into the models used. Four questions were devoted to this category.

The seventh category had to do with credit risk mitigation strategies and hedging tools being used by the respondent. Questions were directed towards the respondent's view regarding the perceived importance of credit risk mitigation in his or her organisation as well as in the South African industry. Insight was gained into the perceived readiness of the South African industry to transfer credit risk to third parties. Information is also obtained on the credit mitigation techniques used by the respondents. Four questions were devoted to this category.

The combined information provided in categories five, six and seven by the respondents provide insight into the level of sophistication in the credit risk management practices in general and from a portfolio approach perspective specifically. Insight can be obtained whether the level of adoption (the portfolio approach) is indeed what the respondent wishes the interviewer to believe.

The interviewer expanded the questionnaire and added a further question regarding the respondent's willingness (individually and as an organisation) to participate in similar exercises, research and questionnaires in future as the view was taken that the networks established should be cultivated as benchmarking benefits could be realised for the participants as well as the industry in total.

6.3.2.5 Structured interviews

As mentioned in paragraph 6.3.2.2, the questionnaires were forwarded to the respondents prior to the scheduled interviews. Once the questionnaires were forwarded, interviews were arranged with representatives of the participating banks. In all instances, the author tried to have representation of all the market segments being served by the respective banking institutions.

Where possible, the information reported upon takes into consideration the corporate market segment, the affluent market segment, and the retail market segment. Information regarding the market segments addressed is provided in the discussion to follow (paragraph 6.4.2.2.2).

The interviews were conducted in a structured manner, the questionnaire forming the basis and directive for the discussions. Additional information has been requested and the latest financials statements were presented to the author. In some instances, the organisational structures and reporting frameworks of the respondents were also obtained.

Interviews were conducted with the following representatives of the participating banks in the sample selection:

- Absa Bank:
  - Friedel Meisenholl – Managing Executive: Absa CRMO.
  - Johan Coetzee – GM: Risk Management Services (Absa CRMO).
  - Pieter Swart – Head: Credit Evaluation (ACMB Credit).
  - Pieter Burger – Credit Head: Portfolio Management (ACMB Credit).
  - Andre Blaauw – GM: Enterprise-wide Risk Management (Absa ERM).

- Standard Bank:
  - David Hodnett – Director: Group Risk Management.
  - Dr. Charlotte Crowther – Manager Risk Measurements: Group Risk Management.

- FNB/RMB:
  - Martin Oberholster – Head of Credit: Corporate.
  - Dawie Spangenberg – Statistical Analyst FNB Retail*.

- Investec:
  - Gary Laughton – Group Credit Risk: Credit Decision Making.
  - Arnie Swiegers – Group Credit Risk: Basel II, KMV.

- Nedcor:
  - Irena Willman – Head: Credit Risk Management.

Regarding the empirical study conducted, it needs to be mentioned that one interview was not conducted in person, but was done telephonically. Another

* Telephonic interview

interview was regarded as a general discussion, as the respondent did not wish for the interview to be structured to the questionnaire nor to be recorded. These were the only two interviews that were not tape-recorded.

The author is of the opinion that these deviations did not jeopardise the study as the one interview represented a specific market segment of one of the banks. Other interviews have been held with representatives of the same bank but from different market segments. The only aspect where information provided differed from the interview held in person, was those that focussed on the approach, the credit-screening models and credit risk quantification models. With regard to the respondent who didn't wish to follow a structured interview, selective information was still obtained but not in a detailed, structured manner.

6.3.3 Method of Data Analysis

6.3.3.1 Data Collection

As stated, data collection was done by means of a structured interview, based on a predetermine questionnaire forwarded to respondents prior to the scheduled interviews. The interviews were conducted with various representatives of the banking institutions as identified in the sample selection. Results were documented in writing and tape-recorded for ease of reference (except for the two interviews as previously mentioned). The data is qualitative in nature incorporating both nominal and ordinal variables.

6.3.3.2 Data Analysis

Data and information were obtained on the presumption that all information will remain company confidential. Reference is not made to any specific banking institution. Banking institutions are reported by using various aliases.

The data was analysed using a simple method of addition and percentage calculation where appropriate. As the information is predominantly qualitative in nature, extensive analyses were not required.

6.3.3.3 Method of 'SAS-Program' Analysis

Due to the nature of the empirical study conducted, a statistical analysis of the data was not conducted. The primary focus of the analysis was to determine how the respondents reacted to the questions and to reflect the responses in the form of a discussed or overview. Statistical analysis would not be meaningful considering the nature of the questionnaire.

6.4 Empirical Study: Results and Findings

6.4.1 Introduction

In the previous section a discussion regarding the approach and methodology followed a discussion on the empirical study. This section focuses on the actual results obtained from the structured interviews. In providing the results, care was taken in the documentation to present the views of the respondents and to defray from any interview bias that might have been present. In this regard the author refrained from expressing an opinion as it might have influenced the outcome.

However, before discussing the results an overview of the problems encountered should be provided. The following problems were encountered with regard to the empirical study:

- In some instances, respondents were hesitant to provide (what they regarded as propriety information) company-specific information.
- Care had to be taken to ensure that the respondents were not being lead with regard to answers provided. This could have resulted in a bias towards the research and not providing a true reflection on the status that prevails in the respondent's organisation.
- Due to the busy schedules of the respondents it was not easy to obtain sufficient time for the structured interviews. Although the questionnaire was discussed in detail in the majority of interviews, some aspects could have been discussed in greater detail if the time was available.

- A more detailed survey regarding certain aspects of the interview would have been helpful in mapping the various models to the various market segments, business units and products – especially as some banks have difficult management and governance structures.
- Difficulties arose in documenting the results as care had to be taken to ensure that there was not any bias towards specific responses. In this regard the author attempted to refrain from giving any comment on or advocating any view as presented by the respondents.

6.4.2 General observations on the data and information

6.4.2.1 Response

As mentioned in paragraph 6.3.2.1, the population entails all banking institutions listed on the Financial Sector of the Johannesburg Stock Exchange. The 'Big Five' banking institutions were selected as a sample for the research due to the fact that credit risk management practices features more prominently in these companies, as they are the major players in providing loans. In general, good cooperation was obtained and all respondents participated willingly. All responses were used and documented in the study.

6.4.2.2 Description of the population (sample selection)

6.4.2.2.1 Asset contribution

Table 6.1 contains a breakdown of the domestic and total asset composition of the 'Big Five', which were sourced from the July 2003 DI900 returns. The 'Big Five' approximates 87% of total assets in the South African industry.

The domestic and total loans and advances composition of the 'Big Five', is represented in Table 6.2. Data was again sourced from the July 2003 DI900 returns. Again, the 'Big Five' contributes 87% of total loans and advances in the South African industry.

Table 6.1 Domestic and Total Asset Contributions of the Big Five

	Domestic Assets (R '000)	**Total Assets (R '000)**	**Domestic Assets as % of Industry (%)**	**Total Assets as % of Industry (%)**
Absa Bank Limited	251 883 314	259 562 623	21,1	19,5
FNB/RMB Combined	211 586 667	234504833	17,7	17,6
FirstRand Bank Limited	208 544 677	231 462 843		
Rand Merchant Bank Limited	3 041 990	3 041 990		
Investec Bank Limited	73 950 464	84 770 258	6,2	6,4
Nedbank Limited	248 698 478	274 793 443	20,8	20,6
The Standard Bank of South Africa Limited	275 845 351	306 692 792	23,1	23,0
'Big Five ' Combined	1 061 964 274	1 160 323 949	88,9	87,1
Industry Total DI900 (40 banks)	1 194 808 008	1 331 488 415	100	100

Source: SARB (2003a-h:Line item 224)

Table 6.2 Domestic and Total Loans and Advances Contributions of the Big Five

	Domestic L&A (R '000)	**Total L&A (R '000)**	**Domestic L&A as % of Industry (%)**	**Total L&A as % of Industry (%)**
Absa Bank Limited	194 609 222	201 918 199	23,1	21,4
FNB/RMB Combined	154 545 646	171 931 091	18,4	18,2
FirstRand Bank Limited	151 683 298	169 068 743		
Rand Merchant Bank Limited	2 862 348	2 862 348		
Investec Bank Limited	52 668 422	61 117 042	6,3	6,5
Nedbank Limited	184 137 540	194 743 244	21,9	20,6
The Standard Bank of South Africa Limited	159 462 865	189 237 703	19,0	20,0
'Big Five ' Combined	745 423 695	818 947 279	88,6	86,7
Industry Total DI900 (40 banks)	841 451 004	944 571 857	100	100

Source: SARB (2003a-h:Line item 95)

The above tables (table 6.1 and table 6.2) therefore clearly state that selecting the 'Big Five', as a sample contributes the majority of the industry's assets as well as the industry's loans and advances. In both instances, the 'Big Five' represents more than 87% of the South African banking industry.

6.4.2.2.2 Market segment representation

The market segments (portfolios) covered with the structured interviews are shown in table 6.3. A total of ten interviews were conducted with representatives from the respective market segments of the 'Big Five' (individually or in combination, e.g. one interview with representatives from either group risk function, corporate function, retail function or in combination).

The empirical study covered both the corporate and retail market segments in the South African banking industry extensively, as represented in Table 6.3.

Table 6.3 Market segments covered in interviews

	Absa	FNB	RMB	Investec	Nedcor	Std. Bank
Mass Market	I	I			I	I
Middle Market	I	I			I	I
Affluent Market	I	N		I	I	I
Commercial Market	I	I			I	I
Corporate Market	I	I	I	I	I	I
Africa Market	N	N	N	N	N	N
International Market	N	N	N	N	N	N

Legend:

I - Included in interview discussion and research study

N - Business focus of institution but not part of interview discussion

Source: Author (2003)

6.4.2.2.3 Absa Bank Limited

Absa Bank Limited is a 100% subsidiary Absa Group Limited. The bank consists of segment-focussed business units, asset-based and product business units, a delivery channel and a REAM-unit (Real Estate Asset Management). Segment-based business units focus on the personal banking market segment (Absa Private

Bank, Personal Financial Services, Retail Banking Services and Flexi Banking Services), the commercial banking market segment (Business Banking Services) and the wholesale banking market segment (Absa Corporate and Merchant Bank inclusive of Absa Bank London, Absa Bank Singapore, Absa Asia Limited and Bankhaus Wolbern & Co. as well as the Africa initiatives). Asset-based and product business units include Absa Home Loans, Absa Vehicle and Asset Finance and Absa Card (Absa Group Limited 2003).

Absa Bank Limited is a domestic and globally active banking institution servicing the total spectrum of clients from all market segments. The African operations include representation in the following countries: Tanzania, Mozambique, Namibia and Zimbabwe. International operations include representation in the following countries: United Kingdom, Singapore, Hong Kong and Germany.

Headline earnings distribution between the various operations is: South Africa (91%), International (5%) and Africa (4%). Total advances for Absa Bank Limited amounts to R199 billion. Headline earnings totalled R3.146 billion as at 31 March 2003. Absa Group Limited is considered part of the 'Big Five' banking institutions in South Africa with total assets amounting to R269 billion.

6.4.2.2.4 FirstRand Limited (Including Rand Merchant Bank – RMB)

The following information was obtained from the bank's annual report (FirstRand 2002), audited results (FirstRand 2003a), results presentation (FirstRand 2003b) and the supplementary information (FirstRand Group 2003). FirstRand Bank Limited is a 100% subsidiary of FirstRand Bank Holdings. FirstRand Bank Holdings is a wholly owned subsidiary of FirstRand, also a holding company, which was established in 1998 when the financial services interests of RMB Holdings and Anglo American Corporation were merged. The other wholly owned subsidiary is the Momentum Group. FirstRand Bank Limited consists of broadly defined segment-, asset-based and product business units namely First National Bank, WesBank, FNB HomeLoans, Rand Merchant Bank, FNB Corporate, Origin and Ansbacher SA.

Other subsidiaries forming part of FirstRand Bank Holdings but NOT FirstRand Bank Limited are:

- African Subsidiaries:
  - FNB Botswana;
  - FNB Namibia; and
  - FNB Swaziland.
- International Subsidiaries:
  - Ansbacher; and
  - RMB International.
- Insurance:
  - First Link; and
  - OUTsurance.
- RMB Private Equity:
  - RMB Corvest;
  - RMB Ventures; and
  - Ethos.

FirstRand Bank Holdings is clearly a domestic and global active banking institution servicing the total spectrum of clients from all market segments. The bank has both African and global representation. The African operations include representation in the countries as listed. International operations include representation in the following countries and continents: The Carribean, Channel Islands, Europe, Far East, London, Sydney and Dublin.

FirstRand Bank Holdings focuses on five segmented clusters as close collaboration between business units servicing the same target market becomes paramount. Accordingly, business units servicing the same target market are 'clustered'; defined in terms of a matrix structure between a segment focus and business unit.

These clusters are: retail (targeting individual consumers), corporate (targeting large corporates and commercial enterprises), wealth (targeting individuals in the middle to upper income market), health (targeting the private health insurance market), and the capital centre (group capital is managed from the centre allowing capital to be moved between the Banking and Insurance Groups to satisfy reserving requirements or investment opportunities.

The Retail cluster includes the following business units:

- FNB Retail;
- WesBank;
- African Banking subsidiaries;
- FNB HomeLoans; and
- Short-term insurance.

The Corporate cluster includes the following business units:

- Rand Merchant Bank;
- FNB Corporate Bank;
- FirstRand Asset Management;
- Momentum Employee Benefits; and
- Banking group Treasury.

The Wealth cluster includes the following business units:

- Momentum Life;
- Momentum International MultiManagers; and
- Private Banking (Domestic):
    - Origin; and
    - Ansbacher SA.

The Health cluster includes the following business units:

- Discover;
- Discovery Health;
- Discovery Life;
- Destiny Health; and
- Discovery Vitality.

Headline earnings distribution for FirstRand Banking Group between the various operations is: South Africa (87%), South Africa Non-banking (16%) and Africa and International (-3%*). Total advances for FirstRand Banking Group amounts to R190 billion. Headline earnings totalled R3.463 billion as at 30 June 2003. All figures quoted are pre-AC133. FirstRand Group banking operations is considered part of the 'Big Five' banking institutions in South Africa with total assets amounting to R256 billion.

6.4.2.2.5 Investec

The information was obtained from the bank's annual reports (Investec 2000 & 2002) and Investec's corporate profile (Investec date unknown).

Investec is an international specialist-banking group that provides its select clients with innovative products and services. Investec operates in eleven countries, with approximately 5000 employees in offices around the world. Principal areas of business are: Investment Banking, Treasury and Specialised Finance, Private Client Activities and Asset Management. The group's operating structure consists of:

- Investment banking includes corporate finance, institutional research, sales and trading, and private equity and direct investments.
- Treasury and specialised finance include financial market activities and banking activities.
- Private Client Activities include private banking, private client portfolio management and stock broking.
- Asset management includes asset management and assurance.

Investec is a domestic and global active banking institution servicing the corporate and affluent 'high net-worth' market segments. The African operations include representation in the following countries: Botswana, Namibia, Swaziland, and South Africa. International operations include representation in the following countries: Australia, Channel Islands, Hong Kong, Ireland, British Virgin Islands, Luxembourg, Israel, Mauritius, Switzerland, United Kingdom, and the Unites States.

* Includes currency translation loss amounting to R605 million

Headline earnings distribution between the various operations for the total Investec group is: South Africa and Other (47%*), UK and Europe (46%) Israel (4%) and USA (3%). Total advances for Investec Group equals R54 billion divided as follows: South Africa and Other (56%*), UK and Europe (33%) Israel (8%) and USA (3%). Headline earnings totalled R1.684 billion as at 31 March 2002. Investec Group is considered part of the 'Big Five' banking institutions in South Africa with total assets amounting to R304 billion (total operations and not only South Africa).

6.4.2.2.6 Nedcor Limited

Nedbank Limited is a 100% subsidiary of Nedcor Limited. Nedbank Limited consists of different clusters (business units focussing on specific market segments) e.g. Nedbank Corporate, Nedbank Retail, Peoples Bank and Imperial Bank. Various alliances are in place e.g. Pick 'n Pay Go Banking, Old Mutual Bank, American Express, Capital One, JD Group and Old Mutual Group Schemes. Nedcor Wealth Management, also part of the Nedcor Limited structure, focuses on both jointly owned (with Old Mutual – Private clients and Credit Protection) and wholly owned businesses (Retail Investments and International Companies). These include: BoE Private Clients (50:50 joint venture with Old Mutual), Credit Protection (50:50 joint venture with Old Mutual), Retail Investment Products and Services, International Companies (Stenham Gestinor, BOE International, NIB International and Chrisell Associates) and Gerrard Private Bank (Nedcor 2002).

Nedbank Corporate is an integrated corporate and investment bank, offering a full range of products and services, such as advisory, debt, equity, lending and transactional services, to large and mid-sized corporates. The business is based on strong, enduring relationships and is driven by innovative thinking and leading-edge technology. Nedbank Corporate can be divided into several sub-units focussing on specific segments and business areas. These are:

* Other includes Mauritius, Hong Kong, Australia, and Botswana
* Other includes Mauritius, Hong Kong, Australia, and Botswana

- Business Banking (small and medium enterprises in South Africa), Capital Markets (competes in the broadly defined merchant and investment banking markets);
- Corporate Banking (delivering mutually beneficial integrated banking services, products and solutions to large corporations operating in South Africa);
- Corporate Finance (the provision of broad-based advice to selected mid- to large-cap domestic and international corporate clients and parastatals in respect of a variety of transactions, including corporate restructures, listings, and mergers);
- Edward Nathan and Friedland (ENF) (provides legal services to predominantly large corporates to which its specialist teams can add considerable value);
- Property and Asset Finance (provides specialist commercial and industrial property and asset finance solutions to the middle to large corporate market);
- International and Africa (to serve the international needs of the domestic client base in the corporate, commercial and private banking sectors);
- Strategic Business Development (focuses on initiating transactions relating to black economic empowerment, the public sector and development initiatives in Africa); and
- Treasury.

Nedbank has developed a unique strategy for its retail and wealth management operations, with clearly segmented target markets served by distinct, standalone brands covering the spectrum from ultra-high-net-worth clients to the emerging market. Nedbank Retail is divided into several sub-units focussing on specific segments and business areas. These are:

- Private Banking (to create a genuine financial partnership with high-net-worth clients);
- Personal Banking (aims to meet the needs of the upper-middle to upper segments of the retail banking sector);
- Nedbank Markets (focused on providing excellent service and support to the full Nedbank client base throughout the Nedbank branch network as it

proactively concentrates on the retention and expansion of retail banking clients through teams);

- Nedcor Group Insurance Brokers (NGIB) (focussing on insurance/ assurance products for individuals and corporates);
- Peoples Bank has two main focus areas being retail banking (focussing on the middle-to lower-income categories offering a comprehensive range of transactional banking products and services, lending facilities and client education) and various alliances between Peoples Bank and *inter alia* Capital One, Old Mutual Group Schemes and the JD Group; and
- Imperial Bank is a focused, entrepreneurial niche bank that is managed in accordance with general banking and risk management principles providing asset-based finance primarily for vehicles, property and aviation. It aims to create profitable relationships with all members of the bank's value chain.

The alliances relevant to Nedbank Retail are:

- Pick 'n Pay Go Banking (aimed at offering convenient and innovative financial services to the middle-income market);
- American Express (credit card facilities to selected clients and card-processing facilities to selected merchants); and
- Old Mutual Bank (focus on delivering a wide range of products and services to existing Old Mutual clients, meeting both their banking and insurance needs).

Nedbank Limited is a domestic and global active banking institution servicing the total spectrum of clients from all market segments. The African operations include representation in the countries like Namibia, Swaziland, Lesotho, Malawi, Mauritius, Madagascar and Zimbabwe. International operations include representation in the following countries and continents: United Kingdom (London), Isle of Man, Hong Kong, and Singapore.

Headline earnings distribution for Nedcor Limited (Group) between the various operations is: South Africa (84%), Africa (8%) and International (8%). Total advances for Nedcor Limited amounted to R208 billion. Headline earnings totalled R2.585 billion as at 31 December 2002. Nedcor Limited's operations is considered part of the 'Big Five' banking institutions in South Africa with total assets amounting to R274 billion.

6.4.2.2.7 Standard Bank of South Africa

Standard Bank Group is a major regional banking force employing more than 37 000 people in its banking and insurance operations. Standard Bank Group is based in South Africa with operations in seventeen other African countries and niche investment and offshore banking operations in twenty-one countries outside Africa. The Standard Bank Group can be divided into Standard Bank operations and Liberty Group operations. The Standard Bank operations include Retail Banking, Business Banking, Standard Corporate and Merchant Bank, Stanbic Africa, Property Finance and International Operations (Standard Bank Group 2002).

The Retail Banking operation provides banking, investment, insurance and other financial services to individual customers, the agricultural sector and small and medium sized enterprises throughout South Africa. These include normal banking products, card, home loans, instalment finance and wealth products.

The Business Banking operation provides financial services to medium sized businesses in South Africa through account executives working with financial specialists. The services include instalment finance (Stannic asset finance and fleet management services), commercial banking and factoring.

Standard Corporate and Merchant Bank provides commercial and investment banking services to the larger corporates in South Africa, foreign banks and international counterparties. These services include treasury, foreign banking, corporate and investment banking, custody, structured debt finance, and electronic banking.

The Property Finance operation provides property-related finance and advisory services and undertake joint ventures. Activities span commercial, industrial, office, retail, wholesale residential developments and specialised property.

Stanbic Africa has a presence in 17 African countries excluding South Africa. Representation *inter* alia is in the following countries: Botswana, Lesotho, Malawi, Namibia, Swaziland, Tanzania, Uganda, Zambia, Nigeria, Ghana, Zimbabwe, Kenya, Congo, and Mauritius. The international operation expands into countries like USA, Russia, Latin America, and Scandinavia.

Total advances for the Standard Bank Operations equals R170 billion as follows: South Africa (72%), Africa (5%) and International operations (23%). Headline earnings for Standard Bank Group and Standard Bank operations respectively equal R5.263 billion and R4.965 billion as at 31 December 2002. Standard Bank Group is considered part of the 'Big Five' banking institutions in South Africa with total assets amounting to R390 billion (Standard Bank operations R304 billion).

6.5 Discussion of Results

In paragraph 6.3.3.2, it was already mentioned that data and information obtained were done with the agreement that all information would be kept confidential. In the discussion of the results and findings, reference is not made to any specific banking institution specifically with reference to its name. Extreme care was taken to neither identify a participating bank nor an individual response from the information provided and documented in this study. Banking institutions' names are omitted and replaced with aliases.

Furthermore, the results will be discussed with reference to the categories as discussed in paragraph 6.3.2.4, except for the first two categories, which will be addressed in combination, due to a close relationship between the categories. Each bank's responses (where applicable) has been divided into a corporate and retail view, as can be seen in table 6.4.

6.5.1 Credit Risk Management Operating Model and Reporting Structure

Category A: Questions 1.

Table 6.4 below illustrates the level of autonomy in credit risk management in terms of centralisation and decentralisation. Certain respondents provided views from an operations perspective, other from a decision-making capability perspective (mandates) and others again from a locations perspective. Some respondents provided views combining some or all of these perspectives.

The views made it extremely difficult to provide a clear-cut categorisation. For instance, with many respondents credit risk was managed centrally, however the applications were prepared within business units focussing on specific market segments, in some cases having their own mandate levels up to a predetermined level.

Table 6.4 Level of Autonomy in Credit Risk Management

<table>
<tr><th>Bank:</th><th>Ac</th><th>Ar</th><th>Bc</th><th>Br</th><th>Cc</th><th>Cr</th><th>Dc</th><th>Dr</th><th>Ec</th><th>Er</th></tr>
<tr><td>Group Risk</td><td colspan="10"></td></tr>
<tr><td>Centralised</td><td colspan="2">X</td><td colspan="2">X</td><td colspan="2">X</td><td colspan="2">X</td><td colspan="2">X</td></tr>
<tr><td>Decentralised</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>Separate Credit Risk Focus</td><td colspan="2">X</td><td colspan="2">X</td><td colspan="2"></td><td colspan="2">X</td><td colspan="2">X</td></tr>
<tr><td>Credit Risk</td><td colspan="10"></td></tr>
<tr><td>Centralised in organisation</td><td colspan="2">N</td><td colspan="2">N</td><td colspan="2">N</td><td colspan="2">N</td><td colspan="2">N</td></tr>
<tr><td>Centralised in segment (c,r)</td><td></td><td></td><td></td><td></td><td>Y</td><td>Y</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Decentralised</td><td colspan="10"></td></tr>
<tr><td>Geographical</td><td colspan="10"></td></tr>
<tr><td>Regions/ Provinces</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td>X</td><td></td><td></td><td>X</td></tr>
<tr><td>Africa Operations</td><td>X</td><td>X</td><td>X</td><td></td><td></td><td></td><td>X</td><td></td><td></td><td></td></tr>
<tr><td>International Operations</td><td>X</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td>X</td><td></td><td></td><td></td></tr>
<tr><td>Business Unit</td><td></td><td></td><td></td><td>X</td><td>X</td><td></td><td></td><td>X</td><td>X</td><td>X</td></tr>
<tr><td>Market Segment</td><td>X</td><td>X</td><td>X</td><td>X</td><td></td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr>
</table>

Legend: c – Corporate r – Retail e.g. Ac = Bank A Corporate

Source: Interviews and Annual reports with participating banks

From table 6.4 it can be seen that the majority of the respondents follow a decentralised approach regarding credit risk management, either based on geographic areas, business units, market segments or in combination. All respondents indicate a central group risk management environment.

Some respondents confirmed credit risk as one of the most significant risks. However, in doing so they did not necessarily went beyond the responsibilities of a "typical lending committee". Only in a few instances did the responsibilities assigned to a group credit committee encompass the 'total' management of credit risk e.g. policy and procedure, portfolio analyses, limits, concentration and diversification opportunities, and lending.

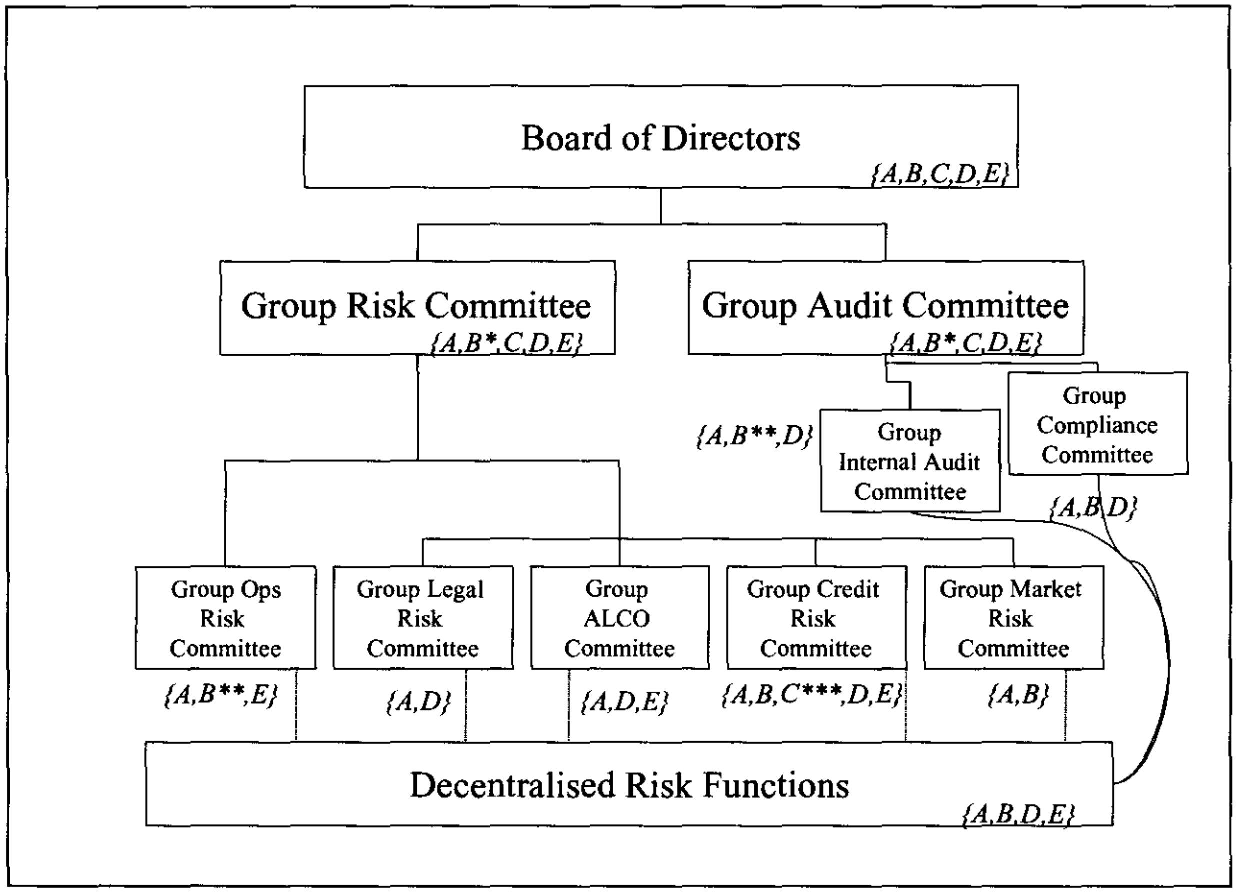
<u>Category A: Questions 2 & Category B: Questions 1 & 2.</u>

Figure 6.3 illustrates that the group structure is aligned to the management of the respondents' overall risk. Respondents also clearly apply the generic structure. The generic group structure adopted by most respondents includes a Board of Directors, Group Risk Committee and Group Audit Committee. One respondent combines the Group Audit Committee and Group Risk Committee into a single Group Audit, Risk and Compliance Committee within an Enterprise-wide risk management (ERM) framework.

The committees flowing from the generic group structure are mostly similar. However, the committees differ substantially in their application, especially the group credit risk committee. Interesting to note is that one respondent has its operational risk committee included in its Group Internal Audit structure.

Furthermore, a Group Credit Risk Committee was present in all cases but the application or utilisation of the committee was directed, in the majority of cases, towards a credit-lending forum (loan granting committee). It was evident in only two instances that the committee's duties and responsibilities went beyond lending decisions to credit risk management.

Figure 6.3 Generic Group Structure



Legend: B* Combined B** Operational Risk included in Audit

C*** Application differs between lending and credit committee

Source: Structured Interviews and Annual Reports

Interesting to note is the prominence given to a Group ALCO committee. All respondents except the two that adopted an Enterprise-wide Risk Management (ERM) focus had a prominent and separate ALCO committee. Both the respondents with the ERM focus have ALCO committees, although on a 'lower' organisational level. One of these ALCO committees is fairly prominent (although not at the same level as previously mentioned) as it reports into the Group Market Risk committee.

The intention of the second question was to provide insight into the credit risk organisational structure and specifically, whether an environment is present in the existing structure congruent to the adoption of the portfolio approach to credit risk. As a derivative, the presence of a portfolio risk management unit would have become clear.

In all except one instance however, the respondents did not wish to share their credit risk organisational structure and focussed on the governance structure for credit risk instead. This inevitable resulted in a discussion of the lending committees and associated mandate levels. As the information has no direct bearing on the purpose of the research it is not further elaborated upon.

6.5.2 Strategy and Credit Risk Management

Category C: Questions 1 & 2.

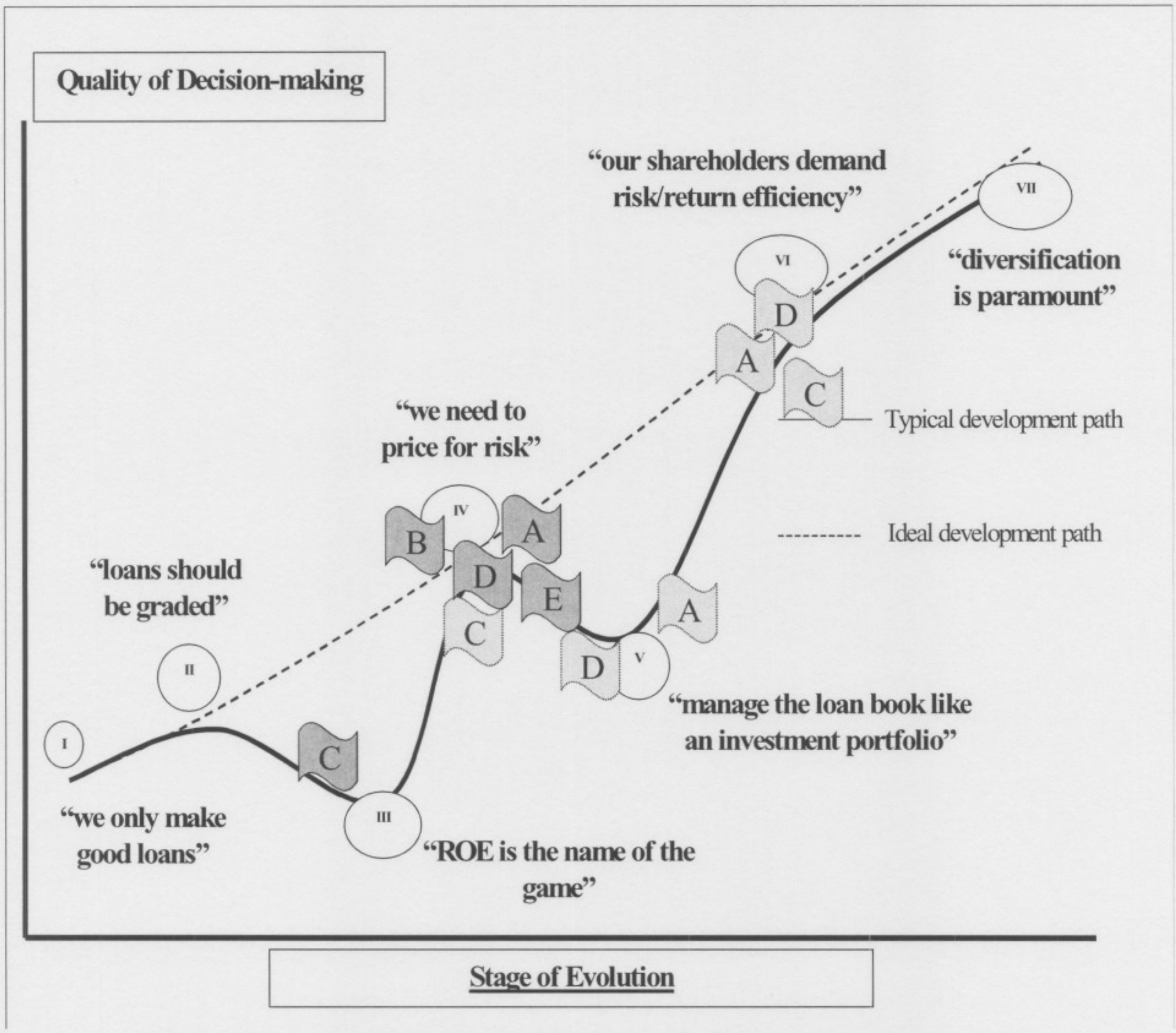
Almost 90% of representatives interviewed (representing 80% of the respondents) were of the opinion that a portfolio approach to credit risk management is of significant strategic importance assigning a score of seven. One respondent did not share this view (assigning a score of between one and two). This was not based on the strategic importance as such, but based on the view that nothing is currently in place and that a framework for the future is still being created. Another respondent, although recognising the importance, stated that they are not using the portfolio approach due to a lack of data. Focus is on the Basel II Capital Accord implementation while piloting a credit risk quantification model.

The reasons for the strategic significance are based on the perceived importance of capital and the effective management thereof. Respondents are of the opinion that portfolio management will play an increasingly important role in future in terms of effective pricing for risk, risk mitigation, identification of concentration effects and diversification opportunities, impact of marketing decisions on value creation, risk and reward management and effective credit decision-making.

Category C: Questions 3 & 4.

Figure 6.4 positions the respondents in terms of the perceived position regarding the evolutionary stages their organisations are in. Respondents are clustered in the proximity of stage IV: "We need to price for risk". Some respondents were of the opinion that they are further advanced toward stage V: "Manage the loan book like an investment portfolio".

Figure 6.4 Respondents' position in the evolutionary stages of credit risk management



Source: Adapted from Anon (1999b:1) with information obtained from interviews

One of the respondents perceived their institution to be between stages II and III: "Loans should be graded" and "ROE is the name of the game". Significant to note is the fact that in many instances, elements of future stages in the evolutionary process are already applied in certain respondents' areas. However, although being positioned between stages IV and V: "We need to price for risk" and "Manage the loan book like an investment portfolio", elements of stage VI: "Our shareholders demand risk/ return efficiency" is already in place.

A point of concern is the misalignment between the responses applied to the evolutionary stages and the responses regarding portfolio management discussed later in the chapter. The misalignment identified is addressed in the section providing the interpretations of the results and findings.

The main reasons provided for the dominant positioning in stage IV are *inter alia* the current implementation of the Basel Capital Accord, emphasizing ROE although not necessary pricing for the underlying risk, data constraints, in process of implementing rating systems, in-house model development, quantification models not fully developed, focussing on building block necessary for portfolio management, and system inadequacies.

<u>Category C: Questions 5 & 6</u>.

When asked to present a view of how long it would take for the respondents to reach stage seven, the majority were of the opinion that it would take between three and five years to reach stage VII: "Diversification is paramount". However, one respondent was confident that they could reach stage seven within twenty-four months.

With regard to the question what the respondents need to achieve or put in place to reach stage seven, the following aspects were listed:

- Basel II capital accord:
  - Rating models;
  - LGD and EAD measurements;
  - Capital measurement and allocation systems;
  - Security value system registration;
  - Maturity determination; and
  - Retail credit portfolio models.
- Central system platform bringing all elements together;
- Solving technical issues (data, design, development);
- Changing attitude towards risk transfer (asset managers and regulator);
- Paradigm shift towards the portfolio approach to credit risk management;

- Capability to measure concentration and diversification;
- Executive level involvement; and
- An active management process.

Category C: Questions 7 & 8.

Responses received regarding the perceived benefits to be realised from the Basel II capital accord, confirmed that the respondents were definitely of the opinion that significant benefits would be realised. 90% of respondents assigned a rating higher than six (seven being the highest) regarding the perceived benefits. One representative was of the opinion that the benefits would be slightly lower and assigned a five rating.

Respondents are of the opinion that the Basel II capital accord would:

- Enable and enhance effective risk management as credit risk can be quantified;
- Assist in the establishment of world-class credit risk management practices;
- Allow for the application of effective and active portfolio risk management;
- Provide additional momentum for the processes already embarked upon in credit risk management (prior to Basel II);
- Eliminate or minimise the possibility of systemic risk as adequate rewards would be generated for the risk taken;
- Make the regulatory regime sensitive to risk, risk transfer and risk quantification; and
- Allow for more effective use of scarce capital

6.5.3 Portfolio Management

Category D: Questions 1 & 2.

When asked whether the respondents applied the portfolio approach to credit risk, 60% of the respondents replied that they do not. 20% of the respondents stated that they do apply the portfolio approach but not very active. One respondent was of the opinion that they do apply the portfolio approach to credit risk management.

What became apparent was the fact that the understanding and application regarding the portfolio approach differ. In answering the question how they define the portfolio approach, the following points were raised:

- Current approach is predominantly expert judgement driven than quantitative driven;
- Exposures to different segments are known – base growth on experience;
- Portfolio view to credit risk – expected losses (EL) and unexpected losses (UL) at portfolio level and sub-portfolio level are measured quantitatively and diversification opportunities are explored;
- The integrating link where all credit risk measures come together;
- Portfolio approach provides the building blocks from the bottom upwards – it is a way of life embracing the portfolio risk management principles: pricing for risk, risk concentration and various risk measurements. It is an integral part of the total end-to-end process – too late if only applied at the end of the process;
- Entails the total process including underwriting, application of grading methodologies, rating approval by credit committee, explanation and supporting statistics what rating means in terms of default, risk quantification on transactional level and portfolio level, consolidation at group level and calculation methodologies being applied;
- Industry and geographical analysis, mining of database, identifying concentration risk and analyses of segments and industries; and
- To obtain clarity regarding the meaning and implication of derived PD's, LGD's and EAD's.

Category D: Questions 3 & 4.

All the representatives were of the opinion that it is of great and significant importance for a banking institution to have a portfolio risk management function (assigned scores of either six or seven). The reasons provided for the assigned importance are *inter alia*:

- Credit portfolio risk management should be done within a separate functional unit with specific skills sets able to obtain a total view of the credit portfolio. A functional responsibility will enhance the ability to identify underlying credit risk given the economic cycle that prevails, its impact on the portfolio together with the implementation of certain corrective measures;

- The only real way a bank can reduce risk overall and credit risk specifically is with portfolio diversification, either in context of credit risk or in context of overall risk diversification. The enabler for the identification of credit risk diversification opportunities is credit portfolio risk management. The only way to determine that sufficient returns are generated given the risks taken on by banks is with portfolio risk management;
- Risk mitigation at an individual loan level is not optimally effective as very little can be done about the loan once it has been granted. Credit portfolio risk management allows for risk mitigation to take place at a portfolio level after the loan has been granted;
- Market shocks can be absorbed or the impact thereof minimised – provides an understanding of the underlying risks of the credit portfolio and allows for credit risk diversification; and
- Due to the cost implications of evaluating loans on a loan-to-loan basis, portfolio risk management provides a means to act as a cost saver.

Two responses were especially noteworthy. One respondent was of the opinion, although recognising the importance of a portfolio risk management functionality, that a dynamic environment is required when establishing such a function. Stating that the presence of a portfolio risk management function might be extremely important in the retail, small- and medium enterprise (SME) environments, large corporate environments do not provide much scope for such a functionality. It is argued that the concentration of large corporates in the South African banking industry, where nearly all-major banks have exposures to a specific client, does not provide much scope for transferring credit risk. Concentration risk should be avoided with the normal approach whereby potential concentrations are addressed in the origination stages.

The second significant insight was the agreement that the credit portfolio risk management function should not operate in isolation. If such a functional capability assists in the adoption of a credit culture and becomes a key player in changing the manner in which the day-to-day business is conducted, the significance of having a credit portfolio risk management function should not be underestimated. Such a capability should cultivate and institutionalise a credit culture, form and leverage the credit decision and operational principle by which credit risk is managed and have the ability to manage the total credit portfolio including active portfolio management and continuous portfolio improvement.

Category D: Question 5.

Responses received regarding the approach followed in designing and developing a portfolio approach was diverse as presented below.

One representative stated that the Basel II Capital Accord triggered the design and development of a portfolio approach and that the approach is based and aligned to the Basel II requirements. It is argued that the approach followed is based on the development of a central platform data model to provide real time active data thereby eliminating the warehouse data-mining concept. The data provided form the building blocks for the portfolio approach to be followed.

A respondent also stated that the approach followed in the design and development of a portfolio approach is based on two pillars, the first to put the tools in place to measure credit risk at the obligor level i.e. exposure, recoveries, and security value. The second pillar entails the measurement of the combined impact of economic scenarios on selected portfolios. The approach allows credit portfolio risk to be estimated due to a dynamic of the external environment.

Two representatives viewed the approach in designing and developing a credit portfolio approach as a natural evolutionary path. It should start as a small function evolving as the deliverables, expectations, and abilities increase. The credit portfolio approach should form an integral part of the institution, as a pragmatic approach is required.

Another respondent stated that a two-pronged approach was followed in designing and developing a credit portfolio approach. The first component was the quantification of risk on an individual name basis and ensures data availability to enable a rating of all exposures. Secondly, being aware of ratings of the exposures, benchmarking can be done against international companies and their profiles can be mapped. Taking into account local economic cycles, the existing portfolio can be modelled. Applying the Basel II recommendations put the finishing touches to the approach being developed.

One respondent argued that they have not adopted the credit portfolio approach and have consequently not made any efforts on the design, the development, nor the implementation of such an approach.

Category D: Question 6 & 7.

When asked what approach was followed in implementing the portfolio approach, the respondents' views again were divergent. Responses ranged from those who stated that the credit portfolio approach has not been implemented yet as it is still in the development stage, to responses stating that the implementation is in its infancy stage as it is aligned with the Basel II requirements, to a response stating that although not fully implemented as yet, progress has been made and the respondent is in the final stage of implementation (final board mandate in process after which the approach needs to be enforced in the business).

One respondent stated that the measurement phase commenced when implementing the credit portfolio approach based on the opinion that one cannot manage if you cannot measure. Methodologies regarding data issues and measurement systems were defined and models customised or developed based on the gap analysis. The second phase entailed addressing organisational issues such as processes, culture, and procedures.

Yet another respondent from a retail environment argued that a top-down approach was followed. A phased approach in implementing the credit portfolio approach in the business units was adopted with specific directives from top and executive management in terms of standards, which business units need to comply with. Forums have been created to enable the sharing of information between participants who adopted the approach. Another mechanism implemented to assist in the implementation process is the rotation of key personnel to all areas to facilitate knowledge transfer.

When asked whether the same methodology would be applied should the respondents have the opportunity to start the process all over, a general comment was that the methodologies followed by the respondents were regarded as sufficient and that it would not have been done any differently.

However, two respondents provided valuable insights. One respondent was of the opinion that a central data platform is a prerequisite for the successful implementation of the credit portfolio approach. By implementing the Basel II requirements, a movement to a more sensitive capital measure is obtained. After this credit portfolio risk management can be implemented and correlations managed. According to another respondent, a separate credit portfolio risk management 'product house' assuming all credit risk should be established – a type of credit insurance model or 'profit centre'. The transfer of credit risk can then be exploited more effectively. Prerequisites for establishing such a 'product house' would be to have a reference price available, to be able to measure and quantify concentration risk, and to identify diversification opportunities.

6.5.4 Data Requirements and Constraints

<u>Category E: Questions 1 & 2</u>.

All the representatives stated that they experienced problems from a data requirement perspective, mainly because potential new requirements were not catered for with the initial system designs. In many instances, these problems have not been resolved and enormous effort is directed towards system enhancements, system changes and systems development to provide the required data and information.

A major issue identified is the availability of historic data. Furthermore, due to the complexity of the requirements like defining the data structures, reporting, aggregation, sources, interfaces, expiry dates, and maturity, one should by no means expect a quick solution. Other important issues were obtaining the required data delivered and packaged in the correct format and secondly having the correct models and using the models correctly to generate the required data where applicable. The fact remains that in practice, because of the lead-time involved, the required information relevant to a specific portfolio can only be build/generated over a period of time.

Category E: Questions 3 & 4.

When asked if the respondents use credit-scoring tools (also known as credit-screening models) to assist in the decision-making processes, an affirmative answer was received from all those representatives representing the retail environment while a mixed response was received from those representatives representing the corporate environment. Although 'scoring tools' were used in the corporate environment, expert judgemental decision-making processes were employed to a large extent.

Responses received regarding the credit-scoring tools applied for the different segments by the different respondents are summarised in table 6.5.

Where clear differentiation exists regarding specific models or tools being applied, especially in the retail environment, references to the tools used were omitted as publication would have jeopardised the confidentially clause.

Information presented in Table 6.5 is not an exhaustive list of tools being used by the industry. In many instances reference was made to the vendor and not the specific tool. In other instances only broad statements were made. Segments omitted during the interviews, have been stated in the table. Although the table does not provide a complete view regarding the credit-screening tools being used by the industry, meaningful observations can still be made. It is clear, for instance, that the industry is using credit-screening tools quite extensively in its decision-making processes.

Table 6.5 Credit-scoring tools applied for the different segments

Bank A	Bank B	Bank C	Bank D	Bank E
Retail				
Not Revealed	In-house development Fair, Isaac Experian	Application Scoring: Yes but not revealed Behavioural Scoring: Fair, Isaac and Probe	In-house scorecards Experian, Fair, Isaac Probe Scope SAS under investigation CreditRisk+ being tested	In-house development Fair, Isaac Experian TransUnion Decision support Strategy Manager
Small Business				
Not Revealed	In-house development Fair, Isaac Experian	Application Scoring: Yes but not revealed Behavioural Scoring: Fair, Isaac	In-house scorecards Experian, Fair, Isaac Probe Scope SAS under investigation	Not Revealed
Medium Business				
Not Revealed	Moody's	Moody's RiskCalc	See Small Business	Not Revealed
Large Business				
In-house development	Moody's	Moody's RiskCalc	In-house development See Corporate	See Corporate
Corporate				
In-house development KMV Internal ratings model based on financial statements	In-house development KMV Oliver Wyman investigation	Banks: Moody's and S&P Country: Moody's and S&P Project Finance: In-house under investigation Other: KMV Ratings model	Banks: In-house Country: In-house Government: In-house under investigation Listed Companies: KMV Ratings model CreditMetrics being tested	Corporate Financial Quantification (CFQ) In-house development KMV Moody's MFA

Source: Interviews

Furthermore, especially in the corporate environment, all respondents use the KMV model as a screening tool. Another noteworthy view is the efforts to develop scoring-tools in-house.

6.5.5 Quantification Models

Category F: Questions 1 & 2.

All the representatives interviewed were of the opinion that models are extremely important in their organisation's credit risk quantification efforts assigning a score equal and higher than six.

When asked why it is considered to be important, the following answers were received:

- It is a Basel II requirement that the rating model be approved in order to get capital relieve;
- Need to measure risk. The quantification of credit risk ensures objectivity;
- Need models to assist in the decision making as it assists in benchmarking exercises; and
- Models are used to quantify bad debt and credit risk and to determine fair value for AC133.

Category F: Questions 3 & 4.

Responses received on whether the respondents used separate models to quantify the various elements of credit risk e.g. Probability of default (PD's), loss given default (LGD's) and exposure at default (EAD's), all respondents confirmed the use of quantification models.

Responses received regarding the models used for different market segments and product areas to quantify credit risk are summarised in table 6.6.

Table 6.6 Credit Risk Quantification models

Bank A	Bank B	Bank C	Bank D	Bank E
KMV Credit Monitor In-house development RICOS ICAS KMV Portfolio Manager	Moody's KMV Behaviour scores In-house development	KMV Moody's RiskCalc S&P Market information Financial statements Altman Z-Score In-house developments with vendor assistance Actuarial approach – retail defaults LGD function of product Fundamental financial analyses	CreditRisk+ CreditMetrics KMV In-house development Retail linked to scorecards	S&P Data application KMV Portfolio Manager Actual experience Moody's CreditRisk+ CEO technology S&P Portfolio tool Behaviour scores, In-house development

Source: Interviews

6.5.6 Credit Risk Mitigation

Category G: Questions 1 & 2.

The question on how important the respondents regard credit risk mitigation in their organisations, all were in alignment that it is extremely important. However, it was clear that an active secondary market remains a prerequisite for successful credit risk mitigation.

Responses regarding the reasons why it was viewed as extremely important are summarised as follows:

- Risk mitigation can assist in obtaining a competitive advantage;
- In order to optimise the risk profile the mitigation of risk is essential. Risk mitigation is a key component of active risk management;
- Enables active portfolio risk management; and

- Risk mitigation free up the balance sheet.

Category G: Questions 3.

The following hedging techniques were considered to be important when asked which methods the respondents utilise in their respective organisations to hedge credit risk:

- Credit Derivatives – selling off risk;
- Loan Syndication;
- Securitisation; and
- External insurance.

It should be noted that the above hedging techniques are over and above the more traditional techniques e.g. underwriting, pricing for risk, and collateralisation, which are used by all respondents extensively. Another significant issue regarding the techniques is that it is done primarily from an exploration and in many instances, from a trading activity perspective.

Category G: Questions 4.

Responses regarding the respondents' views on the South African banking industry's perceived readiness to transfer credit risk to third parties are summarised in the following:

- Early stages as many issues need to be clarified e.g. regulatory issues and banking issues – banks do not really understand credit derivatives as yet;
- The readiness to transfer credit risk linked to the ability to rate clients – currently the focus of many banks. The question however is whether the market in South Africa is big enough. Country risk rating influences the market negatively;
- Many legal and regulatory issues need to be resolved. The corporate bond market needs to develop further. There is a need for a credit risk type or default type index that can be used as underlying index to write contracts;
- The market is developing at a very fast pace – the main constraint is linked to the actions of asset managers. Asset managers need to undergo a paradigm

shift regarding risk taking – currently they are only interested in anything comprising of investment grade.

One respondent did not share these views and was of the opinion that the market is not ready to transfer credit risk. The respondent stated that there is a lot of talk on the subject but very little is happening. On the one hand it is very difficult to sell credit risk overseas especially from a South African perspective. It is also suggested that local insurance companies do not understand credit risk. Transferring credit risk remains a issue of supply and demand. Banks need to become actively involved and assist in the development of the secondary market.

6.5.7 Future Surveys

After the first interview was conducted, it was realised that a need exists within the South African banking industry for a mechanism to be used as a benchmarking tool. As mentioned previously, the interviewer expanded the questionnaire and added a further question regarding the respondent's willingness (individually and as an organisation) to participate in similar exercises, research or questionnaires in future as the view was taken that the networks established should be cultivated as benchmarking benefits could be realised for the participants as well as the industry in total.

The overwhelming response was received regarding a proper benchmarking mechanism. All the respondents indicated their willingness to participate in similar future benchmarking exercises but explicitly expressed the view that the questions posed should be in-depth benchmarking questions allowing for comparisons to be made and not broad statements. When asked if participation should incorporate the provision of specific questions by the participants, the response was affirmative. In this regard it was felt that participating banks should furnish approximately twenty questions each to the organisers for incorporation into the envisaged survey. It was furthermore felt that such a survey should be repeated at least every second or third year and published for the industry as a whole.

6.6 Empirical Study: Interpretation and closing remarks

6.6.1 Interpretation

Based on the results the following interpretation is derived:

- Credit Risk Management in the South African Banking Industry is primarily decentralised based on either geographic areas, business units, market segments or in combination. All respondents indicate a central group risk management environment.
- The generic group structure is present at all respondents' organisations although in one or two instances having a different structure (combining some of the committees) i.e. Board of Directors, Group Risk Committee and Group Audit Committee.
- A Group Credit Risk Committee was present with all respondents but the application or utilisation thereof was directed, in the majority of cases, towards a credit-lending forum (loan granting committee).
- Credit risk is given prominence as one of the most significant risks. However, the level varies between the respondents with only two instances where the duties and responsibilities of the group credit committee extents beyond a "typical lending committee" e.g. policy and procedure, portfolio analyses, limits, concentration and diversification opportunities, and lending.
- The majority of respondents were of the opinion that a separate ALCO committee should feature prominently. Although the respondents with the Enterprise-wide Risk Management focus (ERM function) have ALCO committees, the level of prominence is relatively low compared to the majority.
- With regard to the evolutionary stages of credit risk management, the generalised positioning of the respondents are around stage IV: "We need to price for risk". However, certain elements of each respondents credit risk management framework are further advanced, spread between stage IV and V and in one instance to stage VI.
- A degree of misalignment between the responses applied to the evolutionary stages and the responses regarding the application of portfolio management

principles and approach has been identified. In this regard the following should be noted:

- The credit portfolio approach incorporates not only the 'total process' of obtaining, capturing, delivering, disseminating, analysing, enhancing, modelling and interpreting of data, the systems to provide and 'manipulate' the data, but also entails a credit risk management framework and philosophy of credit portfolio risk management as well as overall portfolio risk management. The credit portfolio approach is thus concerned with the end-to-end credit process and its impact on the organisation's profit.
- Credit portfolio risk management is mainly concerned with micro portfolio risk management – credit risk diversification, concentration, pricing, pro-active and active portfolio management. It is manifested in a specific environment where inputs from the end-to-end credit process culminate into specific deliverables with the main objective of enhancing shareholder value.
- Overall portfolio risk management is mainly concerned with macro portfolio risk management – overall risk diversification, concentration, capital allocation and earnings-at-risk measurements.
- Although the respondents were of the opinion that credit portfolio risk management is extremely important, neither indicated that it has strategic prominence. The credit portfolio risk management function has been established within one respondent's organisation. However, very low prominence has been given in the placement thereof.
- All the respondents applied certain elements of the credit portfolio risk management framework e.g. pricing for risk, calculating expected and unexpected losses, adopting risk-adjusted performance measures, calculating capital requirements, or risk hedging. However, the focus is fragmented and sometimes directed towards the organisation as a whole (trading and portfolio monitoring and analyses) and not credit portfolio risk management specifically. Some for example stated that diversification and credit portfolio risk management are already incorporated into their processes but also that the secondary market is underdeveloped, that credit derivatives are mainly used fro trading

purposes and that asset managers only seek investment grade opportunities, thereby inhibiting the development of the secondary market.

  - The application of credit portfolio risk management as defined is absent in the context of the South African banking industry although certain elements are evidently applied.

- A credit portfolio risk management function should not operate in isolation. If such a functional capability assists in the adoption of a credit culture and becomes a key player in changing the manner in which the day-to-day business is conducted, the significance of having a credit portfolio risk management function should not be underestimated. Such a capability should cultivate and institutionalise a credit culture, form and leverage the credit decision and operational principle by which credit risk is managed and have the ability to manage the total credit portfolio including active portfolio management and continuous portfolio improvement.
- The importance of data for effective credit portfolio risk management cannot be underestimated. Major issues relating to data are the availability f historic data, the complexity of the requirements, the correct delivery and packaging of the data, the availability of the correct models. The importance of a central data platform as a prerequisite for the successful implementation of the credit portfolio approach should not be underestimated.
- The establishment of a separate credit portfolio risk management 'product house' assuming all credit risk, a type of credit insurance model or 'profit centre' should be investigated and explored when adopting the credit portfolio approach as the transfer of credit risk can be exploited more effectively. Prerequisites for establishing such a 'product house' are to have a reference price available, to be able to measure and quantify concentration risk, and to identify diversification opportunities.
- From a modelling perspective, all respondents use credit-screening models to various degrees of sophistication in the retail environment. The rating models applied in the corporate environments is based on mainly two approaches, in-house development and the KMV model.
- Regarding the retail environment, credit portfolio models are mainly absent with a few respondents investigating in-house model development to address

the gap. Credit-screening models are being used to obtain probability of default measurements.

6.6.2 Closing remarks

The local banking industry is currently not entirely ready to implement the credit portfolio risk management approach. In the majority of cases, respondents are still in the process of complying with the Basel II Capital Accord requirements. Due to a lack of sufficient data it would take a minimum of three years for the industry to apply credit portfolio risk management to their credit portfolios (incidentally also the time for Basel II compliance).

Implementing the credit portfolio risk management approach will entail a journey linked to the Basel II Capital Accord. This journey will provide the building blocks for credit portfolio risk management as the required systems, processes and decision engines and expertise will be established and developed to be Basel II compliant. The second phase of the journey will entail the conversion of the aforementioned into actual risk management processes based on and incorporating cultural and behaviour changes. Only then can the credit portfolio risk management approach be applied in its full context.

6.7 Conclusion

This chapter presented the results obtained from an empirical investigation. The study conducted was to determine the nature of credit risk management practices applied in practice by the South African banking industry. The discussion was divided into three sections: Firstly, a discussion on the procedures and methods followed to obtain the required information. Secondly, a section discussing the results obtained from the participating banks and finally a conclusion focussing on a short interpretation of the results.

In the next chapter the information obtained from the literature study and the empirical study will be used as foundation and background to provide a process approach for managing credit asset portfolios in a South African bank. The process approach is formulated against an overview of the account life cycle, forming the foundation for the approach. The discussion on the account life cycle is followed with a discussion on to-be expected data and system variables and deliverables in terms of the account life cycle.

Two perspectives to the management of credit asset portfolios as part of a process approach is highlighted followed by an overview of the credit portfolio risk management approach in context of two distinct but inclusive areas or dimensions, being micro- and macro credit portfolio risk management. The discussion is concluded with specific views on a governance body based on the ALCO process to ensure that the required strategic prominence is assigned to the credit portfolio risk management environment.

CHAPTER 7

A PROCESS APPROACH FOR MANAGING CREDIT ASSET PORTFOLIOS

7.1 Introduction

The third component of the research study provides a process approach to the management of credit asset portfolios in a South African bank. As stated previously, the research study is divided into three parts or components: a literature study on credit risk management, an empirical study regarding the credit risk management practices applied in practice in the South African industry, and the process approach.

The results obtained from an empirical investigation as discussed in Chapter 6 were presented in three sections: Firstly, a discussion on the procedures and methods followed to obtain the required information. Secondly, a section discussing the results obtained from the participating banks. Finally, a conclusion focussing on a short interpretation of the results.

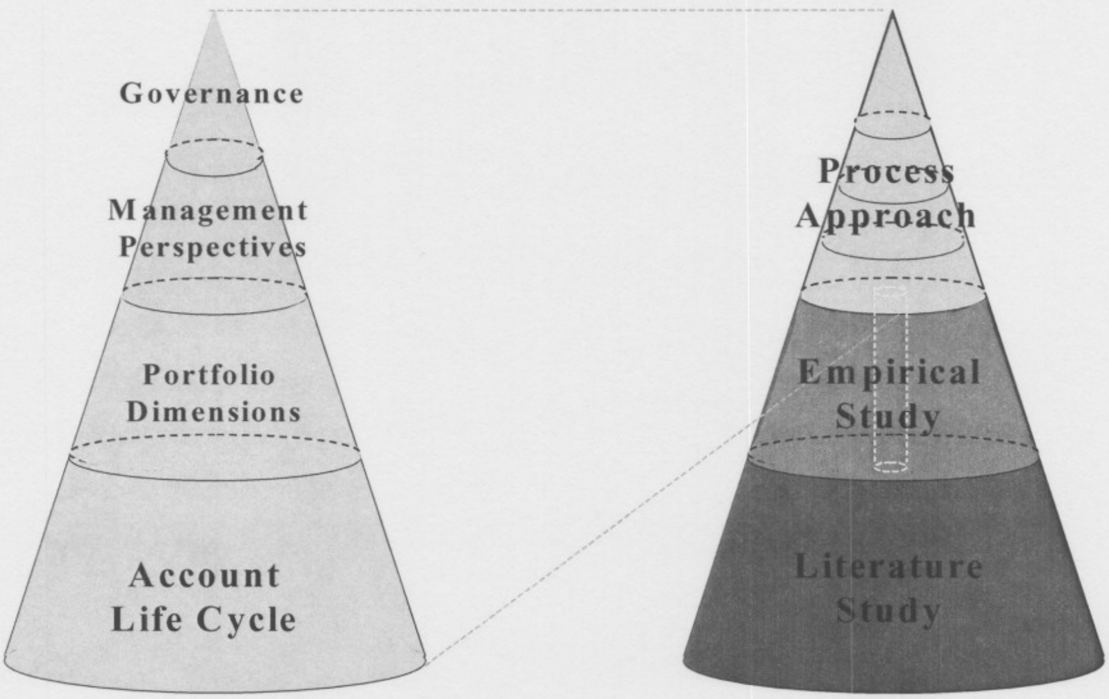
The information obtained from the literature study and the empirical study is being applied in this chapter to provide a process approach for managing credit asset portfolios. The process approach is formulated using the account life cycle. This forms the foundation for the process approach. The discussion on the account life cycle is followed with a discussion of to-be expected data and system variables and deliverables in terms of the account life cycle.

An overview of the credit portfolio risk management approach in context of two distinct but dependent areas or dimensions, being micro- and macro credit portfolio risk management is presented. This is supported by a discussion regarding two perspectives to the management of credit asset portfolios as part of a process approach. The discussion is concluded with specific views on a governance body based on the

ALCO process as discussed in Chapter 2 (paragraph 2.7). The aim of the governance body is to ensure that the required strategic prominence is assigned to the credit portfolio risk management environment.

Referring to the thesis framework provided in Chapter 1, figure 7.1 provides the reader with a graphic illustration regarding the component being discussed:

Figure 7.1. Chapter 7 – Process Approach



Source: Author (2003)

7.2 The Account Life Cycle

7.2.1 Introduction

Each organisation's business whether a product or a service, is conducted with the optimal utilisation of production factors. The business of the organisation will determine the optimal production factor mixture between labour, natural resources, capital, and entrepreneurship required. Applying these production factors to production processes result in value being added and a product or service being rendered.

In the banking environment these production factors and production processes are also applied to render a service to the client. Also, the utilisation of the production factors and processes are everywhere in the organisation – each division, department or unit. To the same extent is the utilisation evidenced in the credit risk management environment. For instance, from a value chain perspective can it be seen that the production factors are applied to specific credit related processes to ensure that the potential transaction is brought to the table, assessed, captured, monitored and when required, recovered. This perspective, also known as the end-to-end process or value chain, is extended to form the account life cycle framework.

The process approach to managing credit asset portfolios should be based on and include the account life cycle framework. In this regard, seven stages can be identified in the account life cycle, namely: opportunity investigation, opportunity credit assessment, normal performance, non-performance category I, non-performance category II, legal recoveries and account termination.

7.2.2 Importance of the account life cycle

The importance of the account life cycle as framework in the process approach for managing credit asset portfolios culminates in its utilisation opportunities as it provides:

- A logical consecutive sequence of activities or events from which the process approach can be formulated;
- A breakdown of the key components in determining credit quality;
- A mechanism for the identification and origination of data variables and systems deliverables within and required by the process approach;
- A mechanism to ensure that all data requirements have been catered for;
- A framework against which any requirements can be mapped, identified and explained;
- A framework against which concepts, dimensions and perspectives can be explained;

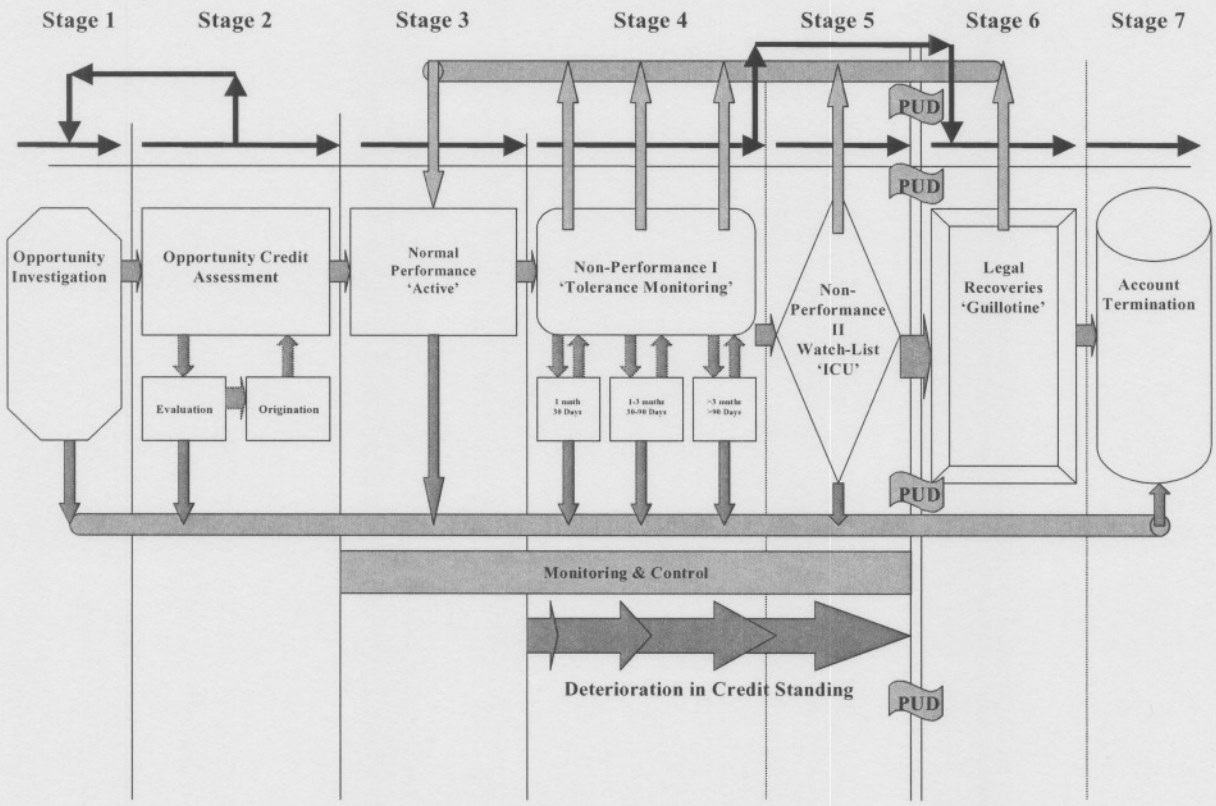
- ➢ A mechanism to ensure that all components of credit risk have been addressed in the process approach; and
- ➢ A framework against which credit asset portfolios can be managed.

7.2.3 Stages in the account life cycle

As mentioned previously, the account life cycle consists of seven broadly defined stages. These stages are illustrated in figure 7.2 below.

Figure 7.2 Account Life Cycle Framework

<u>Account Life Cycle</u>



Source: Author (2003)

Each of these stages is briefly discussed with reference to its function, purpose and high-level processes involved. Where applicable, the drivers for credit risk pertinent to a specific stage are also addressed.

7.2.3.1 Stage 1: Opportunity Identification

The first stage is concerned with the identification of the opportunity. The opportunity can be defined as a potential addition to the credit asset portfolio and can either be a loan or an advance. During this stage the needs of a client are identified and a proposal is formulated for assessment. The requirements of the client can either be assessed through the sales environment or through a client's own self-assessment. The outcome of this stage can be closely linked to the growth targets as defined by the business unit. A close relationship should also exist with any marketing campaigns embarked upon. Processes involved in the opportunity identification phase include marketing, relationship management, sales and administration.

During this stage a decision can be made to terminate the relationship. Although an account has not yet been opened, figure 7.2 shows a funnel running towards the account termination stage. It is interpreted that the relationship pertaining to the specific transaction or account is terminated, irrespective of whether an account has actually been opened. It implies a 'walk-away' action.

7.2.3.2 Stage 2: Opportunity Credit Assessment

Stage two can be divided into two sub-components, namely evaluation and origination. Once the opportunity has been identified, a formal proposal is directed towards the credit risk underwriter for approval. The credit underwriter receives the application and starts with an evaluation process to determine whether the risk associated with the transaction together with repayment ability are acceptable. Acceptability is determined by the overall credit risk profile of the portfolio, taking concentration risk, diversification opportunities and pricing into consideration.

Should the application not meet the acceptability criteria, it is either referred back to the opportunity investigation stage to reconsider, amend and possible resubmission, or the application is turned down in which case the relationship or account is terminated as previously discussed. Once approved, the loan is granted and the origination sub-stage commences. The origination phase acts as formalisation of the grant whereby the facility documents are drawn up and signed, the account is opened, the facilities (limits) are captured on the required systems and repayment commences on a pre-determined date. Credit risk prevails once the documentation has been signed and payment made to the client.

Processes involved in the opportunity credit assessment phase are assessment, financial analyses, documentation, systems and IT, administration, and control. As stated the application can be turned down with an opportunity for resubmission, or it can be turned down in which case the relationship or account is terminated (as part of a 'close-out' process), or the application can be withdrawn in which case close-out happens immediately.

7.2.3.3 Stage 3: Normal Performance - Active

Once the origination stage has been completed (documentation signed), the normal performance stage commences. The first repayment instalment is due as agreed. The main characteristic of the normal performance stage is that the client continues to service his or her debt obligation (repayment of interest and capital as per agreed repayment schedule as per predetermined price). All normal and active accounts are classified as performing loans and advances and operate within the agreed upon norms and parameters during this stage.

During this stage the account is monitored on a daily, weekly and/or monthly basis to *inter alia* determine if any covenants are not adhered to, if the client is not experiencing financial difficulties, if the account conduct is satisfactory, whether any changes occurred to the client profile which might impose greater risk and which the credit underwriter should be aware off. Needless to mention is the fact that the majority of a bank's accounts (loans and advances) operate in this stage of the account life cycle.

During this stage a decision can be made by the client to terminate the relationship and close the account. Referring to figure 7.2, the funnel running towards the account termination stage illustrates this 'close-out' and 'walk-away' action.

Processes involved in the normal performance stage are systems and IT, administration, monitoring and control.

7.2.3.4 Stage 4: Non-performance Class I (Tolerance Monitoring)

Once a client's credit standing deteriorates i.e. the client's repayment ability is affected, default risk increases. In Chapter 3 (paragraph 3.2.3.1) it was stated that the risk of default is dependent on the credit standing of the borrower which is a function of the client's ability to meet his interest and capital contractual repayment as and when due. The main driver of credit standing is the ability of the client to manage his/her cash flow irrespective of the state of the economy.

The non-performance class I stage can be divided into three phases, namely: 1-month delinquency, 2 and 3-month delinquency and longer than 3-month delinquency. These phases reflect the deterioration in credit standing that result in a higher default propensity. As the delinquency phase deteriorates, a more vigorous monitoring and control process is embarked upon. Monitoring and control processes are largely tolerance driven based on past experience, current economic cycle and the business model that prevails. Interest is accrued as credit standing deteriorates and depending on the circumstances, management can decide to enact a provisioning process and start with the raising of provisions in anticipation of an actual default – the probability of default might still be extremely low.

During this stage the accounts are monitored on a daily, weekly and monthly basis to *inter alia* determine if any covenants are not adhered to. It furthermore needs to be determined if the client has met his debt obligation since the previous reporting cycle and whether any additional changes occurred to the client profile which might impose greater risk and which the credit underwriter should be aware off. The process of monitoring and control is largely automated.

Key drivers for determining credit standing deterioration originate from both the internal and external environment. Internally, the following drivers are identified: Stage and quantum of delinquency, inefficient systems and management processes, unrealistic growth targets and reengineering processes impacting on people, systems and credit processes. External factors or drivers identified are: Actions of competitors, statutory and regulatory requirements, socio-political influence, and macro-economic and socio-economic factors. In many instances, the actions of competitors have a more prominent influence on a company's image and strategic risk than on credit risk. With regard to statutory and regulatory requirements, the requirements are compulsory and non-compliance in itself will constitute or enhance credit risk. Socio-political influences on the other hand will impact on a company's strategy and image risk as well as the public's perceived view regarding the company's attitude towards socio-political challenges. This in itself can imply many credit risk related challenges that need to be considered for instance the perception of redlining within the financial industry.

As the macro-economic and socio-economic factors are more predictable due to the availability of sufficient historical data, the following external drivers/ factors are identified:

- Impact of globalisation:
    - Terrorism (11 September USA);
    - United States/ Afghanistan war, United States/ Iraq war;
    - United States/ Korean strained relations;
    - Israeli/ Palestine conflict;
    - Pacific rim economies;
    - Global recession; and
    - Afro pessimism.
- Macro-economic factors:
    - Structural unemployment;
    - Private Sector Credit Extension;
    - Inflation;
    - M3 Money Supply;
    - Interest rates;
    - Disposable income and spending behaviour;
    - Consumer and Business confidence;
    - Debt/ Income ratio; and
    - Exchange rates.
- Environmental factors e.g. climate;

- Socio-economic factors:
  - Aids; and
  - Land reform.
- Seasonality (reoccurrence over certain periods e.g. festive seasons, holidays).

The focus during this stage is on normalising the irregular accounts and accounts in arrears. As stated in Chapter 3 (paragraph 3.2.3.1), credit standing from a company perspective on the other hand, depends on numerous factors such as market outlook, the size of the company, its competitive factors, the quality of management and the shareholders.

Based on the outcome of the efforts to normalise the account and depending on the stage of delinquency, various outcomes can emerge. If successful, the outstanding commitment can be settled and the account can be transferred back into the normal performing stage (account normalisation). Another successful outcome can be that arrangements are made with the bank for a rescheduled repayment structure (rescheduled debt), after which the account is transferred back into the normal performing stage. An additional outcome can result in the client settling his or her account and terminating the account.

However, when the efforts are not successful, certain outcomes can also materialise. For instance, nothing might happen with the result that the account moves to the next consecutive stage of delinquency (with additional monitoring, control and management involvement and resulting consequences). Depending on circumstances, the account can also move into the non-performance class II stage ('watch list') or directly reach 'point of ultimate default' (PUD) where focus is directed towards legal recoveries. Processes involved in the non-performance class I stage are systems and IT, relationship, administration, documentation, monitoring and control.

7.2.3.5 Stage 5: Non-performing Class II (Watch-list)

The non-performing class II stage is an extension of the non-performing class I stage. The reason why a distinction is made between the two stages is based on the fact that circumstances may dictate that a client needs to be managed out of its difficulty. The client is placed on a watch list in an intensive care unit (ICU) environment. In many instances, especially when large credit exposures are involved, effort is directed toward rehabilitating a client into the normal performance stage. This is done using various techniques e.g. debt rescheduling, debt restructuring, and/or management involvement. The reason for rehabilitation is to prevent or minimise losses where possible, feasible and appropriate, given the market segment in which the client operates and rehabilitation potential.

Interest is further accrued, but might also be suspended depending on the circumstances as credit standing deteriorates. When a client reaches stage 5: non-performance class II, actions associated with intensive and special care have already commenced and in all probability, management has already decided to enact a provisioning process. A certain amount of provisions would already been raised even though actual default has not occurred as the probability of default in this instance is relatively high. The same credit risk drivers as discussed in the previous stage apply.

During this stage the accounts are monitored on a daily, weekly and monthly basis to *inter alia* determine if any covenants are not adhered to, if the client has met his debt obligation since the previous reporting cycle and whether any additional changes occurred to the client profile which might impose greater risk and which the credit underwriter should be aware off. The process of monitoring and control is largely a manual driven process with extensive management involvement, depending on the prevailing circumstances. Processes involved in the non-performance class II stage are systems and IT, relationship, administration, documentation, monitoring and control.

Based on the outcome of the efforts to normalise the account various outcomes can emerge. If successful, the outstanding commitment can be settled and the account can be transferred back into the normal performing stage (account normalisation). Another successful outcome can be that arrangements are made with the bank for a rescheduled repayment structure (rescheduled or restructured debt), after which the account is transferred back into the normal performing stage. An additional outcome can result in the client settling his or her account and terminating the account.

However, when the efforts are not successful, the account moves to the legal recoveries stage passing 'point of ultimate default' (PUD). The concept of PUD is explained in the next stage.

7.2.3.6 Stage 6: Legal Recoveries

Once all avenues to rehabilitate a client in financial distress have been exhausted, a decision is taken to transfer the client to the legal recovery environment. This action implies that PUD has been breached. Prior to the 'point of ultimate default' other forms of default occurred. It is therefore necessary to define the PUD.

In Chapter 3 (paragraph 3.2.3.1), several possible definitions of default were addressed, namely technical default, payment default, entering a legal procedure and economic default. Default thus occurs from day one of delinquency (stage 4: non-performing class I), and the associated credit risk increases as the client's credit standing deteriorates i.e. the delinquency period becomes longer. As stated in the discussion of the previous two stages, the possibility exists for the account holder and/or the financial situation to normalise and rehabilitate the account back into stage 3: normal performance. The focus up to PUD from the bank's perspective remains on relationship management and client rehabilitation and as far as possible, client facilitation. PUD differs from the Basel II definition stated in paragraph 3.2.3.1 as the Basel II Capital Accord (Basel, 2003b:80) consider default to occur when a contractual payment has been missed for at least three months.

'Ultimate' default occurs at that point in the account life cycle (PUD), where the primary focus of the bank is directed towards recovering outstanding debt. After PUD has been breached, the bank is not concerned with relationship management and at this stage, it becomes evident that the account cannot be rehabilitated back into the normal performance stage. PUD thus constitutes the point of litigation, the legal recovery process, where the client relationship is terminated and the client becomes a debtor. The aim is to recover as much as possible and to minimise the bank's losses – a 'hard' stance of debt recovery!

In this regard, the importance of being able to register information at PUD becomes obvious. Not only will it identify the inflow and quantum of the legal portfolio, but also assist in forming an expected and unexpected loss perspective. PUD is then used as the default rate as further discussed in paragraph 7.2.4. In the selection of PUD it is important to consider the ability for an account to be normalised because of the impact normalisation have on actual default and loss rates. Once PUD has been breached, focus is on legal recovery. The inability to accurately define PUD would result in inaccurate credit risk spread calculations and even incorrect credit capital allocation calculations, especially as credit-screening model calibration and credit portfolio model calibration are dependent on accurate actual data elements.

Another aspect to consider is that the importance of PUD stems from the normal definitions used for default, especially when it refers to stages 4 and 5 (default being defined as an account being overdue for longer than three months or 90 days). A key purpose of measuring default and losses, apart from quantifying credit risk, is to determine from a portfolio perspective the portion, given the portfolio of loans originally granted, that default that is go bad. Emanating from this purpose results the derived purpose of determining from a portfolio perspective the portion, given the portion that defaulted, of loans written-off as losses.

If for instance the account reaches stage six and due to ineffective internal or external processes, costs in recovering outstanding debt reaches the point of exorbitance, the loss rate derived for the specific portfolio is penalised with an inefficiency premium which has nothing to do with the loan originally granted (it is even outside the control of the obligor). Therefore the rating assigned to a particular client (at a specific price) in a portfolio on which the credit spread calculations are based, would be incorrect and therefore also the credit capital allocation calculation pertaining to that specific portfolio. The ability to identify the different components of outstanding debt becomes important as inefficiencies as a result from internal and external processes can easily be addressed.

The impact of internal process inefficiencies can be quantified and corrective actions implemented. Regarding the external process inefficiencies (for instance an efficient legal process prolonging the recovery process), the impact thereof on the portfolio can also be quantified although a decision will be required whether to incorporate the inefficiency premium in the loss rate or the omit it completely.

It should be a requirement to disseminate the components of outstanding capital and write-offs in terms of the contributions each component make to the overall balance i.e. original loan capital, original security value, interest accrued, security value at PUD, provisions raised, interest suspended, legal costs, carrying costs, holding costs, amount recovered, amount written-off and what this amount is made up off. Only then can the impacts these components have on actual default and loss rates, LGDs, EADs and whether all should form part of the calculations, be identified, analysed and calculated. The impact of these calculations on credit spreads and credit capital allocation calculations and even on a potential profit centre-underwriting model can be judged more accurately.

As stated, an account moves into stage 6: legal recoveries once all venues have been exhausted to rehabilitate a client in financial distress. The focus is directed towards legal recovery of outstanding debt. The relationship with the client is terminated and the client's status changes to debtor. Security initially provided as collateral is 'encashed' and set-off against any monies due by the debtor. Where required, the bank embarks on a process of litigation against the former client. Monitoring still takes place but from a reporting perspective on progress rather that a client status perspective.

Interest is suspended or terminated (stopped) depending on the circumstances and a provision is raised based on the expectation of recovery given the economic cycle, the market conditions and costs associated with the envisaged legal process.

Key drivers for ultimate default, including those stated in the discussion of stage 4: non-performance class I, are the longer than 90 days delinquency category (having a major impact on PUD), and the degree of success achieved during stage 5 in terms of rehabilitation.

Once the account has been written-off, the account moves to the final stage for account termination. However, when legal action is taken after PUD has been breached, it might happen that the account is settled in full and then terminated. Also, but vary rarely, if ever, it might happen that the account is settled in full and the account is normalised into stage 3: normal performance. Processes involved in the legal recoveries stage are systems and IT, legal, recovery, administration, documentation, and progress monitoring.

7.2.3.7 Stage 7: Account Termination

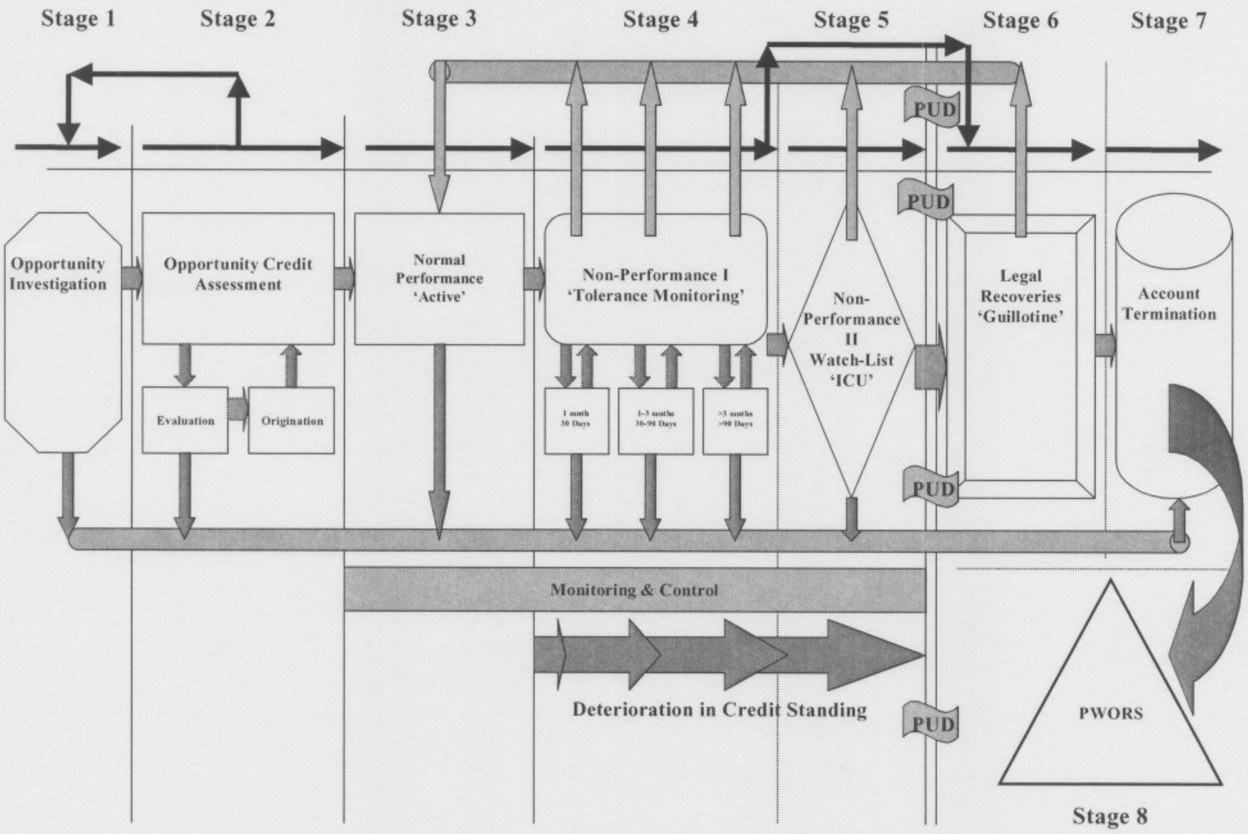
The account termination stage is mainly a 'close-out' stage for the account indication that the end of the account life cycle has been reached. It is more a theoretical concept for illustration and discussion purposes.

7.2.3.8 Credit Life Cycle: Unexpected recoveries

The account life cycle, when expanded to include stage 8: Post Write-off Recoveries (PWORS), becomes the credit life cycle. Although the remainder of the discussion uses the account life cycle as framework, an overview of the credit life cycle is appropriate, as it should be considered from a credit portfolio risk management perspective. It is therefore appropriate to include stage eight in the process approach to managing credit asset portfolios. The credit life cycle is illustrated in figure 7.3. The previous discussion regarding the account life cycle is applied in total to the credit life cycle. Two aspects, one explanatory and the second an addition to the account life cycle, however requires further discussion.

Figure 7.3 Credit Life Cycle

Credit Life Cycle (Adding Stage 8)



Source: Author (2003)

It was stated previously that the first stage in the account life cycle is concerned with the identification of the opportunity where the opportunity was defined as a potential addition to the credit asset portfolio (loan or advance). It was further stated that the needs of a client are identified during this stage and a proposal is formulated for assessment. From a credit life cycle perspective it can be argued that this stage has nothing to do with credit risk and should not form part of the credit life cycle, as the bank is not exposed to credit risk at this point in time. This argument holds true if the opportunity being identified originates from a new client with no commitment towards the bank whatsoever. However, should a client hold a previous commitment and the 'new' opportunity takes the form of a further advance, a further advance on a loan, an additional loan using the same product or an additional loan using a different product, the bank is exposed to credit risk originating through prior assessment and origination. The opportunity investigation stage should therefore be included into the credit life cycle.

Another reason why the opportunity investigation stage should form part of the credit life cycle is that the outcome of this stage can be closely linked to the growth targets as defined by the business units and any marketing campaigns embarked upon. As a key role and responsibility of the credit portfolio risk manager is to actively influence the marketing decision (discussed in more detail in paragraph 7.3.1.1.1) a natural fit of the opportunity investigation stage to the credit life cycle becomes eminent.

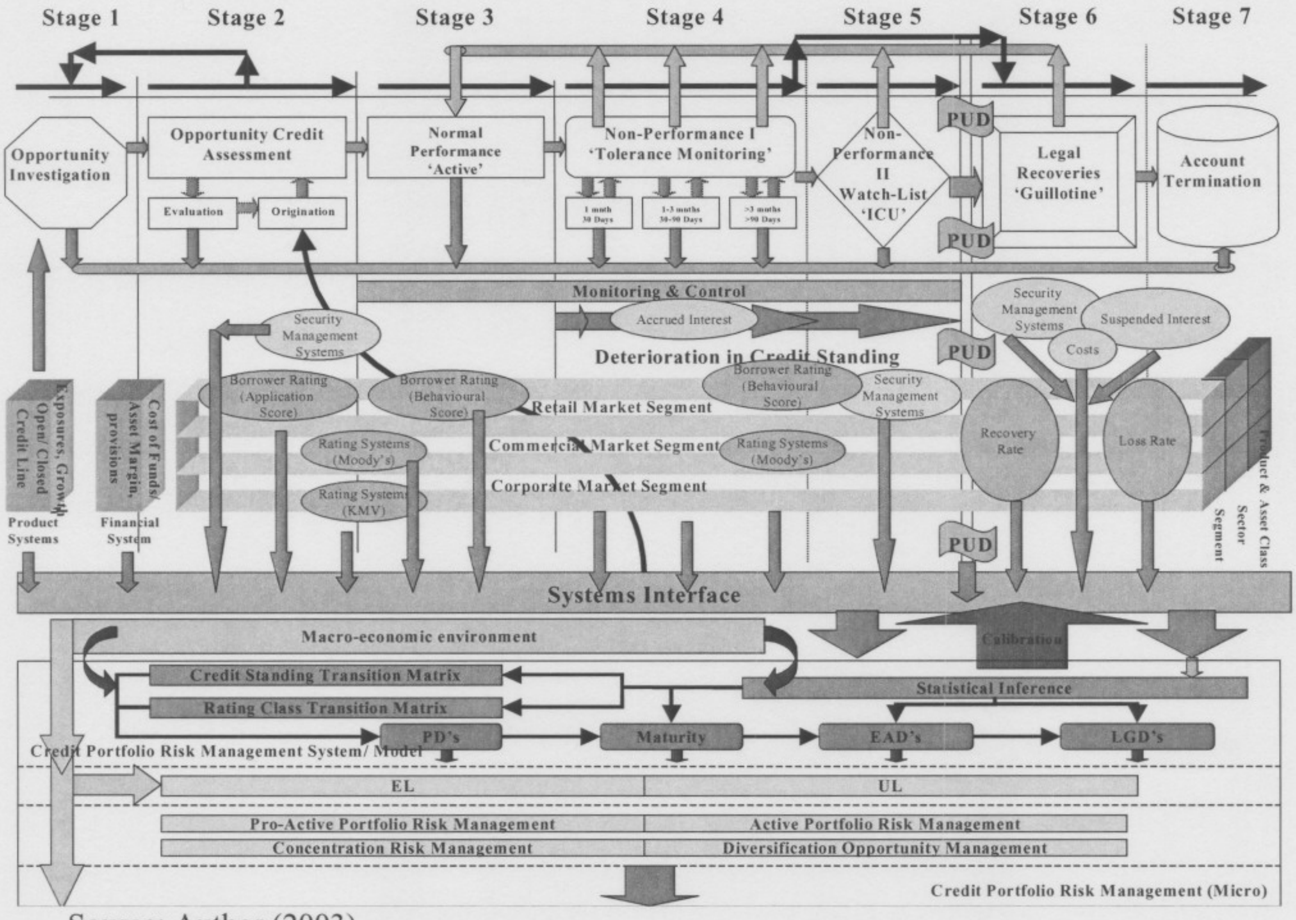
From an additive perspective, the incorporation of stage 8: Post Write-Off Recoveries into the credit life cycle becomes equally important. Normal practice dictate that once an account has been written off, the account is closed (terminated) from a systems-, a process- as well as an accountancy perspective. However, the irrecoverable portion of the debt is transferred to the Post Write-Off Recoveries environment for future recovery. Although the account is closed, debt recovery still continues from a client perspective. For instance, should a client (transferred to the Post Write-Off Recoveries environment) apply for a credit facility and a credit reference is conducted on the client (banks are participants to the credit bureaus), even at a much later future date, a process is enacted to potentially recover any of the original outstanding debt not recovered from a legal recoveries perspective. Should any additional amount be recovered, it is set-off against the debt of the individual and 'taken in' as income to the income statement.

The importance of adding stage eight to the credit life cycle is that the amount recovered (or costs incurred) constitutes an 'unexpected recovery' or 'unexpected cost' to be taken into account from a portfolio perspective as it impacts on the previously derived loss rate. However, as discussed earlier (the discussion on incorrect credit spread and credit capital allocation calculations in paragraph 7.2.3.6) the same principles should be applied when 'unexpected recovery' or 'unexpected costs' are included in credit portfolio risk management calculations. Identifying 'unexpected recovery' or 'unexpected costs' have value especially when a credit risk underwriting model or credit profit-underwriting model is used. The remainder of the discussion is based on the account life cycle as it represents the cornerstone of the process approach.

7.2.4 Data variables and system deliverables

Based on the account and credit life cycle framework discussed in the previous paragraphs, the expected 'to-be' data variables and system deliverables as it builds up to culminate in a credit portfolio risk management system can be identified.

Figure 7.4 Data variables and system deliverables in the account life cycle



Source: Author (2003)

Focussing on each stage of the credit life cycle, specific data elements can be identified or derived from the different stages as illustrated in figure 7.4 above. Important to note is that specific systems are used to accommodate the different market segments focussing on specific sectors, products and asset classes. From a systems perspective, a multiple dimensional layer of integrated data elements, dependencies and interdependencies are present, all impacting on each other.

Another important aspect is the focus on credit asset portfolios. All relevant data elements or system deliverables are by no means discussed, taken into account or illustrated. Various other data elements exist for operational applications, tactical applications, and system specific applications. As the focus is on a process approach for managing credit asset portfolios, figure 7.4 reflects the main data variables and system deliverables applicable. Neither the diagram nor the discussion to follow claim to be comprehensive although it should suffice from an explanatory perspective.

7.2.4.1 Stage 1: Opportunity Investigation

As discussed in previous sections (paragraphs 7.2.3.1 and 7.2.3.8) growth targets as defined by the business units and any marketing campaigns, should be taken into account in the management of credit risk. From a data/system perspective, data variables of importance include segment, sector, or portfolio indicator, exposures, growth targets differentiating between close and open credit lines. As these data elements are usually identified within the operational business unit environment, a possible source would be the institution's relevant product systems.

Other systems to source information from are the financial and accounting systems. These are discussed further in paragraph 7.2.4.7 and paragraph 7.3.1.1.3 regarding pricing and model calibration.

7.2.4.2 Stage 2: Opportunity Credit Assessment

During the opportunity assessment phase the credit underwriter evaluate and assess the application using both qualitative and quantitative criteria. These include financial statement analyses, and risk analyses. In many instances the utilisation of credit-screening models or rating models assist the decision-making process. In the Retail Market segment for example, application scoring for new applications and behavioural scoring for exiting clients are the primary models used. These models generate a client score derived from scorecards, to be used in determining probability of default. The majority of these models take both quantitative and qualitative criteria into consideration in calculating the client scores. The same applies to the Commercial and Corporate Market segments as rating models are used to assign a borrower rating (also known as a credit rating) to each obligor. It should be kept in mind however, that the complexity of decisions increases from the retail to the corporate environments, implying that judgement plays a greater part in the decision process where corporate exposures are concerned.

From a data/system perspective, data variables of importance include segment, sector, or portfolio indicator, client score or borrower rating, security value and type, term of transaction, date of origination, repayment schedule, product or asset class, close or open credit lines. These data elements are identified within both the credit and operational environments therefore possible sources would be the institution's product systems, security systems and credit systems.

Other data elements considered to be important in stage two are security types and values taken for collateralisation purposes, loan-to-value information, date of valuations if applicable, risk appetite, credit spread (pricing information) and transactional risk contribution to portfolio. The latter three elements are pushed back into the system as a feedback loop derived from the credit portfolio risk management system/model (discussed in paragraph 7.2.4.7).

7.2.4.3 Stage 3: Normal Performance

Automated monitoring and control are the main activity during stage three. Credit-screening models assign a score (in the case of a behavioural scoring system a behavioural score) based on the client's conduct on the account. Account conduct forms the main driver for a number of strategies applied to the account e.g. automated limits, and out-of-order account management.

From a data/system perspective, data variables of importance include segment, sector, or portfolio indicator, client score or borrower rating, repayment schedule, product or asset class, state of delinquency, and credit rating. These data elements are usually identified within the credit environments therefore possible sources would be the institution's credit systems.

7.2.4.4 Stage 4 & 5: Non Performance Class I & II

Because the risk of default increases as credit standing deteriorates, the monitoring and control activities become more vigorous with extensive management involvement with an increasingly probability of default. Regarding the retail market segment, the credit-screening models application becomes extremely important, as the retail environment is mainly an automated environment.

From a data/ system perspective, data variables of importance include segment, sector, or portfolio indicator, client score or borrower rating, security value and type, period of delinquency, exposure being delinquent, outstanding capital, provisions raised, accrued interest, remaining term of transaction, date of origination, repayment schedule, product or asset class, close or open credit lines, cost of funding, managing- and systems costs. These data elements are identified within the credit-, operational-, accounting-, and financial environments therefore possible sources would be the institution's product systems, security systems, financial systems, accounting systems and credit systems (risk management systems, provisioning systems, recovery systems, limit- and exposure systems).

7.2.4.5 Stage 6: Legal Recoveries

Legal Recoveries constitute default as PUD has been breached. In the Commercial and Corporate Market segments credit risk models are utilised to assist in the decision-making process. These models provide information on maturity, LGDs and EADs and PDs as part of a comprehensive package. In the Retail Market Segment these models are not commercially available and do banking institutions tend to rely extensively on in-house development. However, the system deliverables as mentioned need to be statistically derived from actual historical data.

From a data/system perspective, data variables of importance include segment, sector, or portfolio indicator, default rate, security value and type, outstanding capital, provisions raised, capital at risk, accrued interest, interest suspended, product or asset class, close or open credit lines, all costs involved, recovery rate, amount written off, loss rate, and contributing costs to loss value. These data elements are identified within the credit-, and financial environments therefore possible sources would be the institution's security systems, financial systems, accounting systems and credit systems (risk management systems, provisioning systems, recovery systems, limit- and exposure systems).

7.2.4.6 Systems Interface

The above mentioned data variables and system deliverables are channelled into a systems interface module acting as a 'program language converter' to facilitate 'one view of the truth'. The reason being that a single interface or system platform is required from where the data required for credit portfolio risk management can be sourced. Due to different systems being applied in a banking institution, each with its own protocols and programming language, an interface module allow configuration to take place into a single credit portfolio risk management system/model.

7.2.4.7 Credit Portfolio Risk Management System

As stated in the previous paragraph, the credit portfolio risk management system or model sources its requirements from the systems interface module to enable the application of credit portfolio risk management. From a data/systems perspective, data elements (both internal and external – macro-economic environment) are ennobled through statistical inference to derive the following deliverables: transition matrixes (credit standing and rating class), effective maturity per product and asset class, probabilities of default per product and asset class, exposures at default per product and asset class and losses given default per product and asset class.

These deliverables are then applied and modelled to enable pro-active and active credit portfolio risk management. The key outcomes of the modelled deliverables are expected losses and unexpected losses. Together with other data variables (e.g. asset margin, cost of funds, and unexpected recoveries or costs) the credit environment's contribution towards shareholder wealth can be determined through the calculation of Credit Risk Adjusted Return On Capital (Credit RAROC).

Another important functionality of the credit portfolio risk management system or model (also a key responsibility of the credit portfolio risk manager) is to enable the calibration of credit-screening models and credit rating models. Because probabilities of default calculations are based on scores or borrower ratings derived from these models ex ante (before default has occurred), the derived PD's are to be calibrated to what is actually happening in the credit portfolio. For instance, calculating a PD of 0,02% for a specific client in portfolio *x* should correspond to a PD based on actual default data of 0,02% for similar clients in portfolio *x*. If the derived PD and 'actual' PD differ the parameters of the credit-screening and credit rating models should be adjusted to provide the same answer. Calibration should always be done using the actual historical data thereby insuring that predictions are in line with actual trends.

The data variables and system deliverables derived from the credit portfolio risk management system/model are further ennoble and channel to a model interface, together with variables from the other external and internal environments e.g. operational risk, market risk, ALCO, market, economy, business units, and internal audit, to be used in the group portfolio risk management environment and reported to the Business Health Forum (BHF). The BHF is discussed in paragraph 7.5 of this chapter).

The concepts of pro-active and active credit portfolio risk management within the dimensional framework of portfolio risk management are further explained and elaborated upon in the next section.

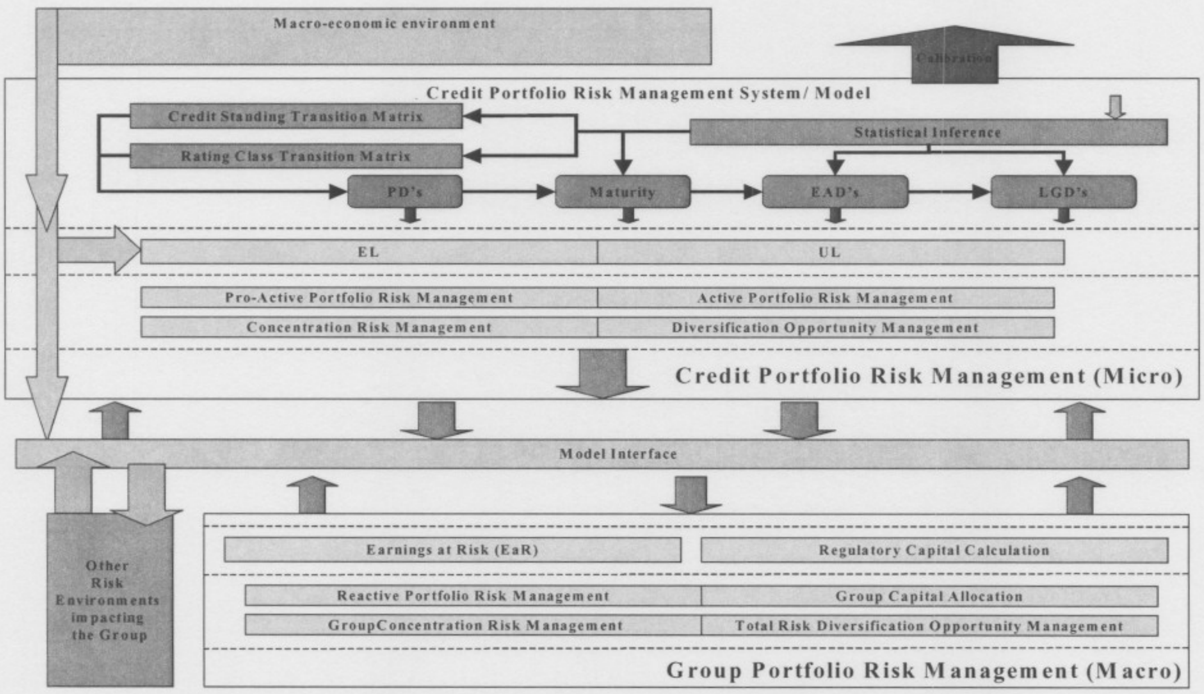
7.3 Portfolio Dimensions

Considering the credit portfolio approach, two clearly distinctive but dependent dimensions are identified, namely credit portfolio risk management and group portfolio risk management. These dimensions are illustrated in figure 7.5 and discussed in the following paragraphs.

7.3.1 Credit Portfolio Risk Management

Credit portfolio risk management or micro portfolio risk management (because of its involvement in sub-portfolios and components of sub-portfolios at a very detailed level) involves various sub-dimensions.

Figure 7.5 Portfolio Dimensions



Source: Author (2003)

A credit portfolio risk management system or model sources its requirements from the systems interface module to enable the application of credit portfolio risk management. As part of the credit portfolio risk management process it has also been argued that specific selected data elements are applied to statistical inference to derive credit risk's contribution towards overall shareholder wealth through Credit RAROC. It was further stated that a key responsibility of the credit portfolio risk manager is to enable the calibration of credit-screening models and credit rating models. Additional to these sub-dimensions, the following sub-dimensions are added, namely pro-active and active credit portfolio risk management, credit concentration risk management, and diversification opportunity management.

7.3.1.1 Pro-active Credit Portfolio Risk Management

Pro-active credit portfolio risk management is concerned with the pro-active influencing of the decision-making process. Its primary aim is to enable the business units and where applicable, the group specialist functions (supporting functions) to execute its respective value propositions. Three key decisions are identified where credit portfolio management can have a significant and pro-active influence in maximising shareholder value: Marketing decision, the pricing decision and the credit decision.

7.3.1.1.1 Pro-active influencing the marketing decision

Applying a credit portfolio risk management model to credit asset portfolios enables the credit portfolio risk manager to calculate any specific portfolio's contribution to overall shareholder wealth (from a credit risk perspective). As credit risk is one of the most significant risks in banking, maximising Credit RAROC should contribute significantly towards ensuring overall shareholder wealth maximisation. Advising the business unit which components or sub-portfolios in its business are responsible for the greatest performance (product or geographical area), the credit portfolio risk manager can pro-actively influence the marketing decision. As the business units focus on the selling of those components or sub-portfolios, diversification effects are taken into account in deriving Credit RAROC. Ensuring the highest possible Credit RAROC the credit portfolio risk manager pro-actively influences the marketing decision as the business unit contributes towards overall RAROC and therefore shareholder value.

7.3.1.1.2 Pro-active influencing the pricing decision

Applying a credit portfolio risk management model to credit asset portfolios enables the credit portfolio risk manager to calculate and compare current and target credit spreads. The credit spread assigned to a particular portfolio or sub-portfolio should at least be sufficient to cover the expected losses of said portfolio. Based on the inherent risk profile of the portfolio, expected losses are calculated. The pricing decision is pro-actively influenced when the credit spread is adjusted to accommodate the expected losses or anticipated expected losses, or where required, excessive spread is generated to compensate for any shortfall which might arise from other portfolios due to a competitive marketing environment. As the credit spread impacts on the Credit RAROC, the ultimate effect thereon should be analysed before a credit spread is recommended.

7.3.1.1.3 Pro-active influencing the credit decision

Applying a credit portfolio risk management model to credit asset portfolios enables the credit portfolio risk manager to advise the credit risk underwriter on those portfolios or sub-portfolios, which contribute the most in terms of diversification effects. Furthermore, the contribution that a specific loan or transaction has towards the portfolio's risk profile can be quantified. The credit decision is therefore pro-actively influenced as the risk contribution on a transactional level should not only enhance the risk profile on a portfolio level, but the transaction should also add value towards Credit RAROC. The credit portfolio risk manager further influences the credit risk decision as a recommended credit spread is provided to the credit risk underwriter to be included in the pricing process.

The credit environment can furthermore be pro-actively influenced. Mapping the macro-economic environment to security values can for instance explain possible negative trends in recovery rates or loss rates. Using transition matrixes (credit standing) can pro-actively identify negative business cycles and ensure that sufficient capacity is in place to accommodate the inflow of defaulting clients into the legal recoveries environment.

7.3.1.1.4 Illustrating pro-active credit portfolio risk management

The above influences can best be explained using the following example. A specific portfolio (wine industry) comprises of two sub-portfolios (based on geographical areas: Western Cape and Orighstad). Each of these sub-portfolios is made up of clients farming grapes. The weather patterns and general climatic conditions are different. The climatic conditions are more suitable for grape farming in the Orighstad area, enhancing the diversification effects of the 'wine industry' portfolio.

Applying a credit portfolio risk management model to these credit asset portfolios enables the credit portfolio risk manager to advise the business unit, the credit underwriter and the group specialist function that:

- Because of the more favourable climatic conditions the credit risk associated with the Orighstad sub-portfolio is lower;
- The lower credit risk manifests in lower expected losses;
- The credit spread charged for the Orighstad area can be lower due to the lower expected losses resulting from the more favourable climatic conditions;
- The better diversification opportunities provided by the Orighstad area increases Credit RAROC;
- From a marketing perspective focus should be directed towards the Orighstad area as its contribution to shareholder wealth is greater than the Western Cape are;
- From a pricing perspective depending on the price strategy, the credit spread can be lowered or be on par with the credit spread of the Western Cape region; and
- From a credit perspective less capital is needed because of the diversification opportunity decreasing unexpected losses.

7.3.1.2 Active Credit Portfolio Risk Management

Active credit portfolio risk management entails the day-to-day application of the credit portfolio risk management approach and principles to managing credit asset portfolios. The day-to-day decision-making on all management levels (operational, tactical and strategic) is based on the principles and deliverables of the credit portfolio risk management approach being applied. It thus becomes part of the business and all its strategies. It entails what the Basel Capital Accord refers to as the 'user test'.

A natural outflow of active credit portfolio risk management is the use of risk mitigating strategies to buy or sell credit risk in order to create an optimum credit asset portfolio. Credit portfolio risk principles are used to identify and ring fence specific asset tranches for transacting OTC-type deals.

Active credit portfolio risk management encompass all the activities associated with the philosophy, approach and principles of credit portfolio risk management.

7.3.1.3 Credit Concentration Risk Management and Diversification

Applying a credit portfolio risk management model to credit asset portfolios enables the credit portfolio risk manager to advise the credit risk underwriter regarding the degree in which portfolios and sub-portfolios contribute towards concentration risk. Because unique risks (refer Chapter 3 paragraph 3.4.2) create diversification opportunities within a credit portfolio context and can be diversified away thereby enhancing Credit RAROC and shareholder value, concentration risk implies that there are not any opportunities for diversification left in the portfolio.

It should be noted that when referring to concentrations, it refers to either exposure concentration (not necessarily implying concentration risk) or risk concentration, the latter a function of a portfolio's expected and unexpected losses.

7.3.2 Group Portfolio Risk Management

Group portfolio risk management or macro portfolio risk management is divided into specific sub-dimensions. These sub-dimensions are EaR, regulatory capital calculation, group capital allocation, reactive portfolio risk management, group concentration risk management and total risk diversification opportunity management. Other aspects to be overseen from a group portfolio risk management perspective are model validation (internal audit) and quality assurance in terms of systems, processes and procedures.

Applying group portfolio risk management to the total banking portfolio ensures that an independent view of risk is obtained and maintained. A natural trend (considered by the industry as best practice) is to manage the banking risks from an enterprise-wide risk framework. However, although the necessity of having a total view of all risks impacting on the financial institution is acknowledged, careful consideration should be exercised during implementation.

In many instances an ineffective functional approach is adopted when applying the enterprise-wide risk management concept i.e. where the enterprise-wide established functionality tends to take on the functional activities of all the risk management activities across the financial institution. This tendency embraces ineffectiveness and even inefficiency, as the respective risks should be managed by those functions understanding the business or risk, knowing what the data relevant to that specific risk entail, and with the required intellectual capital and resources to apply in the management of a specific risk.

Group portfolio risk management and by implication, enterprise-wide risk management should therefore adopt a process or systems approach to group risk as facilitated in a Business Health Forum (BHF). The process or systems approach sèe the functional activities of every risk area as a process or a system, which from a group perspective, need to be brought together to create synergetic outcomes. Even external and other internal factors and environments impact the system or process and are to be considered and made participants in the overall process. The GHF is further discussed in paragraph 7.5.

7.3.2.1 Earnings at Risk, Regulatory Capital Calculation, and Group Capital Allocation

EaR, an activity aiming to determine the impact risks (all the risks a banking institution is faced with) have on the earnings sustainability of the bank, can only

7.4 Perspectives of Credit Risk Management

At this point in the discussion two perspectives to managing these portfolios should be highlighted. Both these perspectives accomplishes specific objectives regarding the credit asset portfolio and should be part of such a process. The perspectives, discussed in the next section, are the economic value perspective and the earnings perspective.

7.4.1 Economic Value Perspective

This research study focuses predominantly on the economic value perspective (also known as the shareholder wealth perspective) to credit portfolio risk management. The economic value perspective has an *ex post* focus (after default has occurred) and calculates the impact of credit risk on Credit RAROC or shareholder value. Referring to the account life cycle, the perspective is concerned with stage 6: legal recoveries, after PUD has been breached.

As mentioned in previous paragraphs, the data variables and system deliverables concerned with the economic value perspective include PD's, LGD's, EAD's, default and loss rates, recovery rates, security values, etc. All literature focuses on the economic value perspective.

7.4.2 Earnings Perspective

Another perspective to credit portfolio risk management, of equal importance but not widely known and recognised, is the earnings perspective. As stated above, the two perspectives have different objectives regarding the management of credit asset portfolios. Where the economic value perspective has an *ex post* focus, the earnings perspective has an *ex ante* focus (before default occurs). It is thus concerned with stages 4 & 5: non-performance classes I and II.

The earnings perspective focuses on the loss in income for the bank as a result of and associated with deterioration in credit standing, it therefore has a cash flow implication to be considered. A loan is granted within a framework of receiving a return on the loan. Should a client's credit standing deteriorate and he or she fails to make a payment, the non-payment has an impact on earnings. The non-payment has specific cost implications, not taken into account in a banking institution's income statement.

The scheduled payment amount normally includes a portion of original capital and interest. The capital portion has a costing aspect to be discounted for against the cost of funds, e.g. the funds transfer price if such a system has been effectively implemented. Due to the instalment or payment not being made, this cost impacts on the cash flow of the bank and should be regarded as a 'loss' for the bank.

Regarding the interest portion not being paid, it is accrued and capitalised, with the result that an opportunity costs equivalent to the cost of capital, is incurred. Once the decision has been taken to either stop or suspend interest, it forms part of the outstanding capital owed by the debtor (refer paragraph 7.2.3.6).

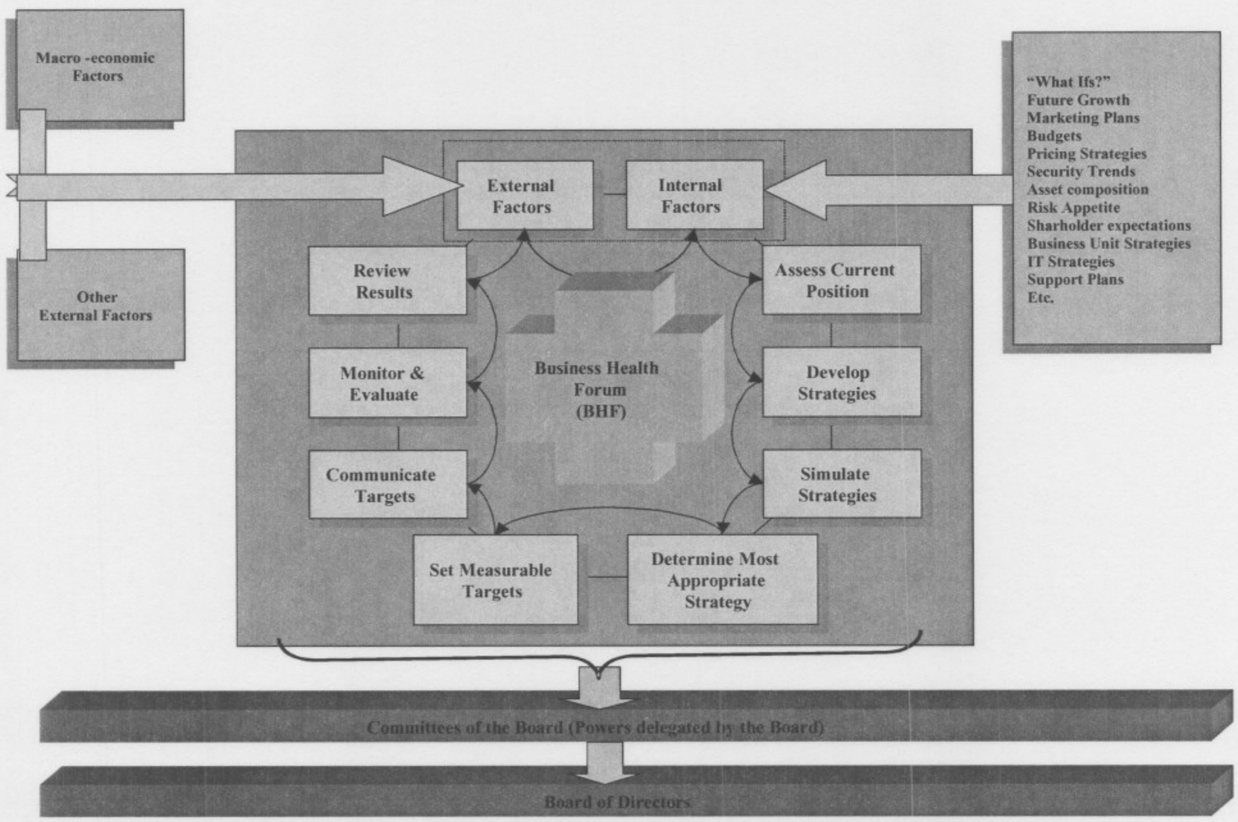
7.5 Governance Body: The Business Health Forum (BHF)

In previous paragraphs it was stated that group portfolio risk management and by implication, enterprise-wide risk management should adopt a process or systems approach to group risk as facilitated in a Business Health Forum (BHF). It was further argued that the process or systems approach implies that the functional activities of every risk area are seen as a sub-process or a sub-system, which from a group perspective, need to be brought together to create synergetic outcomes. The total organisational view includes external and other internal factors and environments impacting on the system or process and is to be considered and made participants in the overall process.

In the literature study, it was advocated that a governance body should be established based on the ALCO process (Chapter 2, paragraph 2.7) to ensure that the required strategic prominence is assigned to the credit portfolio risk management environment. The Business Health Forum, discussed in the remainder of this chapter, acts as oversight body and committee, bringing all aspects of the banking institution (operational, financial, business, external, internal, and risk management) together.

The Business Health Forum is illustrated in figure 7.6.

Figure 7.6 The Business Health Forum (BHF)



Source: Author (2003)

The primary roles of the Business Health Forum are to investigate various proposals directed towards profit and sustainable growth of the bank over the short-, medium-, and long term taking into account the expectations of all the stakeholders, and to recommend the most appropriate proposal or scenario to the relevant board committee(s) for approval, and once approved, to have oversight in the implementation thereof in all departments of the banking institution.

As can be seen from figure 7.6, specific activities or steps are to be followed within a Business Health Forum framework. The next paragraphs provide brief overviews regarding these steps, which are based on the steps in the ALCO process. Also evident is the fact that the steps present an iterative framework of continuous improvement. The discussion regarding the different steps is started with the external factors as it is regarded the most appropriate place to start.

7.5.1 External Factors

All external factors having an influence on the banking institution and its activities are identified, analysed, and its impact qualified and even quantified if possible. These factors may include macro-economic factors, socio-economic factors, socio-political factors, and external benchmarks. Everything originating externally to the bank is to be considered. From a representation perspective, it implies that every Group Specialist Function or supporting function involved with analysing the external environment should have representation on the Business Health Forum e.g. economic department, marketing department, regulatory- and statutory department.

7.5.2 Internal Factors

All internal factors having an influence on the banking institution and its activities are identified, analysed, and its impact qualified and even quantified where possible. These factors may include business plans, growth targets, shareholder's return expectations, legislation, marketing plans, human resources, operational risks, credit risks, market risks, other risks, budgets, security trends, pricing strategies, risk appetite, what if analyses, asset composition and targets, it strategies, and support plans. Everything originating internally to the bank is to be considered. From a representation perspective, it implies that every business unit, Group Specialist Function or supporting function involved with analysing and impacting on the internal environment should have representation on the Business Health Forum e.g. business unit, credit risk, group risk, market risk, ALCO, operational risk, legal department, IT department, economic department, marketing department, regulatory- and statutory department. Each environment forms a sub-process or represents a sub-system to be considered in the overall business strategy.

7.5.3 Current position

Having the required inputs from both the external and internal environments, the current status or position is assessed taking into account not only the status quo but also the expected changes in the environments. Of great importance is that the current situation needs to be well understood before the next step can commence. Assessing the current position is the foundation on which strategies are built.

7.5.4 Develop strategies

Using the outcomes of the previous step, and taking into account the factors identified as well as the strategic direction and objectives, a variety of strategies should be developed. Strategies should address all facets of the business in isolation or in combination with the predetermined strategic direction and objectives. Various 'what if' scenarios should be defined, developed, and evaluated.

7.5.5 Simulate strategies

The strategies and scenarios as developed in the previous step are to be simulated to determine the impacts they would have had over a specific time horizon. Simulating the strategies provides an inexpensive mechanism to determine the impacts specific strategies might have had on the overall business.

7.5.6 Determine most appropriate strategy

The selection of the most appropriate strategy for recommendation to the board committee(s), given the Business Health Forum's perception regarding the future, remains the most important role of the Business Health Forum. Because each environment, process or system potentially impacting the overall business strategy are involved in the selection process and have representation on the forum, a unified view regarding a recommendation can be obtained. This in itself can assist in alignment between all relevant plans, business unit strategies and processes. Once the most appropriate strategy is selected, it is recommended to the board committee(s) for approval.

7.5.7 Setting Targets

Once an appropriate strategy has been selected and recommended, the setting of measurable targets should receive priority. The reason being that the strategy needs to be translated into business objectives and targets against which the successful execution or failure can be measured. The targets should be realistic, measurable and achievable.

7.5.8 Communicate targets

Once measurable targets have been set, the targets are to be communicated through the organisation to ensure that each are know what it needs to achieve and what it is responsible for. The respective environments should understand what their respective contribution is toward achieving the overall business strategy.

7.5.9 Monitor and Evaluate

The actions and activities of the respective internal environments, where applicable, should be monitored regularly to ensure that the decisions taken and the strategy selected is complied with and that the targets are being met. Where deviations occur, the necessary corrective actions should be embarked upon and the impact thereof should be established. The external environment should also be monitored as changes might occur. Such changes should be accommodated into the process and appropriately address where required.

7.5.10 Review results

Before commencing with an external and internal factor analyses, the current results need to be reviewed. This action will provide a methodology to gauge the success of the current strategy in terms of the targets that have been set, to what extent they have been achieved, whether the assumptions made and the perceptions of the future were accurate, and where changes need to be accommodated.

7.5.11 Credit Portfolio Risk Management and the Business Health Forum

Adopting a Business Health Forum 'framework', an independent view of all the risks and activities is ensured. The Business Health Forum also facilitates the role of the credit portfolio risk manager as 'executioner' and 'advisor' of the overall business strategy as the credit portfolio risk management functionality forms part of the representation of the Business Health Forum.

On the one hand credit portfolio risk analyses, credit risk appetite, credit concentration, and diversification can be shared with the forum to be included in the 'what if' scenarios and strategies while on the other hand, pertinent information can be acquired from other representative e.g. target markets, growth targets, and pricing.

7.6 Conclusion

Chapter 7 applied the information obtained from the literature and the empirical study and provided a process approach for managing credit asset portfolios in a South African bank. A framework illustrating the process approach is provided in figure 7.7. Part of the process approach is the account life cycle, forming the foundation of the process approach. Due to its importance from a credit portfolio risk management perspective, the account life cycle has been expanded to become a credit life cycle. The importance of the credit life cycle is that any amounts recovered after accounts have been written off, should be considered in the process for managing credit asset portfolios.

Building on the foundation provided by the account life cycle, a discussion of the to-be expected data and system variables and deliverables is provided as the different data elements, and what they represent, form part of the process approach. The data elements are used in the credit portfolio risk management process. All the data elements and the system deliverables culminates in the credit portfolio risk management approach.

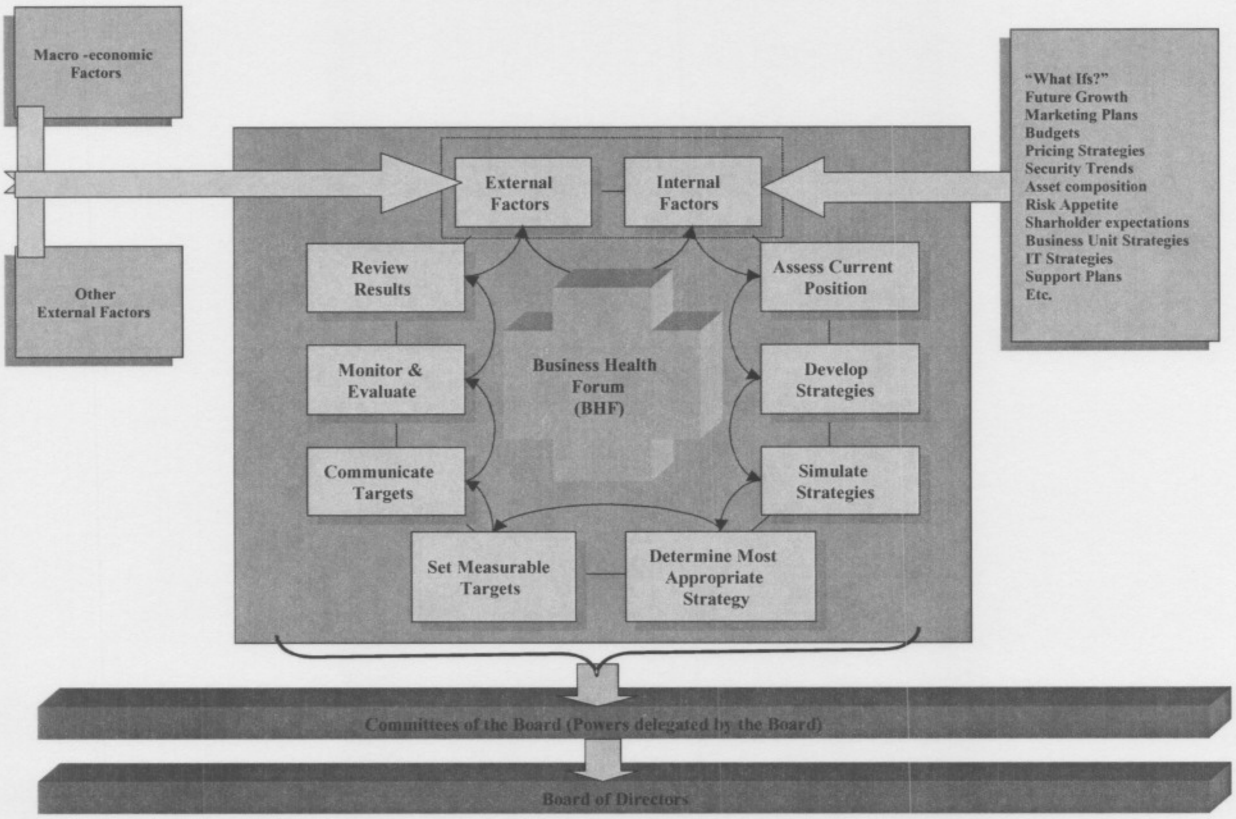
In considering the credit portfolio approach, two clearly distinctive but dependent dimensions have been identified, namely credit portfolio risk management and group portfolio risk management. Due to specific objectives and focus areas, the distinction between the dimensions is to be catered for in the approach for managing credit asset portfolios.

A distinction was also made between two perspectives to managing credit asset portfolios, being the economic value perspective and the earnings perspective. Again important as both these perspectives accomplish specific objectives regarding the credit asset portfolio and the management thereof.

The discussion of the process approach to managing credit asset portfolios is concluded with an argument that a Business Health Forum be established based on the ALCO process, to act as oversight body and committee, bringing all aspects of the banking institution (operational, financial, business, external, internal, and risk management) together. It was further argued that such a governing body ensures an independent view of all the risks and activities and facilitates the role of the credit portfolio risk manager as 'executioner' and 'advisor' of the overall business strategy as the credit portfolio risk management functionality forms part of the representation of the Business Health Forum.

The Business Health Forum is illustrated in figure 7.6.

Figure 7.6 The Business Health Forum (BHF)



Source: Author (2003)

The primary roles of the Business Health Forum are to investigate various proposals directed towards profit and sustainable growth of the bank over the short-, medium-, and long term taking into account the expectations of all the stakeholders, and to recommend the most appropriate proposal or scenario to the relevant board committee(s) for approval, and once approved, to have oversight in the implementation thereof in all departments of the banking institution.

As can be seen from figure 7.6, specific activities or steps are to be followed within a Business Health Forum framework. The next paragraphs provide brief overviews regarding these steps, which are based on the steps in the ALCO process. Also evident is the fact that the steps present an iterative framework of continuous improvement. The discussion regarding the different steps is started with the external factors as it is regarded the most appropriate place to start.

CHAPTER 8

SUMMARY, CONCLUSION AND RECOMMENDATION

8.1 Introduction

The first component of the research study provides a literature review on credit risk management, focusing on the credit portfolio risk management approach and its principles. The second component entails an empirical study regarding the credit risk management practices being applied in the South African Banking Industry, based on structured interviews held with representatives of the 'Big Five' banks in South Africa. The third component uses the insights gained from the literature study as well as the empirical study to provide a process approach to the management of credit asset portfolios in a South African bank.

The aim of Chapter 8 is to provide a logical closure for the research study. The chapter therefore addresses three important issues. Firstly, an overview of the research is provided as refresher on the different aspects touched upon in the various chapters. Secondly, the extend to which the problem statement and study objectives have been met are briefly discussed. In this regard the problem statement and study objectives are repeated for ease of reference. Finally, the research study is concluded with specific recommendations and a closing remark.

8.2 Summary and Overview of the Research

Chapter 1 resented the background to the research, followed by a problem definition, and research objectives. The chapter was concluded with a research structure and discussion on the chapter layout.

Chapters 2 to 5 presented a literature overview regarding credit risk management in general, and the portfolio approach to credit risk management specifically. The format in which the discussion was presented was to provide four building blocks, each building block a specific component of a puzzle. These four chapters in combination completed the theoretical aspects of credit risk management and also provided different author's views on terminology together with an explanation of the portfolio approach and theory.

Chapter 2, the first building block, presented insight into the management function, the managerial role and functional activities. The discussion evolved to include the strategic focus of the credit decision and the role the credit portfolio risk manager needs to play as 'executioner' and 'advisor' to give affect to the credit strategy.

Chapter 3, the second building block, provided a discussion of the portfolio approach to credit risk management, addressing the modern portfolio theory, the application of the modern portfolio theory to credit asset portfolios, the evolution of credit risk management practices, and the credit portfolio approach. The risk-adjusted performance measures to be used from a credit risk management perspective were discussed together with related concept definitions.

The third building block (Chapter 4), presented insight into the credit risk quantification approaches and models. The discussion included an overview of the role the information technology department is required to play in the provision of the required data elements as key to effective credit portfolio risk management. Furthermore, insight has been provided regarding the specific data and reporting requirements, approaches and model classifications, vendor models available for the respective data issues and a comparison between the credit portfolio models.

Chapter 5, the fourth building block, concluded the literature study and provided insight into the risk mitigation strategies or credit risk hedging techniques available to the credit risk portfolio manager to ensure an optimum trade-off between risk and reward. The discussion presented included an overview of the various techniques available and focussed specifically on credit derivatives and securitisation. In this regard, discussions on the principles, types and mechanics were provided.

Chapter 6, focussed on the empirical research phase, provided a discussion off the results obtained from an empirical investigation conducted regarding the credit risk management practices applied in practice by the South African banking industry. The discussion presented was divided into three sections: Firstly, a discussion on the procedures and methods followed to obtain the required information. Secondly, a section discussing the results obtained from the participating banks and finally a conclusion focussing on a short interpretation of the results.

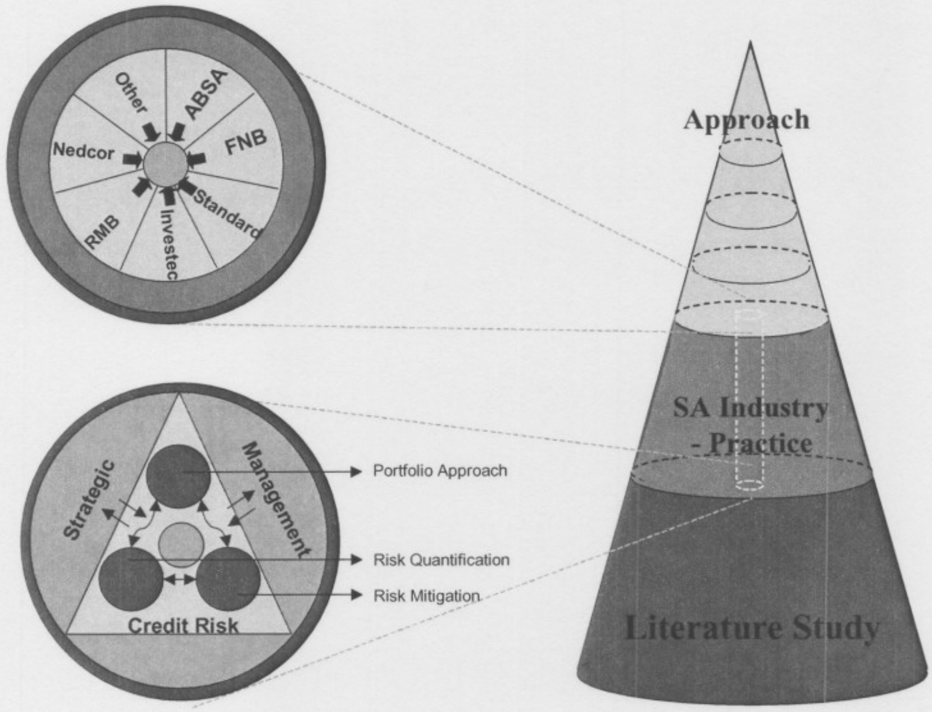
Chapter 7, the final phase and component of the research study, aimed at applying the information obtained from the literature study and the empirical study as background to provide a process approach for managing credit asset portfolios in a South African bank. The process approach was formulated against an overview of the account life cycle, forming the foundation for the process approach. The discussion on the account life cycle was followed with a discussion of to-be expected data and system variables and deliverables in terms of the account life cycle required for effective credit portfolio risk management.

Two perspectives regarding the management of credit asset portfolios as part of a process approach was highlighted followed by an overview of the credit portfolio risk management approach in context of two distinct but inclusive areas or dimensions, being micro- and macro credit portfolio risk management. The discussion is concluded with specific views on a governance body (Business Health Forum) based on the ALCO process to ensure that the required strategic prominence is assigned to the credit portfolio risk management environment.

Chapter 8 concludes the research study, addressing three important issues, namely a research overview, meeting the objectives and a conclusion.

With reference to the thesis framework provided in chapter one, together with the sections illustrating the progress in each chapter, figure 8.1 provides the overall framework of the research study showing each chapter's contribution and position/ placement within the overall research.

Figure 8.1. Framework and Research Components



Source: Author (2003)

8.3 Problem definition and study Objectives

8.3.1 Problem definition and basic hypothesis

The operating environment in which banks conduct their business, especially the credit risk environment, changed significantly since the latter half of the previous decade. Development in credit tools, -techniques and -models received high priority, focus and resources, while the management approach associated with managing the credit risk in portfolio context has not kept pace with these developments and enhancements. The requirements of the Basel II Capital Accord provide a benchmark for credit risk management, and the building blocks for portfolio management.

The developments have resulted in a bombardment of quantitative and qualitative credit risk information and data on the one hand, and on the other the absence of a clear focus and management approach and philosophy, which is applied to effectively manage credit risk. The changes in the credit risk management environment dictate a need for a new management philosophy: a paradigm shift to apply the data and related information to the strategic decision making process. In this context, it is believed that this research study has its greatest contribution, being the formulation of a process approach for managing credit asset portfolios.

Given the above scenario, the South African financial industry is confronted with the following dilemma in managing credit asset portfolios:

- How are the different outcomes of quantification techniques and models incorporated in the credit management process?
- How should the transition be managed from relationship banking and transactional analysis to a portfolio approach in credit risk management?
- How does the portfolio risk manager ensure shareholder value creation and maximisation while having to deal with an optimum portfolio composition?
- International best practices as depicted in the Basel II Capital Accord proposals (Basel, 2003b), as well as the King report (Ernst & Young 2003 Module 1-3 and Myburg 2003) (corporate governance), demand that the portfolio approach to credit risk must be adopted by all banks that want to conduct business in the global arena. It therefore becomes an imperative.
- A universally accepted, current and documented management process is absent in the South African context

8.3.2 Research Objectives

The research study is closely linked to the dilemma facing the South African financial industry. It is becoming increasingly important in the immediate operating environment where performance is driven by the value generated for shareholders in context of the requirements and constraints as determined by the regulatory, statutory and accounting standards bodies.

A primary objective identified in the beginning of the research was the formulation of a process approach to be applied in the management of credit risk (ultimate default) of credit asset portfolios. As part of this objective an implicit requirement of such an approach was that it should form the foundation from where the management of credit risk can be leveraged to exploit all the dimensions of credit risk while focussing on the maximisation of shareholders wealth.

Other objectives defined were:

- To determine the status of South African financial institutions regarding the evolution towards a portfolio approach for credit risk management.
- To determine the management techniques, processes and approaches being used by South African financial institutions in the management of credit risk.
- To determine international best practice methodologies in the management processes as it relates to credit risk and incorporate them in a proposed management approach.
- To develop a thorough knowledge of the portfolio approach to credit risk management.

8.3.3 Meeting the set objectives

The primary objective of formulating a process approach to be applied in the management of credit risk of credit asset portfolios in a South African bank has been successfully met – the framework for such an approach is illustrated in figure 7.7.

The implicit requirement that such an approach should form the foundation where the management of credit risk can be leveraged to exploit all the dimensions of credit risk while focussing on the maximisation of shareholders wealth has been successfully met – implicit requirement imbedded in the framework as well as the discussion on the process approach as provided by Chapter 7.

The secondary objective of determining the status of South African financial institutions regarding the evolution towards a portfolio approach for credit risk management has successfully been met as shown in paragraph 6.5.2.

The secondary objective of determining the management techniques, processes and approaches being used by South African financial institutions in the management of credit risk has only been partially met, mainly due to resistance from respondents to share company-specific information.

The secondary objective to determine international best practice methodologies in the management processes as it relates to credit risk and incorporate it in a proposed management approach has been partially met, as the international benchmark used is based on various textbooks and accompanying theoretical concepts. Unfortunately, the international application of credit risk management methodologies, approaches, systems and processes being applied in practice could not be investigated because of a lack of funds and the practical application in the international arena does not form part of the research study scope.

The secondary objective of developing a thorough knowledge of the portfolio approach to credit risk management has been successfully met as manifested in this research study.

The process approach developed for managing credit asset portfolios incorporates the account life cycle as point of departure to facilitate the various processes to be considered for effective credit portfolio risk management. The approach assists the identification of specific data requirements as it culminate in a credit portfolio risk management functionality enabling the credit portfolio risk management approach and principles to be applied to credit asset portfolios within the context of two perspectives to credit portfolio risk management, namely:

- The economic value perspective (also known as the shareholder wealth perspective) having an ex post focus (after default has occurred) and calculating the impact of credit risk on Credit RAROC or shareholder value; and
- The earnings perspective having an ex ante focus (before default occurs) and addressing the bank's loss in income as a result of and associated with deterioration in credit standing (the cash flow implication to be considered when credit standing deteriorates).

Applying the developed process approach to credit asset portfolios, two distinctive but dependent dimensions with underlying sub-dimensions to portfolio risk management is identified being micro portfolio risk management and macro portfolio risk management; the former focussing on the credit asset portfolio and the latter on the group portfolio in the context of all risks impacting on the organisation.

Establishing a Business Health Forum reporting to the Board appointed committees provide the final stage in the process approach as the forum ensures an independent view of all the risks and activities of the business, including credit risk.

8.4 Conclusion and Recommendations

The local banking community is currently not ready to implement the credit portfolio risk management approach in its full consequence. In the majority of cases, respondents are still in the process of complying with the Basel II Capital Accord requirements. Due to a lack of sufficient data, the industry will take at least three years to apply credit portfolio risk management to their credit portfolios (incidentally also the time for Basel II compliance).

The following aspects are recommended for consideration and possible action:

- Data requirements as building block for effective credit portfolio risk management as well as the procurement (or in-house development) of a credit portfolio risk management system or model should be addressed as high priority for credit portfolio risk management;
- The global availability and application of credit portfolio risk models for the retail market segment should be explored, especially in the Far and Middle East;
- Banks should explore the establishment of a credit portfolio risk management functional unit to allow a comprehensive focus on the total portfolio. The establishment of a separate credit portfolio risk management 'product house' assuming all credit risk, a type of credit insurance model or 'profit centre' should be investigated and explored when adopting the credit portfolio approach as the transfer of credit risk can be exploited more effectively. Prerequisites for establishing such a 'product house' are to have a reference price available, to be able to measure and quantify concentration risk, and to identify diversification opportunities;
- A credit portfolio risk management functional capability should assists in the adoption of a credit culture and become a key player in changing the manner in which the day-to-day business is conducted and not be applied in isolation. Such a capability should cultivate and institutionalise a credit culture, form and

leverage the credit decision and operational principle by which credit risk is managed and have the ability to manage the total credit portfolio including active portfolio management and continuous portfolio improvement;

- The prominence given from a strategic perspective to credit portfolio risk management should receive attention as certain aspects of credit portfolio risk management is fragmented and decentralised;
- The prominence given to credit risk as one of the most significant risks should be addressed from a Group structure perspective. Current Group Credit Risk Committees should where applicable, be expanded to include duties beyond those of a "typical lending committee";
- Establishing a Business Health Forum to act as oversight body and committee, bringing all aspects of the banking institution (operational, financial, business, external, internal, and risk management) together, should be explored. Such a forum ensures an independent view of all the risks and activities of the business. Its primary roles are to investigate various proposals directed towards profit and sustainable growth of the bank over the short-, medium-, and long term taking into account the expectations of all the stakeholders, and to recommend the most appropriate proposal or scenario to the relevant board committee(s) for approval, and once approved, to have oversight in the implementation thereof in all departments of the banking institution. The primary benefit of such a forum is that the forum facilitates a process or systems approach to group risk viewing the functional activities of every risk area as a process or a system, which from a group perspective, need to be brought together to create synergetic outcomes;
- Opportunities to expand the research to include the total application sphere of credit risk management (e.g. retail sector and insurance) should be explored; and
- Opportunities to expand the research study to include a chapter on international application of credit risk management to credit asset portfolios are to be investigated for further studies.

Adopting and applying the developed framework regarding the process approach to managing credit asset portfolios in a South African bank will assist executive management in ensuring that the requirements (processes, systems, data) for effective credit portfolio risk management are met and would broaden the understanding regarding the interdependency between profit, sustainable growth and effective credit portfolio risk management.

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ANNEXURE A

PhD Research

A Process Approach for Managing Credit Asset Portfolios in a South African Bank

Structured Questionnaire to Participating Banks

A. Credit Risk Management Operating Model

1. Is your credit risk management function centralised or decentralised geographically, per business unit or segment? [Explanation]

2. Please explain your credit-operating model? [Explanation]

B. Responsibility and Managerial reporting Structure for Risk Governance

1. How does your Group/Division reporting structure align to the management of **overall risk**? [Explanation]

2. How does your Group/Division reporting structure look in the management of **credit risk**? [Explanation]

C. Strategy and Credit Risk Management

1. On a scale of one to seven, one being least and seven being most, how important is the adoption of a portfolio approach to credit risk management in your organisation from a strategic perspective? [1-7]

2. Why do you consider the rating from a strategic perspective given in the previous question, as appropriate? [Explanation]

3. Referring to the evolutionary stages of credit risk management, in what stage do you consider your organisation to be in? [Stage]

4. Why do you come to that conclusion? [Explanation]

5. What do you envisage your organisation's timeframe to be for reaching stage 7? [Months]

6. What should your organisation need to achieve or put in place to reach stage seven? [Explanation]

7. On a scale of one to seven, one being least benefit and seven being greatest benefit, how do you rate the perceived benefits to be achieved from the New Basel Capital Accord for your organisation? [1-7]

8. Why do you hold that view? [Explanation]

D. Portfolio Management

1. Do you apply the portfolio approach in your credit risk management approach? [Y/N]

2. How do you define the portfolio approach as applied in your bank? [Explanation]

3. On a scale of one to seven, one being least important and seven most important, what importance would you assign for a banking institution to have a portfolio management function? [1-7]

4. Why do you hold that view? [Explanation]

5. What approach did you follow in **designing and developing** your portfolio management approach? [Explanation]

6. What approach did you follow in **implementing** your portfolio management approach? [Explanation]

7. What do you perceive as the "ideal" approach to be followed in adopting a portfolio approach to credit risk management? [Explanation]

E. Data Requirements and Constraints

1. In adopting the portfolio approach to credit risk management, did you experience problems from a data requirement perspective? [Y/N]

2. How were these problems overcome? [Explanation]

3. Do you use credit-scoring tools in your organisation to assist your decision-making process? [Y/N]

4. Which tools do you use for which segments? [Explanation]

F. Quantification Models

1. On a scale of one to seven, one being the least important and seven the most important, how important would you consider models to be in your credit risk quantification efforts in your organisation? [1-7]

2. Why do you consider the rating from a credit risk quantification perspective given in the previous question, as appropriate? [Explanation]

3. Do you use separate models to quantify the various elements or components of credit risk, e.g. PDs, LGDs, and EADs? [Y/N]

4. Which models do you use for your different market segments and product areas to quantify credit risk? [Explanation]

G. Credit Risk Mitigation

1. On a scale of one to seven, one being the least important and seven the most important, how important would you consider **credit risk** mitigation to be in your organisation? [1-7]

2. Why do you consider the rating given in the previous question, as appropriate? [Explanation]

3. Which methods do you utilise in your organisation to hedge credit risk? [Explanation]

4. How do you perceive the South African Industry in terms of readiness to transfer credit risk to third parties? [Explanation]

Would it be possible to furnish copies of the following documentation?

- Latest Financial Statements (Annual report)
- Responsible and Managerial reporting structure for overall risk governance
- Responsible and Managerial reporting structure for credit risk governance
- Any other material with relevance to the above answers to be provided

Thank you for your time and patience. Please be assured that bank-specific information provided would be handled in the utmost confidentiality. Information obtained would be published for the banking group participating members as a whole.

Pieter G. Vosloo

September 2003