



***A MULTIVARIATE MODEL OF INTEGRATED
BRANCH PERFORMANCE AND POTENTIAL
FOCUSING ON PERSONAL BANKING***

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ABSTRACT

Existing methodologies of bank branch performance analysis are dominated by accounting and financial measures that inherently generate information of a retrospective nature. The outcomes are a possible misleading assessment of a branch's economic viability and misguided planning decisions in reconfiguring a branch.

There are few studies that use an interdisciplinary and multivariate perspective for an integrated analysis of bank branch performance. This study develops three principal models for an integrated analysis of personal banking performance, based on data collected from branches of a major Australian trading bank.

Key research objectives are to identify those *potential variables that explain performance variables*, develop models of *overall branch performance* and *overall branch potential*, and develop a *predictive model for the purpose of classifying and profiling* branches.

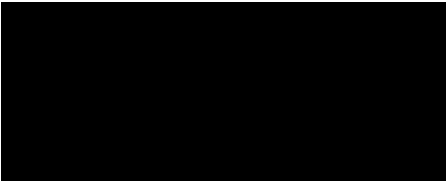
Various data collection methods have been employed, including mailed questionnaires, exit interviews, telephone interviews, and access to internal reports of the study bank, as well as purchasing customised data from the Australian Bureau of Statistics. The principal method of analysis is *analytic survey*. Development of scales and testing of study variables were achieved through quantitative techniques such as factor

analysis, coefficient alpha, multiple linear regression analysis, and discriminant analysis. Multiple regression models trace the links between potential variables and each of the performance variables, as well as providing an overall measure of potential that explains the expected overall performance. Discriminant analysis is applied in deriving a classification model that can distinguish between high, medium, and low performing branches.

In conclusion, the study delivers a model of overall *performance* comprised of eight variables; a model of overall *potential* also comprised of eight variables; and, a discriminant model comprised of five predictors and two functions with validated coefficients, and a cross-validated correct classification rate. In addition, scales developed for such constructs as customer service quality and managerial competence can be applied independent of regression analysis and discriminant analysis models. It is submitted that the findings of the study can be used in decisions concerning reconfiguring, closing, or opening branches. Furthermore, the study could assist in minimising the gap between current branch performance and branch potential, by focusing attention on the treatment of variables that are controllable by bank management.

DECLARATION

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person where due reference is not made in the text.



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GLOSSARY OF ABBREVIATIONS

ABS	:	Australian Bureau of Statistics
BSPV	:	Branch-Specific Potential Variables
CASPV	:	Catchment-Area-Specific Potential Variables
EM	:	Equity Multiplier
MTR	:	Monthly Trend Report
PAF	:	Principal Axis Factoring
PeO	:	Performance Outcome
PPC	:	Profitable Product Concentration
ROA	:	Return on Assets
ROE	:	Return on Equity
SPC	:	Strategic Product Concentration

ALPHABETICAL LEGEND OF ABBREVIATED

VARIABLE NAMES

(Managerial competence variables are prefixed MC; benchmarking dimensions are prefixed BD.)

ACCTYPES	:	Branch staff telling the customer about the different types of accounts and investments available
ADJASHOP	:	Location adjacent to or within walking distance of a regional shopping centre
ADVICE	:	Quality of advice given about managing the customer's finances
AGE	:	Average age of persons aged 15 years or more in the branch catchment area
APOLOGY	:	Ability of branch staff to apologise for a mistake
APPRDADV	:	(number of new) Approved Advances
ARREARS	:	(use of) Personal Loans Arrears Report
ASSIST	:	(use of) ASSIST Terminal
ATMS	:	Number of automatic teller machines
BD1	:	Internally comparing outcomes on key performance factors in different functional areas of branch
BD2	:	Comparing outcomes on key performance factors in different functional areas of branch with that of industry leaders
BD3	:	Internally comparing work processes of branch

BD4	:	Comparing work processes of branch with that of industry leaders
BD5	:	Extending comparisons of work processes of branch to other industries
BD6	:	Identifying sources of benchmarking information
CARDETD	:	(number of new) Carded Term Deposits
BENCH	:	Effective Practice of Benchmarking
CANBI	:	(number of new) Current Accounts Not-Bearing Interest
CARPARK	:	Presence of a free car park
COMPETI	:	Presence of competitors
CONCERN	:	Expression of genuine concern if there is a mistake in the customer's account
CONVENIE	:	Tangible convenience
CUSSEQR	:	Customer service quality
DEPOBAL\$:	Total average deposit balances held
DSS	:	Use of the decision support system
DWELL	:	Proportion of private dwellings rented
EQUSTAFF	:	Number of competitors within 200 metres employing equal or smaller number of staff
EXCEPT	:	(use of) Exceptions Report
FEEINC\$:	Fee income.
FIXEDADV	:	(number of new) Fixed Rate Term Advances
FULDLOAN	:	(number of new) Fully Drawn Loans
FULLTIME	:	Staff numbers, full-time equivalent
GREET	:	Branch staff greeting the customer when it's the customer's turn to be served
HELP	:	Willingness of branch staff to help the customer

HOMELOAN	:	(number of new) Home Loans
INCOME\$:	Average annual family income
INCREFER	:	(number of new) Investment Centre Referrals
INFORMED	:	Branch staff keeping the customer informed about matters of concern to the customer
INSURE	:	(number of new) home and contents insurance policies originated
KNOW	:	Branch staff's knowledge of bank's services and products
LEARN	:	Branch staff helping the customer learn how to keep down banking costs
LEDGER	:	(use of) General Ledger Report
LENDBAL\$:	Total average lending balances outstanding
MANCOMP	:	Managerial competence of the branch manager
MANPERFO	:	(use of) Manager's Performance Report
MC1	:	Manages change
MC2	:	Seeks to develop branch's customer profile in line with the customer groups targeted by the Bank
MC3	:	Encourages customers to provide feedback on quality of service
MC4	:	Practices proactive decision-making
MC5	:	Closely follows developments in the branch's catchment area
MC6	:	Wants to take action to solve problems and overcome obstacles to achieve goals
MC7	:	Perseveres with an issue to its conclusion
MC8	:	Establishes action priorities for achievable goals

- MC9 : Is conscious of time management needs
- MC10 : Identifies lending opportunities
- MC11 : Develops strategies to maximise lending
- MC12 : Identifies deposit gathering opportunities
- MC13 : Develops strategies to maximise deposit gathering
- MC14 : Matches management style to changing situations
- MC15 : Leads by example
- MC16 : Motivates staff through constructive criticism and positive feedback
- MC17 : Stimulates others to work effectively together in group settings
- MC18 : Determines objectives with subordinate staff to develop team effort
- MC19 : Contributes to harmonious and supportive banking environment
- MC20 : Is sensitive in implementing executive decisions
- MC21 : Is effective in handling industrial relations in the branch
- MC22 : Provokes thoughtful reactions to important issues
- MC23 : Counsels staff on full utilisation of personal potential
- MC24 : Fosters a non-discriminatory work environment
- MC25 : Recognises and acknowledges good work of staff
- MC26 : Manages the branch relying on goals and values shared with staff

MC27 : Fosters a high level of trust among staff

MC28 : Informs staff of organisational plans and programs that impact their work lives

MC29 : Encourages input from staff on organisational plans and programs

MC30 : Conveys staff's concerns to higher management

MC31 : Delegates decision-making authority

MC32 : Has interpersonal sensitivity

MC33 : Listens

MC34 : Can communicate in writing for two-way understanding

MC35 : Can communicate orally for two-way understanding

MC36 : Generates ideas for use at appropriate time

MC37 : Exercises common sense in decision-making and problem-solving

MC38 : Marshals relevant arguments for decision-making negotiations

MC39 : Focuses on central issues

MC40 : Discards preconceived ideas when made aware

MC41 : Responds positively to pressures

MC42 : Maintains a sense of humour

MC43 : Remains stable in pressure situations

MC44 : Has knowledge of banking culture: its norms, values, attitudes, customs and language

MC45 : Has knowledge of banking procedures: work flows, systems processing, and technicalities

MISTAKE : Ability of branch staff to put a mistake right

MORSTAFF : Number of competitors within 200 metres
employing more staff than the branch

NEATNESS : Neat appearance of branch staff

NEWDEPO# : Total number of new deposit accounts

NEWLEND# : Total number of new lending accounts

OUTORDER : (use of) Out of Order Report

PERCLINE : (number of new) Personal Credit Lines

PERLOAN : (number of new) Personal Loans

POLITE : Politeness of branch staff

POP : Number of persons aged 15 years or more

POPGR : Growth rate in the 15 years or more age group
between 1986-1991

PROMPT : Promptness of service from branch staff

PUBTRANS : Proximity to public transportation (1 km or
less)

REFER : (use of) Reference Report

REGSHOP : Location at a regional shopping centre

RESILOAN : (number of new) Residential Property Investment
Loans

SBEST# : Number of small business establishments

SBUSLOAN : (number of new) Small Business Loans

SECURITY : Feeling of security in dealings with the branch
staff

SERVWHEN : Branch staff telling the customer when services
will be performed

STAFFNUM : Number of staff behind the counter serving
customers

STREAM : (number of new) Streamline Accounts

STREAMDR : (number of new) Streamline Debit Balances

TELLERS : Number of open tellers during the busy hours of
the day

TELLWIN# : Number of teller windows

TOTCOMP# : Total number of competitor branches in the
branch's catchment area outside a 200 metre
radius

DEFINITIONS OF KEY TERMS

Benchmarking: "A continuous systematic process for comparing the work processes and key performance factors of organisations that are recognised as representing best practices, for the purpose of meeting or surpassing overall industry best practices" (Spendolini 1992, p.10).

Branch: The physical business unit required to deliver the multiple retail products and services.

Branch Performance: The contribution of the branch to achieving the bank's financial and marketing objectives as manifested in the performance outcomes identified in this study.

Branch Potential: The capacity of the branch to generate retail banking business within its catchment area as defined by the potential variables identified in this study.

Business Drivers: Performance outcomes such as average deposit balance, number of new deposit accounts, average lending balance, number of new lending accounts, referrals, and fee income are identified by Para Bank's executive management as *business drivers critical to the Bank's success.*

Catchment Area (also known as Service Area or Trading Area): The geographical area around the branch from which at least 80 per cent of the bank's retail business is likely to be drawn.

Construct: An abstract variable (Nunnally 1978); not directly observable; for example, customer service quality, and managerial competence.

Controllable Variables: Those variables deemed within the sphere of influence of bank or branch management, for example, customer service quality.

Cross-Selling: Selling related products from a lead product (Ritter 1991, p.99).

Decision Support System: "An interactive [computer-based] system that provides the user with easy access to decision models and data in order to support semi-structured and unstructured decision-making tasks" (Mann and Watson 1984, p.27).

Non-controllable Variables: Those variables deemed outside the sphere of influence of bank or branch management, for example, average annual family income.

Performance Variables: Performance outcomes recorded at branch level such as deposit and lending balances, number of new deposit and lending accounts, number of new referrals, and fee income.

Potential Variables: Demographic, socio-economic, and branch-specific variables identified in this study that are theorised to explain the performance variables. For example, population numbers, age, family income, customer service quality, and managerial competence.

Prudential Supervision: "A Reserve Bank policy which seeks to establish a set of standards within which banks should operate for the protection of depositors" (Australian Bankers' Association 1990, p.81).

Triangulation: For the purposes of this study, triangulation is defined as the use of multiple data collection methods within the same measure; for example, collecting responses on the same questionnaire through mail, telephone, and face-to-face interviews.

Unrealised Branch Performance: The difference between overall branch potential and overall branch performance.

CHAPTER ONE

THE STUDY AND ITS SETTING

1.1 THE RESEARCH PROBLEM

There is a dearth of integrated bank branch performance analyses that use an interdisciplinary and multivariate perspective. Existing methodologies are dominated by accounting and financial measures that inherently generate information of a retrospective nature, and can result in misleading assessment of a branch's economic viability, or lead to misguided planning decisions in reconfiguring a branch. As a result, resources are applied ineffectively with undesirable financial and organisational consequences.

Branch performance analysis has been implemented commonly through budgeting, measuring total deposits, and branch profits; the latter two measures generate retrospective information which cannot be used to gauge the potential of a branch to generate retail banking business. Budgeting is criticised for placing too much emphasis on items that are outside the management's sphere of influence, and focusing on expense items rather than overall profitability (Smith III and

Schweikart 1992). On the other hand, measurement of total deposits is criticised on such issues as equal treatment of different types of deposits and ignoring revenues from loans (Chelst, Schultz, and Sanghvi 1988). Furthermore, the use of branch profits, which is an aggregate number, as a measure of branch performance, lacks information on specific factors affecting performance and once again, some of these factors may be beyond a branch management's control (Doyle, Fenwick, and Savage 1979). Equally important, the calculation of branch profits is based on an arbitrary allocation of revenues, and does not allow for varying branch roles (Davenport and Sherman 1987). Therefore, in an effort to improve the quality of decision-making regarding restructuring of branches, a new definition of branch performance is needed that overcomes the shortcomings of accounting measures, and emphasises variables that are controllable by management.

1.2 THE PURPOSE OF THE STUDY

The purpose of this study is to generate an integrated analysis of bank branch performance and potential. The aim is to distinguish between the performance of different branches rather than design an all-encompassing bank branch performance model. In particular, the focus is upon those potential variables controllable by management that can assist in reconfiguring, that is, varying the resources employed at a branch for the purpose of improving performance, or downsizing

(that is, scaling down of a branch's operations). The study develops models capable of evolving with the business organisation, with applications to decision-making expanded as follows:

- a. **Classificatory:** Branches can be classified on their performance, for example, as high performers, medium performers, and low performers. More importantly, categorisation of similarly performing branches into groups can provide a focus for management when deciding how to raise the performance of a particular branch. For example, if the discriminant model to emerge from this study classifies a branch as a low performer, attention to the predictors profiling the medium performers would allow the low performing branch to raise its performance.
- b. **Diagnostic:** Should a branch be reconfigured or discontinued based on a comparison of current performance against branch potential? For example, a low performing branch may also be located in a low potential area, in which case the branch would be a candidate for closure. Similarly, a low performing branch located in a high potential area would benefit from reconfiguring. Assessment of unrealised performance helps address such questions.
- c. **Prescriptive:** If a decision is made to reconfigure a branch, what should be the treatment of controllable potential variables to raise performance? On a more speculative level, in the absence of actual data on

variables, the model would allow bank management to integrate their assessments and generate multiple scenarios, that is, what-if analyses. For example, in the case of planning for a new branch, potential variables can be treated as the independent variables in multiple regression analysis, whereas the predicted dependent variable can be overall performance or any one of the individual performance variables explored in this study. In this way, management can model the overall performance of a branch, by designating values of potential variables.

Since accounting ratios rely upon historical data generated within the organisation, they usually serve little more than as comparison yardsticks. On the other hand, the proposed integration of potential and performance analysis introduces the anticipation element, a crucial function in the management process. Thus, the emphasis in this study is more on information which is prospective to management, rather than retrospective.

The uniqueness of the study lies in its focus on multivariate, interdisciplinary measures defining potential variables controllable by management, and measures of performance outcomes emphasising business drivers critical to the bank's success. A list of the *key research objectives* in this study follows:

- a. Determine the sets of potential variables explaining each of the theorised performance variables;
- b. Develop a measure of overall branch performance;
- c. Develop a measure of overall branch potential; and
- d. Develop a predictive model for classifying and profiling branches.

1.3 THE IMPORTANCE OF THE STUDY

Since the deregulation of the Australian banking industry in 1983, Australian trading banks with branch networks have been forced into greater competition with one other, the newcomers from overseas, the building societies, and a growing array of providers of similar products and services. As banks come to terms with free market conditions, rationalisation of the banking industry is taking place. In a low-growth population, maturing markets will lead to fiercer competition. Similarly, the increased scrutiny of the industry by the Federal government, for example, the Martin Inquiry, has put more pressure on the banks in terms of profitability, effectiveness of competition, product innovation, and information to users (Australian Bankers' Association 1990). As the events of the last few years show, those organisations unable to compete and not oriented toward rapid change, will either become easy targets for takeovers or find themselves in financial difficulties.

It is no longer adequate to have an instinctive feeling for the banking industry. Scientific methods will be employed increasingly in discovering and maintaining a competitive edge between banks. Rationalisation of the existing branch networks is a reflection of each bank's efforts to achieve competitiveness, a process that has also been assisted by technological developments. In the case of mergers and takeovers, it is possible to realise considerable cost savings by either reconfiguring, or closing down non-performing branches, while providing a larger number of branches to bank at, for the combined customers of both banks.¹ The time is now ripe for banks to take a closer look at the performance of their branches, including product and customer foci. An example of the importance of branch performance analysis can be seen in the Federal Government's current pressure to limit approval of home loans in an effort to regulate economic growth and inflationary pressures, which could force some banks to undertake further cost cutting or to consider mergers.²

Views expressed about the future of the Australian banking industry are supported by the findings of a Delphi study focusing on the period 1987-97, which concluded:

...industry is expected to undergo further concentration...total market size is insufficient for

¹ As indicated by Bowen, "...benefits of in-market consolidation should be at least a 25% cost savings and possibly as much as 75% cost savings, as measured by the reduction of the acquiree's non-interest expenses" (Bowen 1990, p.18).

² Reserve Bank of Australia has recently allowed the retention of bank brand names after a takeover. This change effectively minimises the potential loss of market share following a takeover or merger due to existing customers migrating to competitors.

the aspirations of all the present participants...Any new entrants, however, are expected to be balanced by rationalisation among present participants... (Elliott 1990, pp.31-32)

For example, some of the questions now posed by most Australian banks as part of branch network rationalisation are whether the existing branches should be reconfigured, and if so, how? As stated in section 1.2 above, this study proposes to assist such decision-making by providing an analysis of individual branch performance that distinguishes between current branch performance and branch potential, while introducing product and customer foci into the analysis. An equally important outcome of the research process would be the bank management becoming more aware of the issues highlighted in the model (hereafter referred to as *the Model*).³ It should be noted that the Model could be used in an on-going manner to analyse the performance of a branch, regardless of the prevailing economic and regulatory circumstances in the industry.

The study can also be envisaged as addressing directly some of the retail and competitive strategies of Para Bank⁴ (as identified in internal publications). For example, the *customer service quality* construct can generate data that could be used to improve customer service as well as segment and

³ This less tangible benefit of the study was openly acknowledged by the General Manager of Para Bank as being one of the major attractions of the project. However, the objectives of the study do not extend to measuring changes in this awareness.

⁴ The pseudonym Para Bank was coined to preserve confidentiality of the major trading bank providing the data for analysis in this study.

develop the customer base, both of which are listed as retail strategies by Para Bank. The *managerial competence of the branch manager* construct can provide insights into how to improve the system of management, another retail strategy. This particular retail strategy can be further scrutinised by such concepts as the *use of the decision support system*, and the *effective practice of benchmarking*. The actual process of the study, that is, exploring how the required data can be generated, can have an immediate influence on Para Bank's competitive strategies such as effective communications and management skills and process. However, it should be noted that the retail and competitive strategies of improving the customer service, segmenting and developing the customer base, improving the system of management, and effective communications are *not* unique to Para Bank, and are ongoing strategies in the ever competitive banking industry of the 1990s.

1.4 THE SCOPE OF THE STUDY

The scope of the study is limited to the personal banking activities of Para Bank in the States of Victoria and Tasmania in order to enhance manageability of the research project (by definition, business and corporate banking activities are omitted). The scope of the study is also guided by the decision to select an efficient number of key potential and performance variables that make up the Model.

The analysis is intended to assist short to medium-term strategic decision-making regarding individual bank branches, with limited emphasis on measuring the overall performance of a branch network. Decisions on the optimal size of a branch network are considered to be outside the main focus of the study. A quantitative analysis of branch network expansion or contraction is provided by Chitariance (1983). Similarly, the scope of dimensions comprising variables is limited to those that will distinguish between branches.

It should also be emphasised that analysis of product profitability is not attempted because pricing and product design decisions are made by the Head Office, and hence, are constants in the overall equation of branch performance.⁵

1.5 OUTLINE OF THE STUDY

Chapter Two, The Review of the Related Literature, begins with a survey of conceptual frameworks and measures employed in the assessment of overall bank performance. The principle of wealth maximisation is introduced and converged with risk/return frameworks on overall bank performance. Key financial ratios are outlined next, followed by a detailed review of the literature on *branch* performance measurement.

⁵ Deposits are pooled to respond to market needs in funding loans (Australian Bankers' Association 1990, p.25). Hence, centralised asset/liability management removes the responsibility for interest rate risk from the branch level.

The section on branch performance measurement is subdivided into management accounting, key success factors, and econometric models.

Chapter Three, The Proposed Model of Branch Performance, starts with an overall conceptual framework for evaluating branch performance, followed by the shortcomings of existing performance measures as evidenced in the related literature. Disadvantages of using accounting ratios in isolation as indices of branch performance are also discussed. The proposed Model of branch performance measurement is presented by detailing the selection of potential and performance variables, followed by a discussion of the key research objectives in the study. The Chapter concludes with examples of applications of the proposed Model in managerial decision-making.

Chapter Four, The Research Design, discusses the blueprint for developing the Model proposed in the previous Chapter. It begins with a mathematical determination of the sample size, and continues to identify the arguments for homogeneity of the target population. After an overview of the sources of data, the overall methodology, and use of the main quantitative techniques are outlined. This is followed by an explanation of catchment area delineation required for data collection. A detailed section deals with problems associated with mailed questionnaires, including acceptable response rates and testing for bias. Theories behind instrument reliability and validity are also introduced as part of the background to various tests

to follow in Chapter Five. The final section in Chapter Four provides an introduction to the theories of the main quantitative techniques used in the study, such as coefficient alpha, factor analysis, multiple linear regression analysis, and discriminant analysis.

Chapter Five, Scaling the Model Variables, starts with a detailed account of development of the *customer service quality* instrument, one of the key controllable potential variables in the Model. This is followed by development of the *managerial competence* instrument, another key controllable potential variable. Other variables scaled in Chapter Five are *effective practice of benchmarking*, *use of the decision support system*, *profitable product concentration*, *strategic product concentration*, *tangible convenience*, *presence of competitors*, and *cross-selling*. The instruments developed in Chapter Five lay the foundations for collecting data and testing the proposed Model which is presented in Chapter Six.

Chapter Six, Testing the Model, begins with a pilot study of the Model in one of the branches in the target population. This is followed by the main testing of the Model across 137 branches. Data collected are then taken through multiple regression analysis, in the process developing measures of overall branch performance and overall branch potential. Discriminant analysis of the data produces classification functions and generates profiles of low, medium, and high performing branches. External validity of the *customer service*

quality and *managerial competence* instruments are revisited in light of the fresh data collected in the main testing stage of the study.

Chapter Seven, The Conclusion, consolidates the major findings and discusses the Model's principal applications. This is followed by indicating limitations of the Model and suggestions of avenues for future research.

CHAPTER TWO

THE REVIEW OF THE RELATED LITERATURE

2.1 INTRODUCTION

The review of the related literature begins with a survey of well-established conceptual frameworks for measurement of overall bank performance. One of the objectives central to operations of most corporate businesses is the principle of maximising shareholders' wealth, and this principle is explained in the context of banking as being the ultimate measure of overall bank performance. Having laid this broad foundation for the discussion of overall bank performance, its components such as risk and return, and the accompanying financial ratios are introduced. Next, the literature survey focuses on branch performance, which is conceptually subsumed to bank performance. Various attempts at measuring branch performance are categorised under *management accounting*, a discipline focusing on internal reporting of accounting information that helps managerial decision makers. Others are categorised under econometric models that employ multiple regression analysis. Examples of multiple regression analysis cover an assortment of independent variables including catchment area population, demographics, household income, car

parking facilities, branch features, and competition. Examples of dependent variables (that is, measures of performance) include turnover, net savings gain, number of personal current accounts, and deposit levels.

2.2 OVERALL BANK PERFORMANCE MEASUREMENT

In its widest sense, a firm's performance objective can be interpreted as maximising the value of its shareholders' investments at sustainable levels; thus, in the long term, the ultimate measure of overall bank performance must be the market price of its ordinary shares (Gup, Fraser, and Kolari 1989). Hence, the concept of wealth maximisation is reviewed first.

2.2.1 FRAMEWORKS ON MAXIMISING SHAREHOLDERS' WEALTH

Literature on financial management invariably cite the primary objective of corporate decision-making as *maximising the market value of the firm to its shareholders* (Aragon 1989; Bruce et al. 1991; Van Horne and Wachowicz 1995; Weston and Copeland 1992; Bishop et al. 1993; Peirson et al. 1995). Furthermore, the concept of maximising the equity value is not confined to academe. It is almost religiously quoted by chairpersons and managing directors in annual reports. In Kookien's words, "Increasing shareholder value has become the explicit goal of

senior management..." (Koonen 1989, p.15). It is essentially an acknowledgment of management's accountability to shareholders, where agency costs can be minimised, and scarce resources allocated efficiently and effectively.

Hempel and Yawitz who have addressed the principle of equity value maximisation in the context of financial institutions, start off from the premise that "Wealth maximisation is the maximisation of the discounted cash benefits to shareholders" (Hempel and Yawitz 1977, p.20). They then proceed to identify the key variables in cash benefits as *gross receipts from assets, cost of liabilities, overhead costs, taxes, and appropriate risk premium* to be added onto the risk-free interest rate; managerial decisions are expected to be examined for the different ways they may interact with these key variables.

While emphasising the need to remember the principle of maximising shareholders' wealth in all decisions, Hempel and Yawitz (1977) also underscore the need for focusing this principle for the benefit of day-to-day decision-making. With the latter need in mind, they produce four categories of key variables influencing the equity value, namely, spread management, control of overhead, liquidity management, and capital management. These categories are briefly explained next with the help of Hempel and Yawitz (1977) and De Lucia et al. (1987).

Spread management refers to management of the difference between gross revenues and interest expenses. Although it is possible to realise high spreads in the short-run by mixing short-term liabilities with long-term assets, a more desirable state of affairs is to sustain a high positive spread over time within prudential supervision.

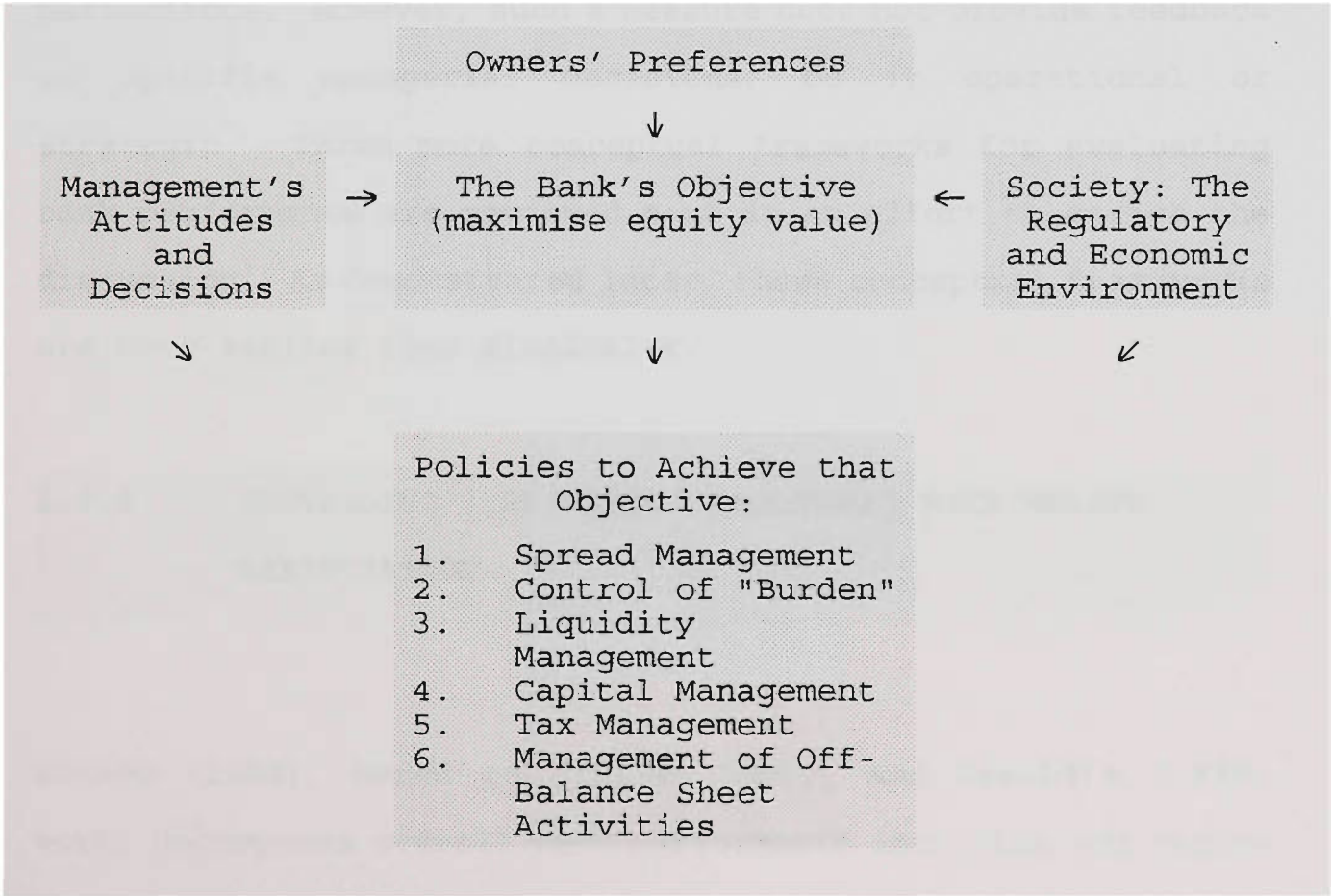
Control of overhead costs or non-interest expenses deals with the ability of the bank to hold down such expenses while maintaining a high spread. High gross spreads may not always translate into high net spreads if investment decisions are not closely scrutinised for their impact on non-interest expenses.

Liquidity management demands the presence of short-term assets that can be quickly converted to cash to meet unexpected deposit withdrawals or funding needs, and liquidity requirements of the Reserve Bank. Interest rates and monetary growth within the economy have to be monitored as part of this process. The bank management will attempt to hold enough short-term assets to meet anticipated liquidity requirements, without unnecessarily lowering the profit performance due to the generally lower yields associated with such assets.

Capital management refers to balancing the level of capital in such a manner that growth of assets and liabilities is sustainable without eroding public confidence or profitability.

Sinkey (1992) uses Hempel and Yawitz's (1977) framework discussed above to arrive at a similar conceptual framework (see Figure 2.1). The bank's primary objective of maximising shareholders' wealth is depicted as being shaped by owners' preferences, management's attitudes and decisions, and society; also listed are six policy strategies to achieve that objective. These policies are, in turn, influenced by management's attitudes and decisions, the regulatory and economic environment, and the objective of maximising equity value. The success of these policy strategies depends on the riskiness of a bank's balance sheet, that is, the nature of assets and the concentration of loan portfolios (Sinkey 1992).

Figure 2.1: Implementation of the Value-Maximisation Principle (Source: Sinkey 1992, p.70)



The first four policies listed in Figure 2.1 have already been outlined as part of Hempel and Yawitz' (1977) framework. The term *control of burden* places overhead costs in the context of non-interest income (that is, fee income), where *burden* is defined as the difference between non-interest income and non-interest expenses. Tax management refers to reducing taxable income, whereas management of off-balance sheet activities (such as letters of credit, lines of credit, and loan commitments) serve to increase fee income and thus, reduce the *burden*.⁶

As indicated earlier, the market price of ordinary shares can be regarded as the ultimate measure of overall bank performance. However, such a measure does not provide feedback on specific managerial decisions, be it operational or strategic. Three more conceptual frameworks for evaluating bank performance are reviewed next in an effort to enrich the discussion. As demonstrated later, these conceptual frameworks are more similar than dissimilar.

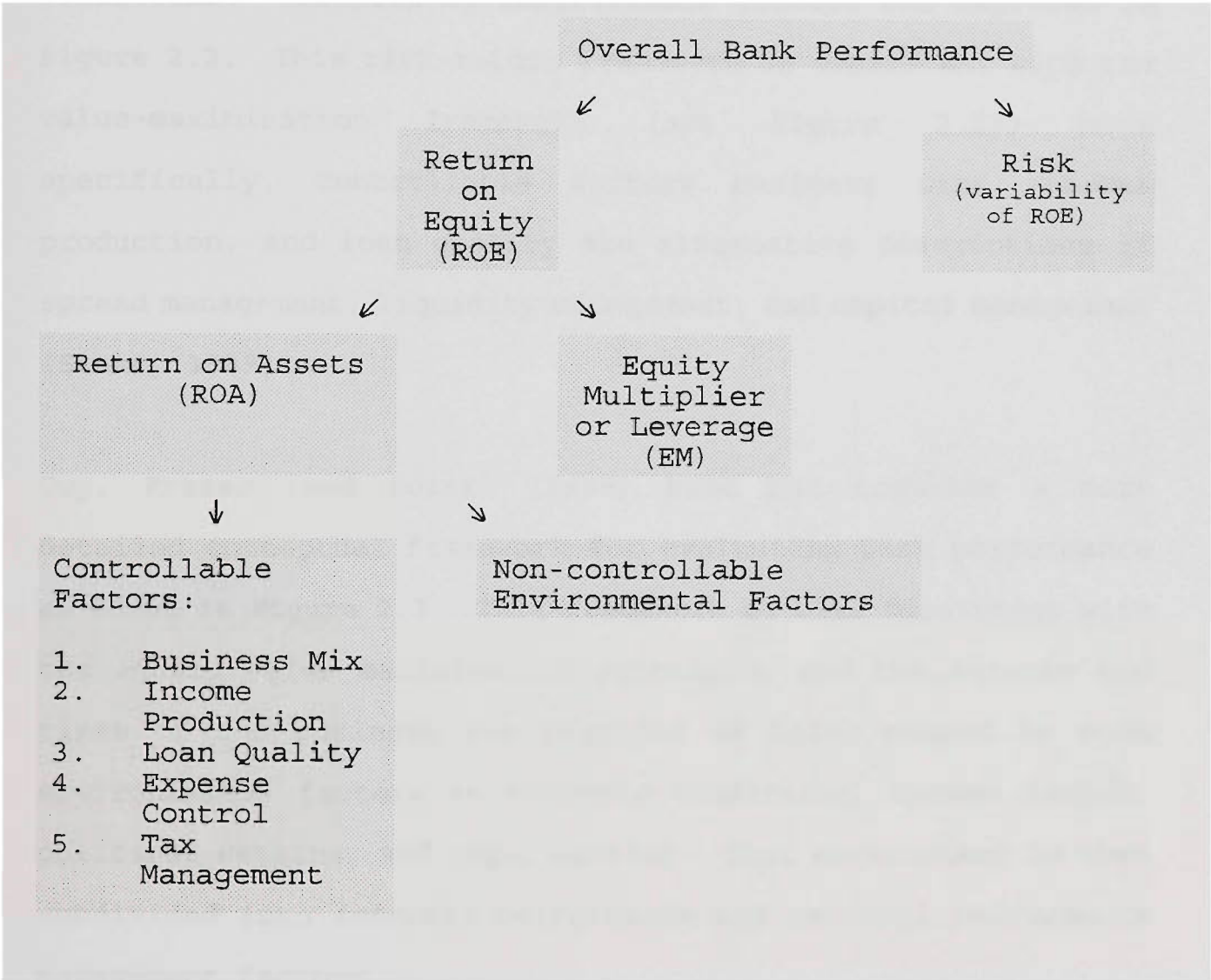
2.2.2 CONVERGING RISK/RETURN FRAMEWORKS WITH WEALTH MAXIMISATION

Sinkey (1992), based on Gillis, Lumry, and Oswald's (1980) work, decomposes overall bank performance into risk and return

⁶ Burden is normally a negative number since non-interest expenses tend to exceed non-interest income.

(see Figure 2.2). Return is measured by the financial ratio *return on equity* (ROE), which is defined as net income divided by average equity, and risk is measured by variability of ROE.⁷

Figure 2.2: Overall Bank Performance: A Risk-Return Framework (Source: Sinkey 1992, p.269)



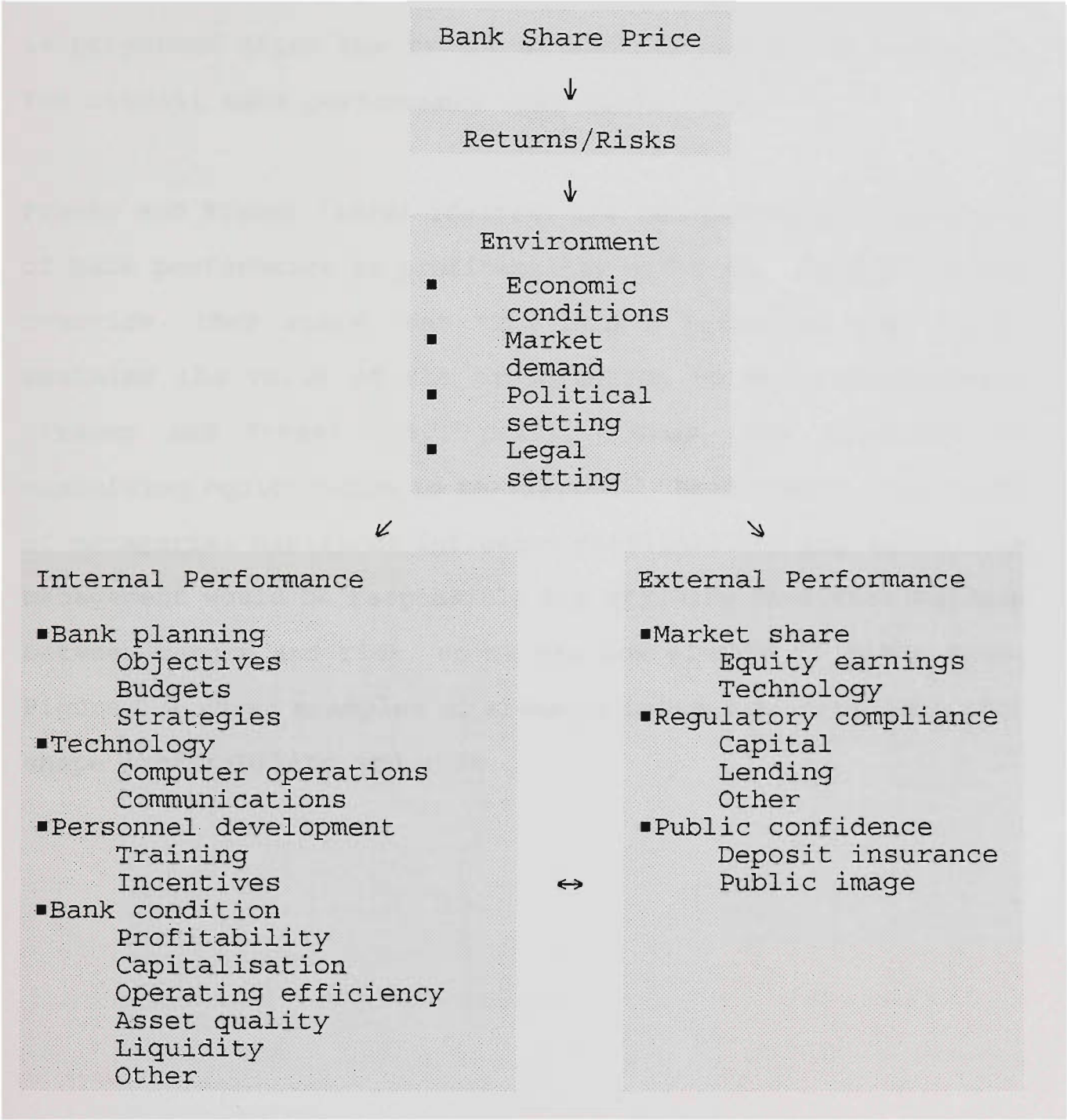
ROE is decomposed into equity multiplier (EM = ratio of average assets to average equity), and return on assets (ROA = ratio of net income to average assets); EM, measuring capitalisation, can also be interpreted as a measure of a bank's potential risk

⁷ Variability of ROE can be computed through variance or standard deviation of ROE. Variability of ROE can, in turn, be traced to different types of risks of doing business such as portfolio risk, regulatory risk, technological risk, and so on (Sinkey 1992).

exposure. ROA is further decomposed into controllable factors, and non-controllable environmental factors. Examples of non-controllable factors are inflation, regulatory constraints, and availability of close substitutes, that is, supply and demand conditions. Examples of controllable factors are depicted in Figure 2.2. This risk-return framework is consistent with the value-maximisation framework (see Figure 2.1); more specifically, controllable factors business risk, income production, and loan quality are alternative descriptions of spread management, liquidity management, and capital management (Sinkey 1989).

Gup, Fraser, and Kolari (1989) have put together a more detailed conceptual framework for evaluating bank performance as shown in Figure 2.3. This framework is also consistent with the equity value maximisation principle, and the returns and risks of the business are regarded as being shaped by such environmental factors as economic conditions, market demand, political setting, and legal setting. This environment is then subdivided into *internal performance* and *external performance* management factors.

Figure 2.3: **A Framework for Evaluating Bank Performance**
 (Source: Gup, Fraser, and Kolari 1989, p.51)



The task of management is to allocate scarce resources to these interrelated factors in order to maximise the value of equity. Internal management factors are those controllable by the bank whereas, external management factors fall outside the bank's direct control. Actual performance analysis is carried out by such financial ratios as ROE and ROA on profitability, EM on

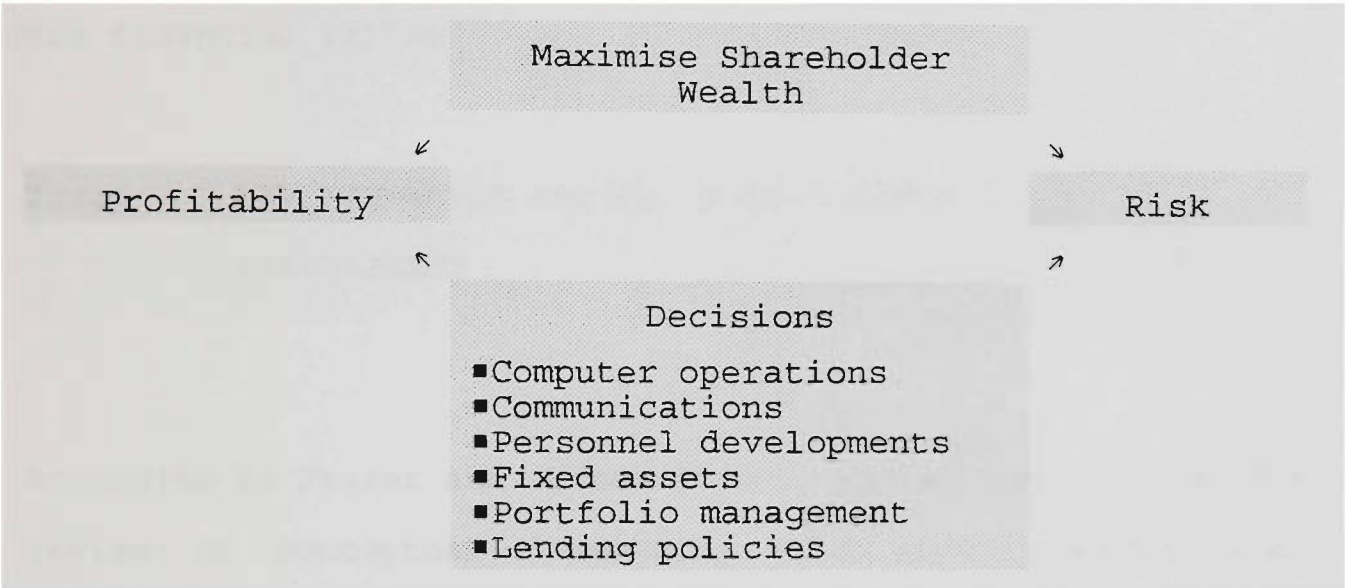
capitalisation, loss rate and loan risk on asset quality, and so on. A selection of the most commonly used financial ratios is presented after the review of another conceptual framework for overall bank performance (see Table 2.1).

Fraser and Fraser (1990) identify the two principal dimensions of bank performance as profitability and risk. As part of the overview, they state that "The bank's principal goal is to maximise the value of the organisation to its shareholders" (Fraser and Fraser 1990, p.29). Thus, the principle of maximising equity value is re-visited.⁸ Practically, all kinds of managerial decisions influence profitability and risk. The management would be responsible for striking that fine balance between return and risk, no matter how elusive it might seem. Figure 2.4 shows examples of areas of managerial decisions that shape profitability and risk.

⁸

However, if the bank does not have publicly traded shares, then the management will have to focus on measures of profitability and risk; there is often a trade-off between return and risk.

Figure 2.4: Profitability and Risk As Dimensions of Bank Performance (Source: Fraser and Fraser 1990, p.32)



In the remainder of their discussion on dimensions of bank performance, Fraser and Fraser (1990) examine financial statements in an effort to analyse profitability and risk; main ratios reviewed are ROE, ROA, leverage multiplier (also known as equity multiplier), interest sensitivity ratios, liquidity ratios, and the equity capital ratio (the reciprocal of equity multiplier).

It is not difficult to see that the various conceptual frameworks for evaluating overall bank performance are similar. While Sinkey (1992) and Gup, Fraser, and Kolari (1989) clearly distinguish between controllable and non-controllable factors, Fraser and Fraser (1990) focus on those factors controllable by bank management. Similarly, while Gup, Fraser, and Kolari (1989), and Fraser and Fraser (1990) use terms like computer operations, communications, personnel development, these are also inherently part of Sinkey's income production and expense control factors. Whatever the author's choice of terms, they

are the factors that determine return and risk. Furthermore, the specific measures applied to different factors in all cases are financial ratios.

2.2.3 KEY FINANCIAL RATIOS IN BANK PERFORMANCE MEASUREMENT

According to Fraser and Fraser (1990), and as indicated by the review of conceptual frameworks, the most commonly used financial ratios are those of ROE and ROA. The link between ROE and ROA is the equity multiplier as shown below:

$$\text{ROA (Net Income / Average Assets)} \times \text{EM (Average Assets / Average Equity)} = \text{ROE (Net Income / Average Equity)}$$

In essence, ROA is a measure of bank's profitability, EM is a measure of risk, and ROE is a summary measure of bank performance. According to Sinkey, "The best measures of a firm's overall performance are the profitability ratios ROE and ROA" (Sinkey 1983, p.201). Although the words *performance* and *profitability* are sometimes used interchangeably as above, profitability ratios can be separated from risk ratios; in turn, profitability and risk are represented together under *overall performance*. Table 2.1 reviews key financial ratios on profitability, risk, and overall performance.

Table 2.1: Key Financial Ratios in Bank Performance Analysis (Source: Fraser and Fraser 1990, pp.91-100)

PROFITABILITY RATIOS	RISK RATIOS
Net income / average assets (ROA)	Overall Risk
Net interest income / average assets	Primary capital / adjusted average assets
Non-interest income / average assets	Growth rate of assets
Overhead expense / average assets	Growth rate of primary capital
Provision of loan and lease losses / average assets	Cash dividends / net operating income
Net securities gains or losses / average assets	Credit Risk
Net extraordinary items / average assets	Net loss / total loans and leases
Applicable income taxes / average assets	Earnings coverage of net loss
Interest income / average assets	Loss reserve / net loss
Interest expense / average assets	Loss reserve / total loans and leases
Interest income / average earning assets	Percent non-current loans and leases
Interest expense / average earning assets	Provision loan loss / average assets
Personnel expense / average assets	Liquidity
Occupancy expense / average assets	Temporary investments / volatile liabilities
Other operating expense / average assets	Volatile liability dependence
	Loans and leases / assets
	Interest Rate
	Gap
	Fraud Risk
	Officer, shareholder loans / asset
SUMMARY RATIO (overall performance)	
Net income / average equity (ROE)	

2.3 BRANCH PERFORMANCE MEASUREMENT

Thygeson stated that "...little academic research has been done on the subject of branch profitability [performance]" (Thygeson 1991, p.19). This statement still holds today. Existing literature on branch performance is dominated by reports of practitioners in the field or consultants, and the common denominator of these reports is *management accounting*. On the other hand, academic research is generally characterised by the development of *econometric models*, comprised of the multiple regression studies also reviewed in this section.

It should be noted that some authors use the terms *performance* and *profitability* interchangeably, ignoring the multi-faceted nature of performance, whereas profitability is usually an accounting measure. In reviewing each author's work, original terms are used. Actual measures of branch profitability are included in the review as a subset of branch performance.

It would also be advisable to offer a short clarification on use of the words *performance* and *potential*. Referring back to the definitions of key terms at the beginning of the thesis, the general definition of branch potential was offered as:

The capacity of the branch to generate retail banking business within its catchment area.

Under this definition, it is possible to regard branch potential as a measure of *normative performance*; that is,

potential is an indication of what a branch's performance *should be*, given the socio-economic and market conditions in its catchment area, and branch-specific variables such as the staff numbers, the customer service quality, and the managerial competence of the branch manager. Hence, the review also focuses on various existing measures of branch potential as part of branch performance measurement. Most often, depending on its application in decision-making, an econometric model can be interpreted as a *performance* or a *potential* model.

2.3.1 THE MANAGEMENT ACCOUNTING APPROACH

A management accounting approach to branch profitability reported by Pisa (1981) begins by acknowledging the shortcomings of traditional measures, such as questions on allocating expenses and revenues. The perspective promoted is that the ultimate source of profits is the customer and that customer profitability should be managed. The first step is assigning customers to responsibility centres, followed by allocation of the customers' accounts to the relevant centres. Next, the profitability of the service role of the branch is determined by examining the cost of transactions. Under the approach reported by Pisa, charges traditionally allocated to the branch from data processing and account services are discontinued; instead, each customer transaction is charged a standard amount. In summary, Pisa defines customer profitability as the difference between the fee paid by a

customer for a service and the average delivery cost of that service. Similarly, a branch's service role is defined as the difference between the actual delivery cost of a service and its average delivery costs across all the branches.

In Thygerson's (1991) work on modelling branch profitability, the branch is regarded as fulfilling the primary role of distributing financial products and services. The profit and loss statement model for the branch is explained as follows:

$$\begin{aligned} \text{Total Branch Profits (TBP)} = & \\ & \text{Branch Servicing Income (BSI)} \\ + & \text{Branch Origination Income (BOI)} \\ + & \text{Branch Fee and Commission Income (BFC)} \\ - & \text{Branch Total Costs (BTC)} \end{aligned}$$

where

BSI = Fees received in return for services performed for other business units of the bank.

BOI = Commissions and processing fees earned in selling bank's assets, plus the present value of interest savings, defined as the difference between the interest rates on the alternative sources and the interest costs of deposits.

BTC = Direct costs of running the branch allocated on a per account or per employee basis.

Thygerson assumes BSI to be non-existent for most branches, and thus, it is not included in his numeric example. The format of the profit and loss statement provided by Thygerson is reproduced in Table 2.2 below:

Table 2.2: Income Statement for Hypothetical Branch (TBP)
(Source: Thygerson 1991, p.23)

Income:		
Deposit Origination (BOI)		\$88,886
Fee Income (BFC)		4,416
Total Income		93,302
Costs:		
Direct and Interest (BTC)		72,249
Income or (Loss)	(TBP)	\$21,053

Another management accounting approach proposes the use of contribution reporting (Smith III and Schweikart 1992). The essence of this approach is to measure that part of branch profits under branch control. This requires determination of direct revenues and direct expenses. Under contribution reporting, expenses that cannot be traced to the branch are not allocated. An increase in branch lending and fee income are claimed to be the immediate impacts of implementing contribution reporting. A principal source of revenue is identified as excess funds sent by the branch to its home office. This gives rise to the question of transfer pricing, that is, what should the branch charge for funds passed on to

other departments? The compromise proposed by Smith III and Schweikart (1992) is transfer pricing excess funds at the average cost of short-term and long-term funds raised by the branch, plus one percent. The expectation is that this practice will encourage branches to increase their local lending rather than simply contribute to the bank's pooled funds.⁹ The downside is that it is possible for branches to lend beyond the limits imposed by reserve requirements. Although this would not pose a problem when only a few branches are concerned, over-lending by the majority of branches would be undesirable. To prevent this situation arising, excess credit income from transfer pricing should increase when lending approaches the dollar deposit base of the branch.

Use of average cost of funds could hide the business mix of a particular branch, detracting from a proper evaluation of the branch's strategic position in the network. According to Smith III and Schweikart (1992), it is therefore, advisable to employ the individual branch cost of funds in assessing branch performance. On the other hand, marketing expenses are not allocated since it is difficult to trace their benefits to a branch and since such decisions are normally made by executive management.

⁹ However, some branches, for example, those in established areas with older customers, will have a natural bias towards liabilities, whereas, branches in growth areas or non-residential areas can be expected to be asset driven. In practice, asset/liability management is centrally controlled.

Other similar examples of the management accounting approach can be found in reports by Hook (1978), Bupp (1981), and Hansen (1990).

2.3.2 IDENTIFYING KEY SUCCESS FACTORS

An important non-management accounting study by McDonell and Rubin (1991) presents a methodology for organising a branch performance measurement system. The process of setting up a branch performance system begins with identifying the key corporate success factors. The branch functions are then examined for those activities that particularly influence these key factors and measurable components determined. At this stage, standards are established and summary reports generated. It is also essential to decide upon methods that will assist in monitoring these measures over time. Finally, methods of communicating performance measurements and rewarding performance have to be determined. Four typical *critical success factors* are identified. They are:

- Service delivery and quality
- Sales (growth of quality loans and deposits)
- Expense control (productivity)
- Loss control (risk management) (McDonell and Rubin 1991, p.47)

The activities to be measured must be within the sphere of control of the people involved. The principal objective of performance measurement is to align the goals of employees with that of policy makers in the bank (McDonell and Rubin 1991).

2.3.3 THE ECONOMETRIC MODELS

A study by Heald (1972) assesses store performance (defined as a function of turnover) using multiple regression techniques. According to Heald, such techniques have been applied to various retail stores including supermarkets and building society branches. The process begins by determining the retail outlet's catchment area. The next step is the collection of relevant data on all variables that could contribute to performance. These variables are usually categorised into three groups, namely, internal, external, and demographic; three examples are supervisor's ability, car parking facilities, and population, respectively. Stepwise regression is used to reduce the number of variables.

The typical results from a study of 53 variables across 70 stores are reported in Table 2.3, where the turnover is multiplied by 1,000. According to Heald, the aim is to arrive at a final regression equation that has a high coefficient of determination, with meaningful factors.

Table 2.3: Typical Regression Coefficients (Source: Heald 1972, p.451)

INDEPENDENT VARIABLE	REGRESSION COEFFICIENT (x000)
Selling Area in ft ²	0.063
Number of Key Traders	10.0
Percentage of Catchment Population Classified as Social Class AB	3.5
Car Parking on scale 0=no parking to 4=excellent	34.0
Competition (number of competitors in vicinity)	-5.0
Catchment Population	0.002
R ² = 0.88	

For example, using the regression coefficients in Table 2.3, it can be seen that each additional 100 square foot of selling area increases turnover by £6,300 per annum; each additional competitor's store decreases turnover by £5,000 per annum; and, each additional 1000 people within the catchment area raises turnover by £2,000 per annum. Some of the other practical conclusions reported are as follows:

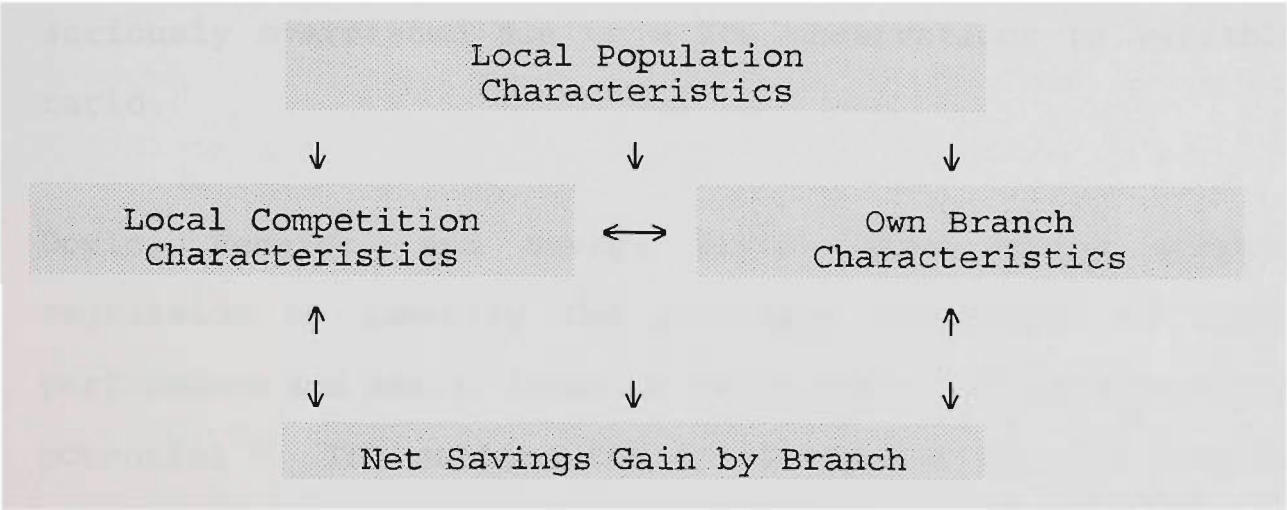
- Good car parking facilities could add as much as 20 percent to the turnover of outlets...
- Turnover is more dependent on the number of selling staff than on the size of the shop...
- Competition within 220 yards from the outlets was identified as the most significant detriment to turnover. (Heald 1972, p.446)

Heald extends the use of multiple regression models on branch performance to an assessment of their potential. For example, contribution of external factors to turnover is used to rank branches. External factors are given as number of key traders, competition, car parking facilities, availability of public

transport, office accommodation, exterior appearance, and rating of site and attitudes to the store.

Another performance study using regression models was by Clawson (1974). The study developed a stepwise regression approach for use by the management of a savings and loan association with a focus on local savings performance measured by net savings gain. Examples of its application include setting performance standards for existing branches, identifying low performing branches as well as high performers, and selecting new branch locations.¹⁰ The conceptual model investigated is reproduced in Figure 2.5.

Figure 2.5: General Correlates of Savings Performance in a Local Retail Financial Market (Source: Clawson 1974, p.9)



Population characteristics include such variables as percentage of renter occupied dwellings in the branch catchment area, income per capita, and percentage of persons aged 45-64 (Clawson offers no explanation for choosing this age range but implies that the second age group of 65 and over was

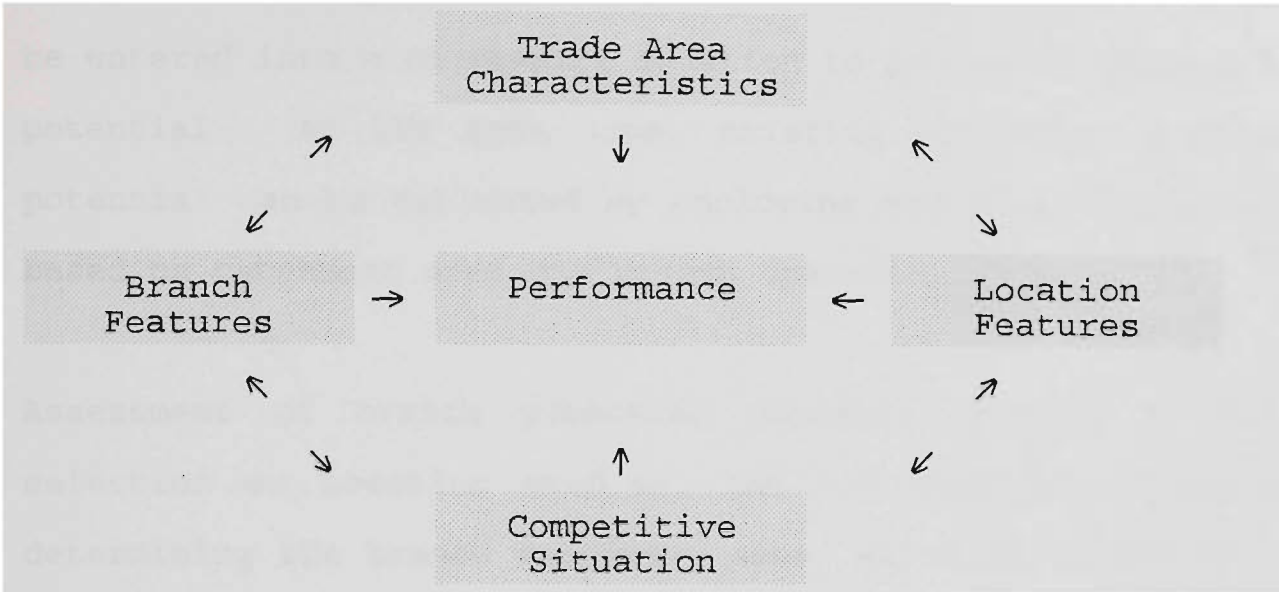
¹⁰ Scrutiny of the regression equation can guide selection of branch sites with potential.

statistically eliminated). Competition characteristics include variables such as number of competing savings and loan facilities, number of commercial bank facilities, and average net savings gain of local savings and loan competitors. Examples of variables comprising the branch characteristics are whether the branch is inside a formal shopping centre, age of branch, and a rating on parking adequacy. After stepwise regression, 10 independent variables remain in the equation with competition variables explaining 52 per cent of the variation in net savings gains, population variables explaining 21.9 per cent, and branch variables explaining 17.6 per cent. However, it should be noted that Clawson's study has been criticised. According to Alpert and Bibb (1974), the coefficients of variation reported by Clawson could well be seriously overstated due to a low *observations to variables* ratio.

Doyle, Fenwick, and Savage (1979) also employ stepwise regression to identify the principal dimensions of branch performance and assist location decisions by determining branch potential.¹¹ The setting for the study was the 180 branches of a regional bank. The conceptual framework followed is represented in Figure 2.6. Once again, the bi-directional nature of arrows indicate sets of interactive variables.

¹¹ Doyle, Fenwick, and Savage published the same study in 1981 in the *Journal of Bank Research* under the new title of "A Model for Evaluating Branch Location and Performance".

Figure 2.6: **Determinants of Branch Performance** (Source: Doyle, Fenwick, and Savage 1979, p.107)



Doyle, Fenwick, and Savage (1979) use the terms *potential* and *performance* interchangeably. Some examples of the independent variables used are percentage of self-employed and population aged over 65 years under the *trade area characteristics*; number of major retailers within x metres under *location features*; number of other financial institutes divided by number of competitive banks under *competitive situation*; and, age of branch under *branch features*. The sample size of 180 branches were split into two equal samples to validate the coefficients of stepwise regression on 13 variables. The methodology followed by Doyle, Fenwick, and Savage (1979) calls for setting up of a number of regression models where the dependent variable (that is, branch performance) is represented by various surrogate measures including the number of personal current accounts, average value of personal current accounts, and new personal loans each year.

Similar to Clawson's (1974) proposal, Doyle, Fenwick, and Savage (1979) suggest that data collected from a new site can be entered into a regression equation to produce a measure of potential. At the same time, existing branches' business potential can be estimated by employing regression equations based on catchment area and branch characteristics.

Assessment of branch potential normally appears in site selection or location studies, and the procedure involves determining the branch catchment area, which is discussed in section 4.5 of the thesis. According to Chelst, Schultz, and Sanghvi (1988) branch potential is estimated usually through demographic data linked to survey data of banking behaviour or internal bank data. Soenen (1974) describes three methods for projecting deposit potential in a given catchment area. The first of these, the *statistical method*, involves determining the relevant variables with regards to bank success and setting up a regression equation. The equation can then be applied to forecasting the deposit levels at a proposed site. The *summary or relative method* requires identification of the average per capita or per family deposits for the larger area the branch catchment area is located in. Deposit potential of the catchment area is then estimated by multiplying the average per capita deposit by the population in the market area. The third method, *analysis of the market by type of deposit*, calls for determining levels for individual deposits, commercial deposits, industrial deposits, and public monies, and summing them up. These deposits can be estimated by a combination of

interviews with local businesses and investigation of financial statements. However, a more structured method is suggested for estimating retail deposit potential as per the American Bankers Association. The following steps outline this method:

- (a) Determine number of families per income level.
- (b) Compute total number of accounts for each income group.
- (c) Multiply (b) times average balances; result equals deposit potential per income level.
- (d) Add to obtain time and demand deposit potential for entire trading area.
- (e) Determine the bank's share of total based on competition. (Soenen 1974, p.220)

Olsen and Lord (1979) hypothesise seven market area characteristics as giving rise to branch performance measured by *average daily consumer chequing account deposits* and *average daily consumer savings account deposits*. These market area characteristics are listed below:

Demand Variables:

Purchasing power [number of households x mean household income]
Employment in area
Retail square footage
Median household income
Percentage of housing units renter occupied

Supply Variables:

External competition [number of branches of other commercial banks]
Internal competition [presence of another branch of the same bank] (Olsen and Lord 1979, p.106)

These variables are determinants of branch business potential. Olsen and Lord (1979) employ stepwise regression to produce two models. The results of this regression analysis are presented in Table 2.4. For example, the greater part of variation in checking account deposits is explained by median household income, followed by retail square footage and external competition in order of declining relative importance. In the

case of external competition, the negative sign of the regression coefficient implies a reduction in checking account deposits as external competition increases.

Table 2.4: **Results of Stepwise Regression on Market Area Characteristics (Source: Olsen and Lord 1979, p.108)**

MODEL	VARIABLES IN THE EQUATION	REGRESSION COEFFICIENTS	CUMULATIVE R ²
Checking Account Deposits	Median household income	1.2706	0.55
	Retail square footage	0.2365	0.72
	External competition	-8.6889	0.77
Savings Account Deposits	Purchasing power	0.0021	0.57
	Employment	0.0375	0.77
	Percent renter	-1.2973	0.81

The business unit in the conceptual frameworks reviewed in section 2.2 was the *bank*. It should be noted that the conceptual frameworks discussed under *overall bank performance* could theoretically be applied to the *branch*. The problem is one of implementing an equitable information system for allocating capital, costs, and revenue in calculating ratios. Practical difficulties aside, Simonson (1989) suggests five subsystems for such an information system, namely, allocation of overhead costs, transfer-pricing of funds, allocation of equity, market value accounting, and management of interest sensitivity. However, development of this traditional information system is outside the scope of this study.

2.4 CONCLUSION

Review of the related literature reveals that maximising shareholders' wealth and measuring risk/return ratios are the commonly used frameworks for assessing the overall performance of a bank. Nevertheless, these are summary measures, and financial ratios used at the bank level are particularly difficult to generate at the branch level due to problems associated with allocation of indirect variable and fixed costs, including capital, revenues, and expenses. Even if one were to assume the existence of an equitable allocation system, the nature of retrospective financial ratios based on internal historical data means that they are of limited use for strategic decision-making and planning. Ratios are not an effective means of representing the many facets of performance.

A viable alternative to using summary measures like the market value of shares or financial ratios is that of multiple regression models that can predict performance based on a selection of variables, reflecting management's desired focus. For example, if management defines performance as the *fee income* generated in the branch, it can then proceed to investigate the predictive power of such independent variables as *number of small business establishments* in the catchment area of the branch, *population*, *family income*, *presence of competitors*, *quality of customer service*, *managerial competence*, and so on.

CHAPTER THREE

THE PROPOSED MODEL OF BRANCH PERFORMANCE

3.1 INTRODUCTION

Notwithstanding reports by bankers and consultants in the area of management accounting, academic research into branch performance has been characterised by studies in operations research, and marketing management. Such studies investigate the relationships between demographics and socio-economics of the catchment area population, branch features, and a narrow definition of performance, for example, deposit levels.

In this Chapter, a conceptual framework is proposed, building on the literature surveyed in Chapter Two, which identifies the position of Personal Banking (Retail Banking) Performance in the overall framework of bank performance. Setting out from an analysis of shortcomings of the existing performance measures, a multivariate, interdisciplinary branch performance model is detailed. Reasons for the selection of potential and performance variables for the proposed Model are provided, as well as tracing the variables back to the related literature. Also stated are the key research objectives addressed in this

study, concluding the Chapter with examples of applications of the proposed Model in managerial decision-making.

3.2 A CONCEPTUAL FRAMEWORK FOR BRANCH PERFORMANCE

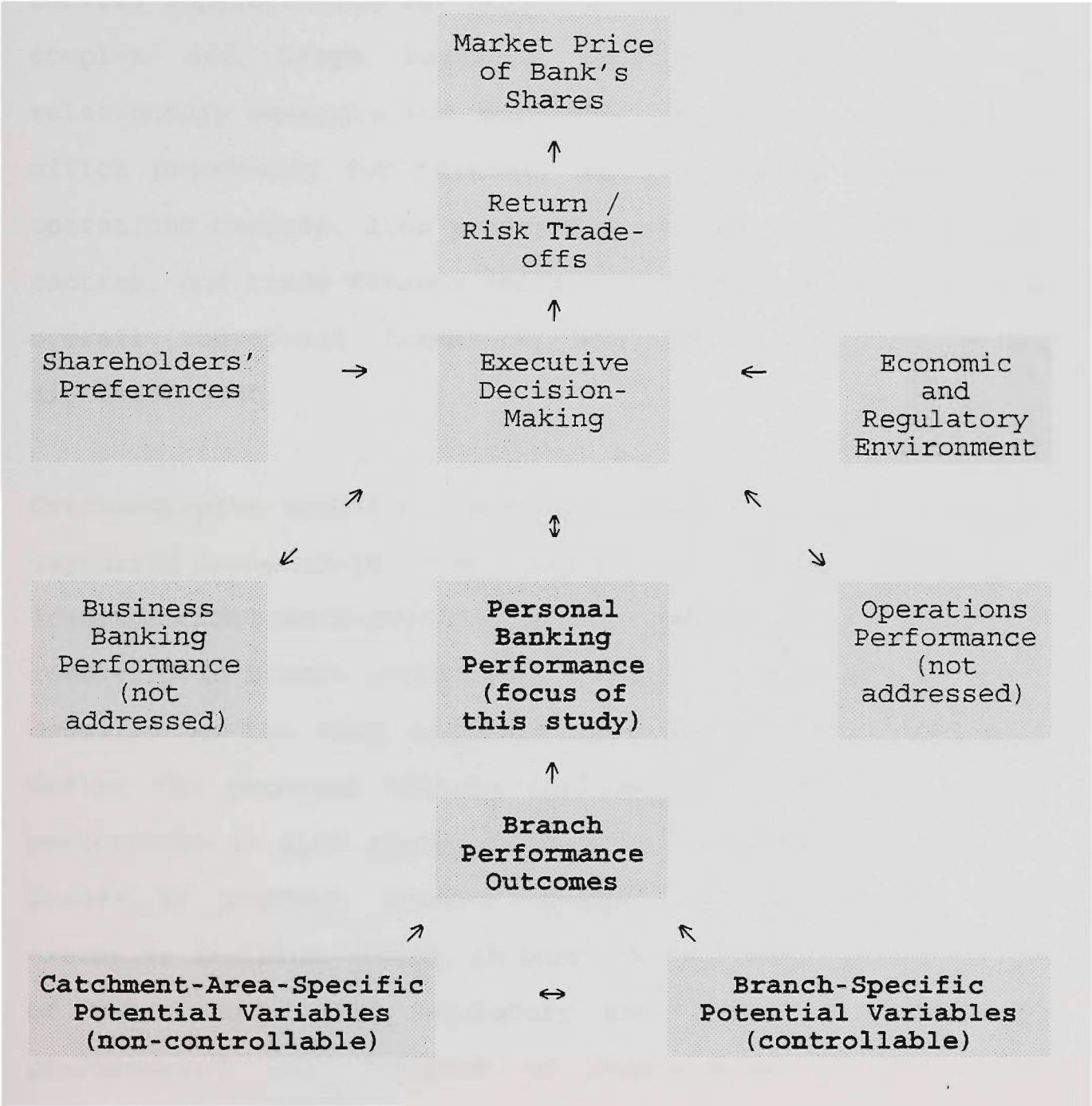
In the review of the related literature, market price of a company's shares was identified as the ultimate measure of bank performance. Return on equity and return on assets were described respectively as a summary measure of bank performance and a measure of bank profitability. On the other hand, a number of regression models were reviewed under branch performance measurement that identified various determinants of performance and their explanatory power. As one moves away from summary measures to more specific measures, the information content and its usefulness for managerial decision-making increases.¹² In developing a new model of branch performance, one of the aims of this study is to design multivariate, interdisciplinary measures that can capture the essence of controllable factors that influence the performance of a branch. Other equally important aims are for the Model to reflect corporate objectives and business drivers critical to the bank's success¹³; to represent the business mix of the

¹² According to Gillis, Lumry, and Oswald, "...aggregate evaluations do little to identify the source of performance or what can or should be done to enhance it" (Gillis, Lumry, and Oswald 1980, p.70).

¹³ Business drivers are identified by Para Bank as average deposit balance, number of new deposits, average lending balance, number of new lending accounts, referrals, and fee income.

branch; and, to be useful for reconfiguring branches. The overall conceptual framework is depicted in Figure 3.1.

Figure 3.1: Overall Conceptual Framework for Evaluating Branch Performance



The focus of this performance measurement study is on the Personal Banking activities, as embodied in branch banking. These activities can be summarised as telling, customer service, housing loans, personal loans, and small business

lending (Para Bank 1993). The two areas of overall bank performance not addressed in this study are business banking and operations; business banking and operations are handled at centres separate from the branches. *Business banking* handles complex and large business lending through teams of relationship managers and analysts. *Operations* services the office processing for personal banking and is comprised of operations centres, loan processing centres, customer enquiry centres, and trade finance centres. The rationale behind the overall conceptual framework depicted in Figure 3.1 is discussed next.

Catchment-area-specific, non-controllable potential variables capturing demographic, socio-economic, and market information interact with branch-specific controllable potential variables, resulting in branch performance outcomes (these variables are detailed in the next section). In effect, these outcomes define the personal banking performance. Personal banking performance is also shaped by inputs from Head Office on such issues as pricing, product design, and marketing.¹⁴ The executive decision-making, in turn, is influenced by the nature of the economic and regulatory environment, shareholders' preferences¹⁵, and feedback on performances of the three structural components of Para Bank, namely, business banking,

¹⁴ However, as these inputs are constants for branches, they are not relevant in this study, which is designed to distinguish between branches.

¹⁵ Shareholders' preferences refer to such choices as dividends versus capital gains, riskiness of investments undertaken by the company, social impact of company's activities, and so on.

personal banking, and operations. Executive decisions, particularly those of a strategic nature, involve trade-offs between maximising returns and minimising risks. Ultimately, capital markets assess the overall performance of the bank in light of its managerial actions, and price the bank's shares accordingly.

3.3 THE SHORTCOMINGS OF EXISTING PERFORMANCE MEASURES

Traditional measures of bank profitability, ROA and ROE, are beset with problems of allocating assets, equity, and net income when applied at branch level (Smith III and Schweikart 1992). Since most other key financial ratios in bank performance analysis (see Chapter Two, Table 2.1) require that at least one of these components is calculated, they will also suffer from similar problems.

Some of the more common approaches in branch performance analysis have been budgeting (that is, management accounting), and measuring total deposits. The former is frequently criticised for focusing on items that are outside the control of management, and emphasising expense items rather than overall profitability (Smith III and Schweikart 1992). The latter, although probably the simplest measure of branch performance, has the following disadvantages (Chelst, Schultz, and Sanghvi 1988):

- a. Different types of deposits are treated equally, ignoring varying profit margins.
- b. Revenues from loans are ignored.
- c. Branches with heavy transactions traffic but few new account openings are undervalued.

On the other hand, concentrating on branch profit as a measure of performance also has its serious drawbacks in the form of finding equitable ways to allocate revenues and expenses (Davenport and Sherman 1987). As an accounting measure, branch profit is the end-result of an assortment of factors and processes that shape a branch, and is retrospective in nature. Furthermore, while some of these factors are within the sphere of branch management's influence, for example, customer service quality, others such as the local conditions prevailing in the branch's catchment area can best be considered as external factors (Doyle, Fenwick, and Savage 1979).

Shortcomings of financial statement analysis merit further comment along similar lines. Employing only accounting ratios in analysing performance has a number of problems associated with it. For example, accounting ratios give little indication as to the specific reasons for good or bad performance; what types of decisions enabled the organisation to achieve a good performance, even though others may have detracted from this performance? What was the contribution of the management's decisions to current performance and what will it be for future performance? A substantial amount of information is lost on

performance of different functions as accounting ratios tend to aggregate results (Sherman and Gold 1985).

Davenport and Sherman summed up the disadvantages of ratios by the following statement:

...Ratios cannot capture the interplay among multiple resources (computer technology and staffing, for example) and outputs (such as new accounts opened and checks cashed). (Davenport and Sherman 1987, p.35)

Regarding *measures of profitability based on ratios* as the sole indices of branch performance will at best provide the decision-maker with inadequate information that is condemned to irrelevancy even before it is applied (Eccles 1991). Such measures rely upon historical data generated within the organisation and usually serve little more than comparison yardsticks, whereas integration of potential and performance analysis, introduces the anticipation element, a crucial function in the management process. Thus, the emphasis within the proposed study is more on information which is prospective to management, rather than retrospective.

Criticisms can also be levelled at profitability measures which couple present value of interest savings cash flows with more conventional management accounting techniques, with the aim of arriving at a profit and loss statement for the branch. Although such financial measures could include a forecast of deposit growth, they are still considered to be viewing the branch potential through a narrow focus and without adequate analysis of the underlying factors. Therefore, claims by

Thygeson (1991) of such a method's successful application in analysing branch profitability should be interpreted with caution when the same procedure is projected to performance analysis.

Branch potential measures commonly focus on local conditions or factors external to the organisation. The significance of local conditions is captured below:

...A high performing branch may still be an underachiever if the neighbourhood potential is unusually high. Conversely, poor performance may be the result of the lack of potential, in which case, the branch is a candidate for closure. (Chelst, Schultz, and Sanghvi 1988, p.7)

Some multivariate potential measures attempt to determine demographic and/or socio-economic characteristics, presence of competitors, presence of businesses generating custom for bank branches, and certain branch features such as number of staff or floor area (Doyle, Fenwick, and Savage 1979, and Clawson 1974). However, even such commendable studies fail to integrate dimensions such as customer service quality, managerial competence of the branch manager, effective practice of benchmarking, and use of the decision support system in a performance model.

A further example of such studies can be seen in the work of Olsen and Lord (1979) where market area characteristics were investigated as predictors of branch performance (defined as checking and savings account deposits). Olsen and Lord included median household income, percentage of renter occupied housing units, and number of competing branches in the area as

part of the group of predictor variables. However, no attempt was made to include branch-specific variables or variables internal to the branch. Similarly, the definition of branch performance is very narrow.

It is worthwhile reproducing the limitations of conventional performance measures cited by Davenport and Sherman (1987) before further exploring how branch performance should be analysed:

Table 3.1: Limitations of Common Performance Measures
(Source: Davenport and Sherman 1987, p.36)

MEASURE	LIMITATIONS
. Branch profitability	. Relies on arbitrary allocation of revenue . Does not measure efficiency of resource use . Does not accommodate different branch roles . Does not reflect mix of transactions
. Output ratios	. Measure only one output/input relationship at a time . Do not pinpoint specific opportunities for cost reduction or output increase
. Production volume	. Does not measure efficiency of resource use . Emphasises production at any cost
. Market share	. Engenders disagreement about definition of market and competition
. Staffing model comparison	. Does not address other costs . May not be relevant to a particular institution . Tends to be formalistic . Requires intensive data collection effort

The main drawbacks of existing performance analyses are either an over-reliance on management accounting and financial statement analysis, or a noticeable absence of branch-specific potential measures as integral components. According to McDonell and Rubin (1991), financial statements are not conducive to focusing branch activities on corporate objectives. Even those performance models that attempt to incorporate some measure of potential are likely to be considered semi-static models since they fail to bring together such concepts as customer service quality, managerial competence of the branch manager, effective practice of benchmarking, and so on.

3.4 THE PROPOSED MODEL OF BRANCH PERFORMANCE MEASUREMENT

There is an emerging body of literature attempting to formalise an interdisciplinary approach to performance analysis, looking beyond purely financial or accounting measures (Chase, Northcraft, and Wolf 1984). As early as 1977, Reich, in his doctoral dissertation, recognised the need for branch performance analysis when he stated that:

...a definition of potential is required which is both theoretically sound as well as being utilitarian to the branch administration. This would open the door to the development of meaningful branch performance evaluation methodologies. (Reich 1977, p.29)

In 1979, the call for the need for a multivariate analysis continued in the form of comments such as "...all banks have an

acute need for tools which can model the multivariate determination of branch potential..." (Doyle, Fenwick, and Savage 1979, p.105).

In 1988, Chelst, Schultz, and Sanghvi were further pointing out the need to assess potential as part of branch performance evaluation.

This study proposes to develop a performance model of the branch that will integrate selected potential variables (for example, from demographics, socio-economics, marketing, management, and information systems), and performance outcomes in an effective and efficient analysis. According to Chelst, Schultz, and Sanghvi (1988), assessment of branch potential is based normally on demographic profile of its catchment area population, and internal bank data.

3.4.1 OVERVIEW OF THE VARIABLE SELECTION PROCESS

The variable selection process to create the exploratory list (pre-test list) began by theorising two groups of variables, namely, the potential variables, and the performance variables. Remembering that branch potential was defined as *the capacity of the branch to generate retail banking business within its catchment area*, it was hypothesised that the so-called potential variables will manifest themselves in performance outcomes (variables). While review of the literature provided

the majority of variables, other variables were devised as a result of observations made in Para Bank, and the wider banking industry. Selection of the final list of variables requires omission of spurious relationships and redundant indicators, or those indicators that fail to capture the underlying processes; tests to this end are covered in Chapter Six. The process of variable selection for the pre-test list is detailed next.

3.4.2 ACCOUNTING FOR THE POTENTIAL VARIABLES IN THE PROPOSED MODEL

The number of people living in the catchment area of a branch is one of the frequently studied variables in the analysis of performance. Heald (1972) includes catchment population in his regression equation reproduced in Table 2.3 in the review of the related literature. Clawson (1974) uses a different perspective in his regression analysis by measuring the number of persons in the 45-64 age group. Soenen (1974) proposes measuring the trading area population by counting the number of households. Doyle, Fenwick, and Savage (1979) include the age categories of *population aged over 65 years* and *population aged under 15 years* in their list of independent variables. Similarly, Min (1989) indicates area population as one of the demographic variables to be studied in evaluating bank profitability.

Soenen (1974) and Min (1989) also refer to rate of population change in addition to population numbers. Population and population growth rate in the catchment area are indicative of demand for deposit and lending products; nevertheless, such demographic data provide only crude measures of potential if used in isolation. This leads the search for variables toward additional demographic and socio-economic variables such as age and family income.

Clawson (1974) and Doyle, Fenwick, and Savage (1979) employ age indirectly through population count. For example, Clawson (1974) focuses on persons aged 45-64, whereas Doyle, Fenwick, and Savage (1979) focus on under 15 and over 65 age groups, which were reported under population in the previous paragraph. A more direct use of age is suggested by Frerichs (1990) where age is listed as one of the branch potential variables determining market viability.

Family income (or, household income) has been listed by Soenen (1974), Olsen and Lord (1979), Rose (1986), Min (1989), and Frerichs (1990). Soenen (1974) places total family income and median household income under the heading of *economic factors*. Olsen and Lord (1979) use median household income as one of their demand variables (reported in Table 2.4). Rose (1986) identifies household income levels in the service area as one of the key factors determining demand for banking services. Min (1989) reports total family income and median family income under socio-economic data, whereas Frerichs (1990) makes a

passing remark about including *income factors* in assessing the viability of a branch's market.

Average age and *average annual family income* can be regarded as being more indicative of the demand for different types of products and average balances when compared to population and population growth rate.¹⁶ For example, an average young family is likely to have a home loan, a personal loan, and a low-balance savings account due to lack of disposable income, whereas an average middle-aged couple with no dependent children are likely to have a higher balance savings account and various investment accounts.

The proportion of private dwellings rented in an area is another potential variable often investigated. In a regression analysis, Clawson (1974) calls this variable *renter occupied dwellings*. Soenen (1974) approaches the measure from a demographic perspective by focusing on *percentage of households renting*. Olsen and Lord (1979) also use a similar measure they call *percentage of housing units renter occupied*; their regression analysis findings indicate a negative relationship between savings levels and percentage of housing units renter occupied. On the other hand, Rose (1986) identifies *proportion of renter vs. owner-occupied dwellings in the area to be served*. *Proportion of private dwellings rented* is regarded as

¹⁶

In this study, measurement of population, population growth rate, and average age excluded those persons below the age of 15 as they were regarded as having little relevance to demand for retail banking products/services.

being linked to the strategic product of home loans; the expected relationship here is that a smaller number of home loans will be written as the proportion of private dwellings rented increases.

Similarly, *number of small business establishments* can help explain the catchment area's potential for small business loans (another strategic product). At the same time, it has intuitive appeal for representing the capacity to generate retail banking business.

From a supply and demand perspective, *presence of competitors* is included in recognition of a loss of potential to other banks operating in the same catchment area (Chelst, Schultz, and Sanghvi 1988; Frerichs 1990). Clawson (1974) includes a block of seven variables in a pre-test list under the heading of *competition block*; examples from this block are number of competing facilities, population per facility, and market share of competitors. Olsen and Lord (1979) measure the number of competing branches in the area and list it under supply variables. Doyle, Fenwick, and Savage (1979) examine the number of competitive banks within different distances from the branch, and the number of banks with more attractive facilities, defining what they call the *competitive situation*.

The importance of *tangible convenience* has been fully recognised as early as 1971 by Kramer and in 1974 by Soenen; physical location of a branch, number of teller windows, number

of automatic teller machines, and presence of a car park contribute to the dimension of tangible convenience in this study. Heald (1972) recognises the significance of car parking facilities, availability of public transportation, and internal physical features of the branch. Clawson (1974) argues along similar lines, investigating physical location of the branch, for example, whether it is inside a shopping centre, and adequacy of parking. Soenen (1974) examines such attributes as ease of physical access to the branch through major streets, parking facilities, and availability of public transportation; convenience is reported in terms of location, as the single most important reason for selecting a branch.

Staff numbers is a measure of labour resources at a branch's disposal. Heald (1972) cites *number of staff* as one of the factors influencing branch turnover.

In today's banking where a more sophisticated consumer with less bank loyalty is becoming the norm, *customer service quality* is an indispensable competitive strategy. A study by Laroche, Rosenblatt, and Manning (1986) found service-related factors such as competence and friendliness of bank personnel as the most important determinants of patronage. Theoretically, it is probably the most significant controllable potential dimension in the Model; in fact, customer service quality is also one of the key performance objectives identified in Para Bank's Annual report (1992).

Customer service quality (as well as tangible convenience) can be regarded as contributing to the critical success factor *service delivery and quality* identified by McDonell and Rubin (1991). Davenport and Sherman (1987) refer to customer service ratings as one of the indicators to include as part of comparative branch performance diagnosis. Eccles (1991) reports that companies are complementing financial figures with customer satisfaction as part of their formal performance measurement.

Probably the second most influential controllable potential variable is the *managerial competence of the branch manager*, where the branch manager is seen as a team leader. In the role of the team leader, the branch manager's competence will influence the full range of branch activities, including the quality of customer service. Rose (1986) argues that a branch's performance is affected by economic and social conditions prevailing in its catchment area, as well as the competence of its management.

Use of the decision support system is regarded as enhancing the accuracy and quality of managerial decision-making, and it is included in the Model based on its intuitive appeal.

Effective practice of benchmarking is considered to improve branch operations as part of the overall management process. Eccles (1991) states that benchmarking provides managers with a general methodology for taking financial or non-financial

measures, while transforming attitudes, and it should be part of performance measurement. Details of the composite potential variables are developed in Chapter Five.

3.4.3 ACCOUNTING FOR THE PERFORMANCE VARIABLES IN THE PROPOSED MODEL

McDonnell and Rubin (1991) identify sales of deposit and lending products as one of their critical success dimensions. Similarly, performance outcomes such as average deposit balance, number of new deposit accounts, average lending balance, number of new lending accounts, referrals, and fee income are identified by Para Bank's executive management as business drivers critical to the Bank's success.

Doyle, Fenwick, and Savage (1979) run a series of regression analyses by varying the dependent variable (performance). In their regression equations, performance is represented by number or average balance of various types of accounts. Olsen and Lord (1979) use average daily consumer checking account deposits and average daily consumer savings account deposits as their two branch performance variables. Similarly, Rose (1986) lists under the heading of "key performance measures to look at" such variables as average balance in personal chequing accounts, number of savings and time accounts, and number of new deposit accounts and number of new loans within the last twelve months.

Profitable product concentration and *strategic product concentration* dimensions are designed to acknowledge that part of a branch's performance attributable to selling of the most profitable products, and promotion of strategically significant products respectively (see Chapter Five, sections 5.6 and 5.7).

Cross-selling can be thought of as an effective way of raising a branch's performance through selling related products. Cross-selling is the central activity of relationship banking, where the needs of the customer and the services provided by the bank are brought together in such a manner as to generate optimum benefit to both parties (Davis 1989). Furthermore, assessment of future trends in the Australian banking industry points to rising relationship banking through the 1990s (KPMG Peat Marwick 1991). Table 3.2 provides a summary of use of the Model variables in performance measurement literature.

Table 3.2: Summary of Actual Use or Suggested Use of the Model Variables and Other Similar Variables in Performance Measurement Literature

VARIABLE	AUTHOR(S)
Catchment Area Population	Heald (1972); Clawson (1974); Soenen (1974); Doyle, Fenwick, and Savage (1979); Min (1989)
Population Growth Rate	Soenen (1974); Min (1989)
Age	Clawson (1974); Doyle, Fenwick, and Savage (1979); Frerichs (1990)
Median Household Income	Soenen (1974); Olsen and Lord (1979); Rose (1986); Min (1989); Frerichs (1990)
Private Dwellings Rented (%)	Clawson (1974); Soenen (1974); Olsen and Lord (1979); Rose (1986)
Competition	Clawson (1974); Olsen and Lord (1979); Doyle, Fenwick, and Savage (1979); Chelst, Schultz, and Sanghvi (1988)
Convenience	Heald (1972); Clawson (1974); Soenen (1974)
Staff Numbers	Heald (1972)
Customer Service Quality	Davenport and Sherman (1987); Eccles (1991); McDonell and Rubin (1991)
Managerial Competence	Rose (1986)
Benchmarking	Eccles (1991)
Average Account Balances	Doyle, Fenwick, and Savage (1979); Olsen and Lord (1979); Rose (1986)
Number of New Accounts	Doyle, Fenwick, and Savage (1979); Rose (1986)

As a final note to variable selection, it should be borne in mind that there is no universal agreement on the definition of performance (Speed 1991, p.115). Moreover, the selection of performance variables in accordance with Para Bank's critical business drivers agrees with McDonell and Rubin's succinct statement that "The main purpose of performance measurement is

to align the goals of individual employees and the bank as a whole" (McDonell and Rubin 1991, p.56).

3.4.4 PRE-TEST LIST OF THE VARIABLES IN THE PROPOSED MODEL

Below is a pre-test list of the proposed variables discussed in the previous section. Data collected on this exploratory list will be processed through multiple regression analysis. Those potential and performance variables of composite nature, that is, consisting of multiple items, have been preceded by the words *dimension of*, the development of which is reported in Chapter Five. A preview of the items comprising these dimensions is provided in Appendix A.

Catchment-Area-Specific Potential Variables (non-controllable)

population (number of persons aged 15 years or more)

population growth rate (%)

average age (of persons aged 15 years or more)

average annual family income

proportion of private dwellings rented (%)

number of small business establishments

dimension of presence of competitors

Branch-Specific Potential Variables (controllable)

dimension of tangible convenience

staff numbers, full-time equivalent

dimension of customer service quality
dimension of managerial competence of the branch manager
dimension of use of the decision support system
dimension of effective practice of benchmarking

Performance Outcomes

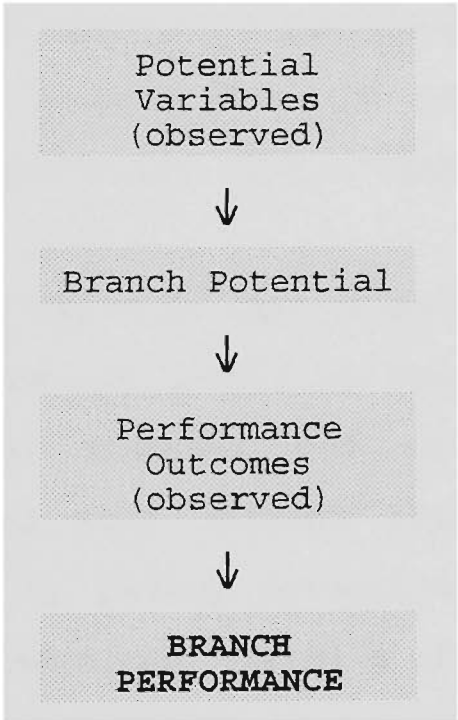
total average deposit balances held
total number of new deposit accounts
total average lending balances outstanding
total number of new lending accounts
number of new referrals
dimension of profitable product concentration
dimension of strategic product concentration
fee income
cross-selling ratio

Those with capacity to influence performance outcomes, and considered beyond the control of management are classified under the heading of *catchment-area-specific potential variables (CASPV)*; those variables, in principle, deemed controllable by bank or branch management are classified under *branch-specific potential variables (BSPV)*.

3.4.5 KEY RESEARCH OBJECTIVES

The theory advanced in this study states that potential variables manifest themselves in the form of performance outcomes (see Figure 3.2). Therefore, one of the key research objectives is to determine which potential variables explain the variation in each of the performance variables.

Figure 3.2: Integration of Potential and Performance



Identifying the groups of potential variables explaining each of the performance variables would generate a detailed examination of branch performance, providing a wealth of information that could be used in managerial decision-making. This is addressed in Chapter Six under multiple regression analysis.

Also developed are measures of overall branch performance and overall branch potential primarily for the purpose of ranking

branches, and measuring unrealised performance, that is, the performance gap.

Unrealised branch performance can be construed as being measured at the normative level. Focus is on the gap between branch performance suggested by overall branch potential (as per regression analysis in Chapter Six), and overall branch performance, both measured directly. The concept of normative unrealised performance is restated below:

Normative unrealised branch performance can be argued as the difference between what the performance should be given branch's potential, and current branch performance.

Another research objective is that of developing a predictive model for classifying and profiling branches. Grouping of similarly performing branches can provide a focus for management concerned with raising the performance of a particular branch, by paying attention to the predictors profiling the targeted group. Details of this process can be read under discriminant analysis in Chapter Six, section 6.3.3.

The key research objectives can be summarised as follows:

- a. Determine sets of potential variables explaining each of the theorised performance variables;
- b. Develop a measure of overall branch performance;
- c. Develop a measure of overall branch potential; and
- d. Develop a predictive model for classifying and profiling branches.

3.4.6 EXAMPLES OF APPLICATIONS OF THE PROPOSED MODEL IN MANAGERIAL DECISION-MAKING

The proposed model of branch performance will provide answers to at least two crucial managerial questions, namely, 'What is the performance gap of a branch? and, 'Can the branch performance be raised by reconfiguring?' Other performance related questions will be primarily variations around these themes. The following examples of reconfiguring are offered in an attempt to expand on the applications of the Model.

When the Model is applied to an existing branch, a comparison of current branch performance and branch potential will guide the management in reconfiguring the branch with a focus on raising performance. On the other hand, downsizing, that is, scaling down of a branch's operations, would constitute a special application of reconfiguring where the driving force is the predetermined reductions in resources allocated to the branch, affecting either some or all of the branch-specific potential variables. Hence, if management were to dictate the level of certain branch-specific potential variables, the Model would predict the expected performance (as per regression analysis in Chapter Six).

When the Model is applied as part of planning for a new branch, management's attention would primarily be focused upon determining that particular configuration of potential

variables that will result in higher performance. Clearly, there are multiple applications of the Model.

3.5 CONCLUSION

The uniqueness of the Model lies in its focus on multivariate, interdisciplinary measures defining potential variables controllable by management, and measures of performance outcomes emphasising business drivers critical to bank success. The variables included in the Model, and the benefits of developing and applying the Model, can be traced to corporate strategies and objectives such as improving customer service, segmenting and developing the customer base, and improving management skills. Two of the key potential variables, namely, customer service quality, and managerial competence, have a particularly pervasive influence on operation of a branch, and its success in delivery of products and services; these variables are developed in Chapter Five. The key research objectives to be addressed in the proposed Model can be summarised as to *identify potential variables explaining each of the performance variables, develop measures of overall potential and overall performance, and develop a model for classifying and profiling branches.*

CHAPTER FOUR

THE RESEARCH DESIGN

4.1 INTRODUCTION

The research design addresses the issues regarding implementation of the proposed Model developed in Chapter Three. The issue of sample size is determined mathematically, while the assumption about population homogeneity is supported with relevant arguments. The Chapter is then expanded with an overview of data sources, where the corresponding source of data for each variable in the Model is stated. The overview on methodology discusses the overall approach followed, from qualitative assessment of the concepts, to main testing of the Model. The section on methodology also introduces the reasons for choosing such quantitative techniques as multiple linear regression analysis, and discriminant analysis. This is followed by an explanation of delineation of the branch catchment area for the purpose of data collection. Given extensive use of mailed questionnaires in this study, a separate section discusses in detail how to deal with problems commonly associated with mailed questionnaires, such as response rate and testing for bias. The last two sections of

d = degree of accuracy (also known as precision or sampling error)

$$n = 3.841 \times 316 \times 0.2(1-0.2) \div [0.05^2(316-1) + 3.841 \times 0.2(1-0.2)]$$

$$n \approx 139$$

Since the sampling fraction ($n/N = 139/316 = 0.4399$) is larger than 5 per cent (rule of thumb), the following correction formula is applied (adopted from Monette 1990, p.149):

$$n' = n \div [1 + (n \div N)]$$

where n' = adjusted sample size
 n = sample size estimate
 N = population size

$$n' = 139 \div [1 + (139 \div 316)] \approx \underline{97}$$

Thus, the required sample size is indicated as 97 branches.

It should be noted that the value of P (variability) in Krejcie and Morgan's equation was chosen as 0.2. The underlying assumption here is that the population is relatively homogeneous; if maximum variability were assumed, then the value of P would have been 0.5, requiring a sample size of 112 branches. Crouch describes a situation of maximum variability as "...when the population is equally split between having and not having the attributes under consideration" (Crouch 1984, p.138). However, general knowledge in the area, and interviews with academics and bankers, indicate that the population under study is principally an homogeneous population (that is, there is a small amount of variability). Arguments leading to the contention of homogeneity are:

- a. Branch personnel are exposed to the same in-house training.
- b. Branches are equipped with the same technology.

- c. Promotional guidelines adhered to are the same.
- d. The products available from one branch to the next are the same.
- e. Banks are regulated and supervised by the Reserve Bank of Australia.
- f. Banks are required to observe common prudential and disclosure practices, and more regulation is expected in these areas (KPMG Peat Marwick 1991, p.38).
- g. Large number of banks in a small market implies vigorous competition, the significance of which is that new products are rapidly imitated by others; for example, cheque accounts bearing interest (CABI) and all-in-one accounts.
- h. In spite of the risky loans made by the Australian banks in the 1980s and the substantial amounts of resulting bad debts, the banking industry is historically a risk-averse industry, projecting an image of stability rather than uncertainty.
- i. Population, and hence, staff across the sampling area are the same in terms of education, lifestyle, income distribution, and so on.

In summary, the pivotal concern in choice of sample size is to be resource-effective in the research efforts without sacrificing the validity of results inferred from the data collected. As Bordens and Abbott put it, "...try to select an economic sample - one that includes enough subjects to ensure a valid survey, and no more" (Bordens and Abbott 1988, p.192).

Accommodating the above guidelines and practical constraints, a target branch sample size of about 140 would allow for the possible reduction in number of cases entering the final analysis, due to missing values, and at the same time be a cost-effective sample size.

4.3 THE DATA: OVERVIEW

In addition to Para Bank and its customers, other sources of data for this study are the Australian Bureau of Statistics (ABS), and the C-DATA and SuperMap data bases in the university's library.

Demographic and socio-economic data under catchment-area-specific potential variables were obtained from a combination of customised data purchased from the Australian Bureau of Statistics, C-DATA, and SuperMap data bases.¹⁸ The data on branch-specific potential variables and performance outcomes were collected through a combination of questionnaires mailed to bank branches, interviews, and access of Para Bank's data bases by the researcher. Data collected on the Model variables were later coded and a data bank created. Data on performance outcomes (with the exception of cross-selling ratio) were collected from the most recent Monthly Trend Report available

¹⁸

The time lag between the latest Census in 1991 and collection of data on non-demographic variables in early 1994 is not expected to confound testing of the Model given stagnation of the Australian economy in the early 1990s, and a low population growth rate.

at the time of implementation. The Monthly Trend Report issued at branch level displays data for a period of eight months, and it is regarded as a short enough time-frame for potential variables not to change substantially, and long enough to capture performance outcomes representative of a branch's overall performance.

Specific data sources for the variables in the Model are indicated below in square brackets:

population [1991 Census]
population growth rate [1991/1986 Censuses]
average age [1991 Census]
average annual family income [1991 Census]
proportion of private dwellings rented [1991 Census]
number of small business establishments [ABS Business Register as at August 1992]
presence of competitors [branch manager]
tangible convenience [branch manager]
staff numbers, full-time equivalent [MTR]
customer service quality [branch customers]
managerial competence of the branch manager [branch-classified staff]¹⁹
use of the decision support system [branch-classified staff]
effective practice of benchmarking [branch manager]
total average deposit balances held [MTR]
total number of new deposit accounts [MTR]
total average lending balances outstanding [MTR]
total number of new lending accounts [MTR]
number of new referrals [MTR]
profitable product concentration [MTR]
strategic product concentration [MTR]

¹⁹ Branch-classified staff: manager customer services, manager loans, supervisor operations, supervisor teller services.

fee income [MTR]

cross-selling ratio [branch manager]

Mathematical methods can be employed to disguise research data during data collection, retrieval, and reporting of results. One of the simplest mathematical methods of disguise is to multiply numerical data by a factor known only to the researcher. Upon Para Bank's request, a Confidentiality Deed was signed at the start of the project. University regulations regarding confidential treatment of research data are of further assurance.

4.4 THE METHODOLOGY: OVERVIEW

The main thrust of the methodology is one of *analytic survey*, predicting strengths and directions of association. A consultative panel was formed comprised of managers representing the key areas of Para Bank's retail banking operations, in order to facilitate the qualitative assessment at various stages of the study. Initially, exploratory interviews and mailed questionnaires targeted members of the consultative panel to confirm the performance measures currently in use, and to test assumptions and the appropriateness of the performance and potential concepts.

This lead to a qualitative assessment of the validity of specific concepts.²⁰

The next step was to develop scales to measure individual concepts. Pre-test surveys were used to identify the more significant items within composite variables and ascertain their appropriateness; look for guidelines for the order in which questions and statements should be posed; convert certain open-ended questions to closed-ended questions; and develop rating scales.²¹

As an initial quantitative assessment of validity and reliability of the proposed variables, data collected in the pilot stages of scale development was subjected to factor analysis and coefficient alpha respectively. In the process, the weak items within factors were eliminated, thus, reducing the number of items in the main survey. By focusing upon items with high factor loadings, it was then possible to reduce the amount of data to be collected. This made the research effort more manageable and the emerging factors more discriminating.²² In the main stages of scale development, tests of the pilot stages were repeated, further probing validities. Where

²⁰ The panel was also used to invite comments on questionnaire items in the early stages of scale development in *customer service quality* and *managerial competence* instruments (see Chapter Five).

²¹ According to Williamson et al., "...The subjects should be encouraged to comment freely about the questions themselves, as well as about the issues they address" (Williamson et al. 1982, p.143).

²² Factor analysis also helped confirm the conceptualised dimensions within constructs.

appropriate, triangulation of data collection methods was followed within the same measure, in search of supportive evidence for validity. The theory of instrument reliability and validity is reviewed in section 4.7.

A pilot study of the Model across one of Para Bank's branches was implemented to further clarify sources of data for the potential variables and performance outcomes, and anticipate problem areas on the main survey. The main study questionnaire was mailed to branch managers across 119 branches in Victoria and 18 branches in Tasmania (total of 137 branches, which is 3 short of the number aimed for at the end of section 4.2). The extent of use of mailed questionnaires was determined by the centralised data processing facilities available at Para Bank.²³ Interviews enhanced data collection on qualitative potential variables.

Testing of the Model is through stepwise regression and discriminant analysis. Selection of these well-developed statistical techniques is particularly appropriate since the key research question is model-building, where normally an efficient set of independent variables is desirable. Stepwise regression helps ascertain the relationships among variables, whereas discriminant analysis guides the assessment of combinations of predictor variables separating branches (that

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In order to minimise respondent bias, survey of the same group of people should be preferred when collecting branch-specific data through mailed questionnaires, although this would ultimately be determined by the nature of data solicited.

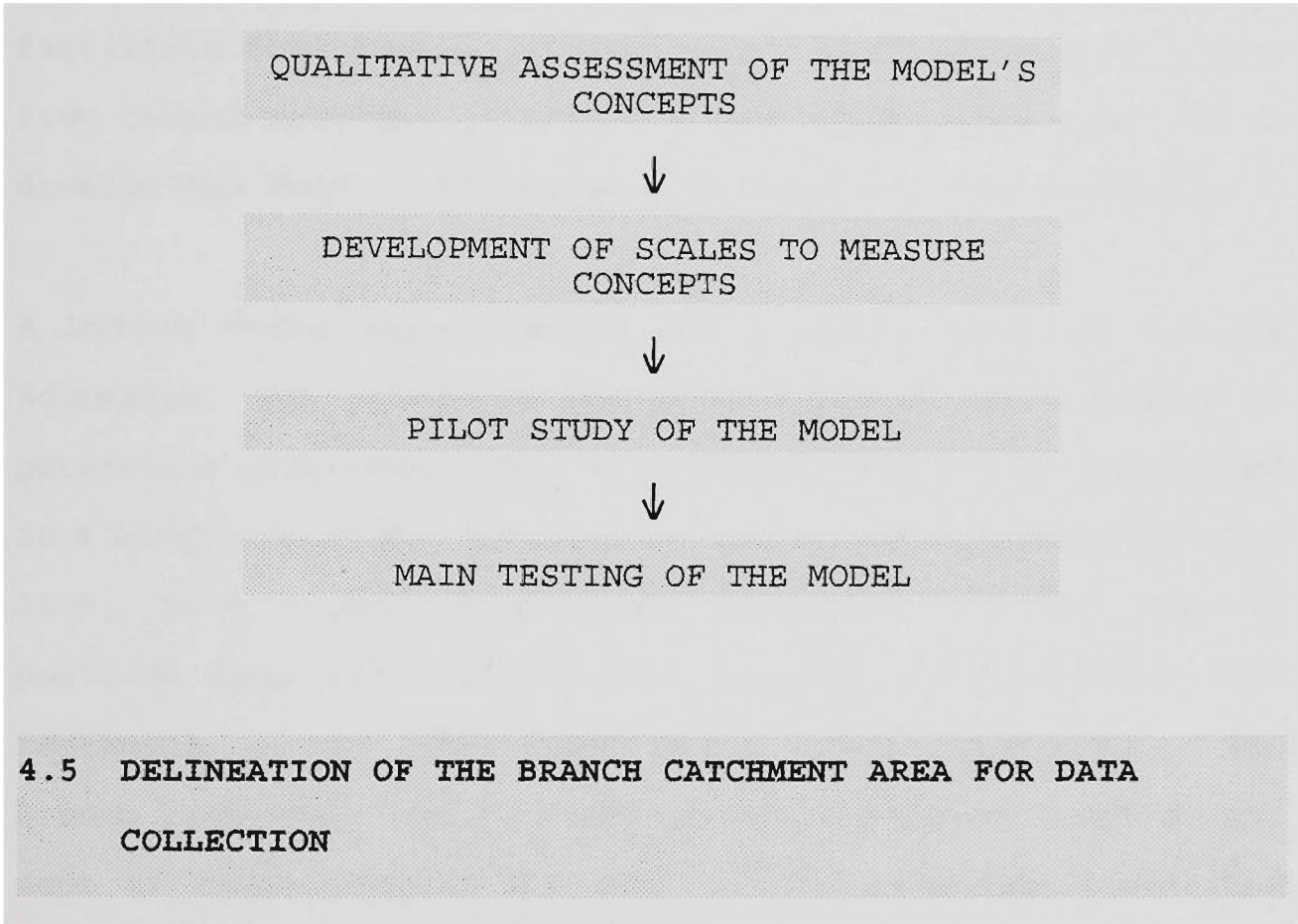
is, classification), with the further aim of profiling characteristics that distinguish branches. Three branch groups are identified as the dependent variables in discriminant analysis, namely, expected *high performers*, *medium performers*, and *low performers*.

Min proposes the use of *multiple regression analysis* "...to investigate the relationships between bank profitability and input data" (Min 1989, p.209). Gillis, Lumry, and Oswald (1980) employed multiple regression analysis to bank performance measurement, a technique they considered to be ideal for explaining performance. Olsen and Lord (1979) also used multiple regression analysis to predict branch performance from market area characteristics.

On the other hand, one of the early applications of *discriminant analysis* was identifying risky borrowers. Churchill (1979a) illustrates the case of the Consumer Finance Company classifying loan applicants into "poor", "equivocal", and "good" risks by employing four predictors. Discriminant analysis has also been applied in banking research by Pool (1974), Awh and Waters (1974), and Speed (1991). Pool (1974) applied discriminant analysis to separate users of cash dispensing machines from non-users based on such secondary data as demographic factors, life-style factors, and opinions on bank services. Awh and Waters (1974) investigated the ability of economic, demographic, and attitudinal characteristics to distinguish between active and inactive bank charge-

cardholders. Speed (1991) tested differences in performance between groups of companies on such variables as marketing practices, strategies, and organisational characteristics.

Figure 4.1: Overview of Methodology



It would be very costly and impractical to try and determine the catchment area in its entirety. Doyle, Fenwick, and Savage define it as "...that geographical area from which a branch draws most of its business" (Doyle, Fenwick, and Savage 1979, p.107). This interpretation of catchment area is also supported by McLean (1968), Austin (1969), and Eilon and Fowkes (1972). For the purpose of collecting data for catchment-area-specific potential variables in testing the Model, branch managers were asked to judge their catchment area in terms of

postcodes. Interviews with branch managers revealed that this rather crude method is the best understood and the most widely practiced approach in the absence of a more sophisticated method from Para Bank's marketing services. It should be noted that use of postcodes to delineate geographical areas also facilitate down-loading of demographic and socio-economic data from Census records; given the branch sample size required to develop the Model, this becomes an important consideration.

A branch would survey about 300 randomly selected account addresses, and determine the proportion (%) of accounts in particular postcodes; very small proportions can be aggregated in a single category, for example, 25 per cent in postcode area 3049, 30 per cent in postcode area 3048, 20 per cent in postcode area 3047, 8 per cent in postcode area 3046, and remaining 17 per cent under *miscellaneous* postcodes. The branch management would be required to capture at least 80 per cent of their sampled accounts in the postcodes identified (this criterion was added after the Model was piloted). The emerging postcodes can then be used by the managers to trace their branches' catchment areas on a map. In visualising catchment areas, branch managers would be cautioned to allow for physical boundaries such as rivers and major highways. Proportions of branch business identified for the postcodes defining catchment areas are then applied to the demographic and socio-economic data to measure the catchment-area-specific-potential variables. Details of such calculations can be seen in Chapter Six, section 6.3.

A less practical and more costly method would be plotting a random sample of retail customer addresses on a map containing the branch; a circle capturing these addresses is then drawn. Once the coordinates of the circle's centre are determined (the centre of the circle may not be the branch), demographic and socio-economic data can be captured by SuperMap (Small Areas Data Base) or ABS' Information Consultancy Service. Heald (1972) reports that the radius of the circle defining the boundaries of the catchment area can be expected to increase with outlet size, rural siting, presence of key-traders, social class (*vis-à-vis* mobility), and decrease in population density. However, a major drawback of this approach would be the question on whether the *random* sample of customer addresses reflect the true geographical distribution of branch's customer population. Also, it is essentially a quantitative approach and it should be accompanied by qualitative judgements in real-life branch decisions. Another significant limitation of using this relatively simple approach in isolation would be overlapping catchment areas, since branch's potential can be overstated, and thus, performance understated, for example, in central business districts.²⁴ To avoid a similar problem with the proposed postcode method, randomly selected branches were scrutinised for such closely located outlets and omitted from the sample, enhancing homogeneity.

²⁴ For further examples of delineating the catchment area see Herz (1991), Doyle, Fenwick, and Savage (1979), Soenen (1974), and Davidson (1969).

Methods of delineating the catchment area and locating retail outlets are commonly grouped under *Analog Models* and *Gravity Models*. A more recent iterative and mathematically complex location procedure with a network perspective (as opposed to the individual branch perspective required in this study) is the *Branch Optimal Location Decision* (BOLD) model, which tackles most of the limitations associated with the analog and gravity models. For a brief discussion of the above models see Chelst, Schultz, and Sanghvi (1988).

4.6 DEALING WITH PROBLEMS COMMONLY ASSOCIATED WITH MAILED QUESTIONNAIRES

Some of the problems commonly associated with mailed questionnaires are reduction in control of key variables, the order in which questions are answered, the identity of the subject providing the answers (who might be different from the intended subject), inability to probe while answers are given, and inadequate response rate (Oppenheim 1966). Although many approaches have been developed to tackle the above, the solutions will not completely eliminate all the problems, and the mailed questionnaire, as a data collection method, must be partially judged in the context of its ease of management and lower costs, particularly when dealing with geographically dispersed, large samples. Ultimately, the researcher will have to answer such questions as 'Do the respondents significantly

differ from non-respondents?', and if so, 'In what ways and to what degrees?'.

4.6.1 THE ACCEPTABLE RESPONSE RATE

Regarding acceptable response rates, Babbie (1990, p.182) quotes 60 per cent as "good" and 70 per cent as "very good" (rules of thumb only). Babbie further advises that interpretation of the adequacy of the response rate be placed in the context of existing literature for the type of study undertaken, also concluding that tests for non-response are not to be neglected. In a mailed questionnaire survey of banks concerning various cost accounting issues, a 69 per cent participation rate was reported as "extremely high" (Gardner and Lammers 1988, p.39).

4.6.2 ENHANCING THE ANTICIPATED RESPONSE RATE AND ACCELERATING RESPONSE

Response rates can be raised by gaining the explicit endorsement of senior management for the research study in the form of either a letter of introduction to be attached to the questionnaires or an internal memorandum. A letter of endorsement from the university outlining the potential

contribution of the study to the profession could be of added value (Sudman 1985, and Vocino 1977).

The following paragraph outlines some of the other approaches and techniques that can increase the response rate (and, encourage early response), from a literature review by Kanuk and Berenson (1975) of the empirical studies in mail surveys and response rates:²⁵

- a.) Follow-up letter and reminders (with a clearly visible statement on the back of the cover letter saying reminders will be forwarded).
- b.) Stamped and self-addressed return envelope.
- c. Deadline date.
- d.) Mailing out of questionnaires by special delivery.
- e. Cover letter (in addition to letter(s) of endorsement); Kanuk and Berenson (1975) reported that empirical evidence on cover letters was inadequate to draw any conclusions. Nevertheless, the inclusion of a cover letter is a widespread practice. Labrecque (1978) reported higher response rates from questionnaires accompanied by cover letters with titled signatures.

²⁵

A similar review by Linsky (1975) supports Kanuk and Berenson's findings.

4.6.3 TESTING FOR MAILED QUESTIONNAIRE BIASES

Biases can be classified into *non-response* and *response* bias. Non-response bias can be tested for by looking at known characteristics of the sample and comparing these against the characteristics of the non-respondents; if possible, telephone interviews of the non-respondents could reveal valuable information. Alternatively, the dates of return can be monitored; late respondents have been discovered to be similar to non-respondents (Oppenheim 1966, and Babbie 1990). Similarly, response bias needs to be considered in regard to wording and ordering of questions, and the particular relationship surveyed within the selected sample. Furthermore, the reliability of responses can be tested by generating alpha coefficients from the first two-thirds of responses against the last one-third of responses. When comparison of important characteristics of respondents and non-respondents reveal the two groups to be similar, then the researcher can assert the representativeness of respondents with more confidence.

The primary practice of minimising the majority of mailed questionnaire biases is careful identification of the study population, and well-considered design and packaging of the questionnaire. One particular source of response bias, the so-called *acquiescence bias*, is defined as a respondent's inclination to agree with a particular position (Zikmund 1991). It can be minimised by switching the poles of Likert-type

scales (on negatively worded items) or ordering successive devices interchangeably. However, caution should be exercised with including items of negative connotations since comprehension mistakes could actually rise (Wason and Johnson-Laird 1972). If on the other hand, the concern is who will fill in the questionnaire, then a personal telephone call could be of help. Similarly, short follow-up questionnaires could facilitate probing of issues that were not anticipated on the main questionnaire.

4.6.4 CONSIDERATIONS IN MAIL SURVEY OF PROFESSIONALS

It would also be germane to the study to briefly look at how mail survey of professionals could differ from survey of the general public. Professionals can be expected to be busy people who would undertake a quick cost-benefit analysis before filling in the questionnaire. In the process of cost-benefit analysis, they would require a substantial amount of background information about the purpose of the study, and probably, some indication of how the questions were drafted, since they are likely to have well-formed opinions of the topic surveyed (Sudman 1985). The length of the questionnaire will be determined by the need to cover as much ground as possible without making the whole exercise overbearing for the subject. Depending on the type of data surveyed, emphasis should be placed on providing the opportunity to comment, even after closed-ended questions.

4.7 INSTRUMENT RELIABILITY AND VALIDITY: AN OVERVIEW OF THEORY

In designing good scales of measurement, the researcher needs to assess the reliability and validity of the instrument under investigation. In simple terms, reliability can be defined as the extent to which an instrument can generate consistent results (free of measurement errors), whereas validity can be regarded as focusing on the degree to which an instrument measures what it aims to measure (Zikmund 1991). Reliability is construed as internal consistency of items comprising a construct, and repeatability of the measure. Validity of a measure, on the other hand, can be a more complex concept to establish; it is normally investigated at three levels, namely, content validity, criterion validity, and construct validity. Reliability is addressed in more detail first.

Internal consistency addresses the homogeneity of a measure (Stone 1978). That is, it poses the question 'What is the average correlation among items comprising an instrument?' Nunnally (1978) recommends calculation of coefficient alpha as the first step, setting an upper limit for other tests on reliability. For example, a complementary test of internal consistency could be *alternative forms or equivalent form method*, where two equivalent alternative instruments are administered to the same group of subjects, normally within a space of two weeks. Alternative forms method is recommended

when the concept measured is expected to change in a short period of time (Peter 1979). With this method, the researcher is hoping to see a high correlation between the alternative forms as an indication of instrument reliability (Zikmund 1991).

On the other hand, in terms of repeatability, test-retest method involves administering the same instrument to the same subjects again within a short period of time, principally testing for stability of results (Stone 1978; Peter 1979).²⁶ However, there are serious potential problems with the test-retest method; for example, subjects can become sensitive to the test, influencing the results of the second test, or attitudes may change in the period between the two tests. Therefore, it is difficult to interpret the correlation of results from the first and second tests.

Validity answers the question 'Does a scale measure what it is meant to measure?' (Stone 1978). Assessing validity of a measure begins with content validity. Content validity is a subjective assessment of whether the instrument "...logically appears to accurately reflect what it purports to measure" (Zikmund 1991, p.263). Content validity will be influenced by the process of item selection when a scale is first put

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Test-retest method was not feasible in this study since the names of respondents were not to be revealed as part of the confidentiality agreement reached with Para Bank's management, and the staff association. Furthermore, the intrusion upon the branch personnel's time for the same questionnaire was deemed unacceptable.

together. Hence, appropriate literature survey of the domain of interest will help avoid idiosyncratic items.

Criterion validity (also known as convergent validity) is an empirical approach and addresses the question 'Does this measure correlate with other measures of the same construct?' On the other hand, construct validity is examined during statistical analysis of data and addresses the question 'Is empirical evidence consistent with the theoretical logic of concepts?' (Allen and Yen 1979; Zikmund 1991). Put more simply, construct validity empirically probes the composition of relationships among items and compares the results with the theorised relationships (Peter 1981). For example, internal structures revealed by factor analysis can provide an assessment of construct validity (Nunnally 1978; Allen and Yen 1979; Peter 1981). The extent of presence of internal consistency can also lend support to construct validity; however, while internal consistency is regarded as a pre-requisite for presence of construct validity, an internally consistent instrument does not necessarily have construct validity (Nunnally 1978; Peter 1979).

Finally, triangulation of different data gathering methods can provide further examination of construct validity (Straub and Carlson 1989). If the results obtained through different data gathering methods are similar, then this is accepted as supportive evidence for construct validity, that is, data represents true scores and are not artefacts of the type of

data gathering method. The obvious disadvantage with triangulation is the severe demand it places on the resources of the researcher.

In this overview of validity, external validity has so far not been mentioned. Normally, external validity is regarded as a validity problem faced by the researcher in generalising the findings from the sample investigated to the larger population. As Zikmund puts it, "In essence, it is a sampling question" (Zikmund 1991, p.228). Therefore, one of the best methods of increasing external validity is random sampling (Cook and Campbell 1979), a method used in this study. A point of interest to be noted is that external validity and construct validity share a common purpose, namely, making generalisations (Cook and Campbell 1979). In this study, establishing external validity would mean generalising the findings to the target population, that is, Para Bank's Victorian and Tasmanian branches. In practice, stability of factor structures across samples collected at different stages of the study will be examined.

4.8 INTRODUCTION TO THE MAIN QUANTITATIVE TECHNIQUES USED IN THE STUDY

Principally, four separate statistical techniques were used at various stages of the study, namely, coefficient alpha, factor analysis, multiple linear regression analysis, and discriminant analysis. Each of these methods are briefly discussed next.

4.8.1 COEFFICIENT ALPHA

Coefficient alpha (also known as Cronbach alpha) is recommended as the first test of internal consistency in assessing reliability of a multiple-item variable (Nunnally 1978, p.230). It assesses the homogeneity of a group of items used to define a variable. Coefficient alpha can be applied to scales with as few items as two (Norusis 1993). If coefficient alpha is low, the indication is that either the scale has few items, or the items have little in common; in both cases, the researcher has to return to the domain of the concept under investigation and select other items.

In determining total scale reliability, coefficient alpha assumes a single dimension. In the case of multidimensional instruments, total scale reliability needs to be calculated using the formula of Reliability of Linear Combinations

developed by Nunnally (1978, p.248). Further details on coefficient alpha and reliability of linear combinations can be read in Appendix H.

4.8.2 FACTOR ANALYSIS

Some variables or dimensions within variables cannot be directly observed, and are known as latent variables or factors. The researcher improvises by taking measurements on observable items instead, and analyses the data with the hope of exposing factors (Long 1984). The analysis examines the pattern of correlations among the observable items, looking for coherent subsets that can be distinguished from each other. According to Nunnally (1978), factor analysis is concerned with identifying groups of related variables whose intra-group correlation is higher than inter-group correlation.

Two common aims for undertaking factor analysis are reducing the number of observable variables into a smaller number of factors, and providing operational definitions for underlying processes by examining the variables comprising factors (Tabachnick and Fidell 1989). The extent factors can be interpreted is a good measure of how useful the technique is for the research question on hand. In interpreting a factor, what is sought is a group of variables that are particularly highly correlated within that factor, but much less so with other factors.

It should also be noted that the term *factor analysis* covers a wide range of extraction techniques designed to help conceptualise groupings of variables. The term *factor analysis* is sometimes used without clearly distinguishing whether a particular analysis conforms with the principal components model or the factor analytic model. In principal components analysis, the correlation matrix diagonal is occupied by ones, that is, each variable contributes a unit of variance, including error and unique variance. In the factor analytic model, error and unique variance are excluded, which means the matrix diagonal is occupied by numbers between 0 and 1, representing communalities (that is, estimates of shared variances).

The factor extraction technique used throughout this study is *principal axis factoring* (also known as *principal-factor method*). The factor extraction technique of principal axis factoring estimates communalities in order to eliminate error and unique variance from factors (Kim and Mueller 1982); hence, this procedure can be classified as a factor analytic model, and "it is widely used and understood" (Tabachnick and Fidell 1989, p.626). According to Harman, "The common factors account for the correlations among the variables, while each unique factor accounts for the remaining variance (including error) of that variable" (Harman 1976, p.15). Factor analysis is deemed appropriate in this study for two principal reasons:

- a. This study is an exercise in model-building. It is, thus, of main interest to arrive at a theoretical

solution where results are not confused by error and unique variance.

- b. The factor extraction procedure of *principal axis factoring* has been the preferred technique in mainstream literature on *customer service quality* (Parasuraman, Zeithaml, and Berry 1988; Babakus and Boller 1992).²⁷

One of the outputs generated by factor analysis is a factor matrix. A factor matrix consists of variables entering the analysis listed on the left-hand column, with corresponding factor loadings shown under each factor column in the body of the matrix. A factor loading, when squared, yields the proportion of variance explained in a given variable by a factor. Sometimes it is difficult to interpret the structure of a factor matrix because variables might have high loadings on several factors. For example, if the matrix extracted by principal axis factoring is initially difficult to interpret, a common practice is to rotate the factor matrix orthogonally²⁸; orthogonal rotation produces uncorrelated factors (see Chapter Five, Table 5.4 for an example of rotated factor matrix). The Varimax method of orthogonal rotation maximises the variance of loadings within factors, and produces a structure that is easier to interpret. In terms of deciding

²⁷ The first scale developed in Chapter Five of this study is on customer service quality.

²⁸ Mathematically, there are an infinite number of possible rotations explaining the same amount of variance, with no objective criterion for selecting one over the others but that of its use to the researcher (Tabachnick and Fidell 1989).

which loadings are important, Nunnally (1978, p.434) classifies loadings below 0.4 as small. If the magnitude of a factor loading is suspect, it is advisable to examine the correlation matrix.

4.8.3 MULTIPLE LINEAR REGRESSION ANALYSIS

Multiple regression analysis determines the linear associations between a group of independent variables and a dependent variable; however, there is no implication that such relationships are of a causal nature. Multiple regression analysis provides an equation to predict the magnitude of the dependent variable, given values for the independent variables. Results of the analysis are easiest to interpret when the independent variables are uncorrelated amongst themselves, but highly correlated with the dependent variable.

The principal objective of multiple regression analysis can be summarised as *identifying the smallest number of uncorrelated and linearly related independent variables that will explain the largest proportion of variation in the dependent variable*; the measure of this variation explained is the *multiple Pearson coefficient of determination*, or simply, *R squared* in computer outputs. An *R squared* of 0 indicates no linear relationship between the independent variables and the dependent variable. *R squared* is, in effect, a measure of goodness of fit of a particular model to the population investigated; that is, it is

the square of the linear multiple Pearson correlation coefficient between predicted and observed values of the dependent variable.²⁹

The significance of R squared can be tested through the F-statistic and its associated probability. The F-statistic is a test of the null hypothesis that there is no linear relationship between the dependent and independent variables, that is, R squared equals 0.0 (Norusis 1993). When the F-statistic is high and the level of significance is close to zero, then the null hypothesis can be rejected, accepting the alternative hypothesis that *there is a linear relationship between the dependent and independent variables*.

The general equation of the linear multiple regression analysis takes the following form:

$$Y' = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_kX_k$$

where Y' = predicted value of the dependent variable

a = value of the dependent variable when all the independent variables are zero, that is, the Y intercept.

b = regression coefficients

X = independent variables

While the intercept and regression coefficients would be constants when examining a particular sample, different values for the dependent variable are predicted for each case by

²⁹

R squared tends to be overestimated as the sample size gets smaller. Most statistical packages output an *adjusted R squared* by default.

substituting the corresponding values for independent variables.

The particular type of multiple regression technique used in this study is *stepwise regression*. With stepwise regression, independent variables are added one by one as they meet pre-specified statistical criteria, and may be removed from the equation at any stage of the run when their contribution becomes insignificant. Hence, when the aim of the researcher is to arrive at an efficient prediction equation, stepwise regression is an appropriate technique. Multiple linear regression analysis, and in particular, stepwise regression, is normally promoted as a model-building technique (Tabachnick and Fidell 1989; Norusis 1993).

Statistical significance of the independent variables entering the stepwise regression equation warrant further comment. A common test of significance is the t-statistic, testing the null hypothesis that the regression coefficient of an independent variable is zero. This null hypothesis can be restated as *there is no relationship between the independent variable and the dependent variable* (Lewis-Beck 1982). The t-statistic and its associated significance level is automatically produced in most statistical packages. Normally, the null hypothesis is rejected for those non-zero coefficients which have significance levels of 5 per cent or less.³⁰

³⁰

A 5% significance level is only a rule of thumb and more or less significance can be acceptable depending on the nature of experiment.

4.8.4 DISCRIMINANT ANALYSIS

In discriminant analysis, a group of independent variables are combined linearly to distinguish between two or more mutually exclusive categories of cases (Zikmund 1991). The resulting discriminant function, which is similar to a regression equation, maximises the ratio of between-group variance to within-group variance. The purpose of discriminant analysis can be summarised in three principal points:

- (1) developing predictive models to classify individuals into groups...
- (2) "profiling" characteristics of groups which are most dominant in terms of discrimination...and/or
- (3) identifying the major underlying dimensions (i.e., discriminant functions) which differentiate among groups. (Crask and Perreault 1977, p.60)

The discriminant analysis starts with a sample of cases of known group memberships, leading to a discriminant function (or, functions) that can be used to categorise new cases of known predictor values. The smaller of total number of categories minus one or number of predictor variables gives the number of possible discriminant functions (Huberty 1984; Tabachnick and Fidell 1989). For example, in a three-group analysis, the maximum number of discriminant functions would be two. The discriminant function generates a score for each case, according to which cases are classified into one of the categories in the analysis. The larger the differences in group predictor means, the more discriminating is the function.

Effectiveness of the discriminant function can be assessed by noting the percentage of cases correctly classified (or, the percentage misclassified). Klecka (1982) and Norusis (1992) point to the importance of interpreting the correct classification rate in the context of that expected by chance alone. For example, if there are four categories of cases in the sample investigated, with equal prior probabilities, then 25 per cent of the cases are expected to be correctly classified by chance. That is, the percentage of cases correctly classified by the discriminant function will need to exceed 25 per cent by a considerable margin before the function can be regarded as effective. An optimal discriminant function minimises the probability of misclassification (Norusis 1992).

The discriminating power or effectiveness of a function can be further assessed by noting its eigenvalue and canonical correlation (Klecka 1982). An eigenvalue is the ratio of between-groups to within-groups sums of squares in analysis of variance; a large eigenvalue on a function is associated with good discriminating power (Norusis 1992). The canonical correlation of a function is the square root of between-groups to total sums of squares; it measures the degree of association between the discriminant function and categories (Green, Tull, and Albaum 1988). According to Klecka, "...canonical correlation can be a valuable tool in judging the substantive utility of the discriminant function" (Klecka 1982, p.37). Although the first function is the most discriminating function relative to other functions, it is only after noting the

canonical correlation of a function that one can ascertain its effectiveness in discriminating the categories under investigation.

In this study, stepwise discriminant analysis is used with the objective of identifying those predictor variables, that is, potential variables, making significant contributions to distinguishing between branches on performance. In the absence of any theoretical justification for giving priority to certain predictors, it is appropriate to allow statistical criteria to determine the most useful discriminating variables (Klecka 1982). Minimising Wilks' lambda, that is, the ratio of within-groups to total sum of squares in analysis of variance, is the common selection rule for entry of a variable at each step of the stepwise analysis (Green, Tull, and Albaum 1988, p.523). Significance of the change in Wilks' lambda is normally determined by pre-specified F-statistics or significance of F-statistics (Norusis 1992). Briefly, the stepwise discriminant analysis admits first the variable that will minimise Wilks' lambda more than the other variables, following which, the remaining variables are examined once again for the variable that will minimise Wilks' lambda for the discriminant function. After the second variable is entered, the first variable is re-examined to see whether it should be removed, and so on. Variable selection is completed when none of the variables meet entry or removal criteria. The emerging linear function can be depicted as:

$$D = B_0 + B_1 X_1 + B_2 X_2 + \dots + B_p X_p$$

where B 's are the estimated discriminant function coefficients and X 's represent the values of predictors (independent variables). If the function is an effective one, categories will differ in their D scores.

Validating the classification accuracy is a potential concern in discriminant analysis (Lachenbruch and Mickey 1968; Crask and Perreault 1977; Speed 1991). When the effectiveness of a function is tested by classifying cases that were used to derive the function in the first place, the percentage of correctly classified cases is overstated. In discriminant analysis, this bias is minimised by estimating the percentage of correctly classified cases through the leave-one-out method after Lachenbruch (1965) (also known as cross-validation; Efron 1979).

Leave-one-out method is a useful technique where a second independent sample is not available, and an estimate of the expected actual error rate is sought. It involves omitting a case while estimating a function on the remaining subset of cases, and classifying the omitted case according to the estimated function (Lachenbruch 1975; Hand 1981; Tabachnick and Fidell 1989; Morrison 1990); the procedure is repeated as many times as the sample size. At the end of the iteration, number of misclassifications are totalled and divided by the number of subsets to arrive at the estimate of the expected actual error rate. According to Hand, "The total number of misclassifications relative to the design set size is then an

almost unbiased estimate of the expected true error rate" (Hand 1981, p.188). Alternatively, the ratio of correct classifications to number of subsets gives the estimate of the expected true correct classification rate.

A second issue of validation that requires attention in discriminant analysis is that of stability of discriminant function coefficients (Crask and Perreault 1977; Speed 1991). How much can the researcher be confident that the coefficients derived from the sample will hold for other samples? The answer to this key question is assessed by the sample reuse method of *jackknifing*. In a similar manner to that of leave-one-out method, a case is omitted from the sample and discriminant function coefficients estimated for the remaining subset, repeating the computation until all the possible subsets are exhausted. Next, pseudovalues and jackknife estimators are computed with the purpose of establishing confidence intervals for discriminant function coefficients (mathematical details of jackknifing employed in this study can be read in Appendix H). If the predictor coefficients derived from the complete sample fall within these confidence intervals, then the researcher concludes that coefficients are not artefacts of sample size (Fenwick 1979; Speed 1994).

4.9 CONCLUSION

A sound research design demands careful attention to sample size, robustness of methodology, and suitability of the quantitative techniques chosen for the analysis on hand. Simple random sampling enhances generalisability of research findings to the target population, whereas multiple stages in developing scales, and retesting initial findings on fresh data adds confidence to assessment of reliability and validity of instruments used. Since the nature of this study is one of building an efficient model, multiple regression analysis and discriminant analysis are particularly appropriate techniques to employ. Armed with the methodology developed in this Chapter and the raised awareness of such issues as response rates and bias in surveys, and reliability and validity of instruments, the study is ready to proceed into the actual scaling of the Model's variables as reported in Chapter Five.

CHAPTER FIVE

SCALING THE MODEL VARIABLES

5.1 INTRODUCTION

Wherever appropriate, multiple-item scales are developed. According to Peter (1979), a multiple-item scale has the advantage of letting measurement errors cancel each other out, and in the process, enhancing reliability. In identifying a concept's domain, the objective of this study is to end up with a set of dimensions and items that will distinguish between branches (rather than a comprehensive set of the concept's features in personal banking). Hence, choice of dimensions and items for the purpose of this study can be likened to *incremental analysis* in Management Accounting where only the differentiating changes are considered relevant for analysis.

The purpose of this Chapter is two-fold, that is, developing scales that can be used independently to measure particular concepts, while identifying the variables that will enter multiple regression analysis and discriminant analysis in the following Chapter. The Chapter begins with a detailed account of the constructs *customer service quality* and *managerial*

competence of the branch manager, two of the key branch-specific (controllable) potential variables in the Model. The general framework employed in reporting scale development is that of detailing a conceptual framework first, followed by research design, results and analysis, and conclusions. Other variables developed in this Chapter include effective practice of benchmarking, use of the decision support system, profitable product concentration, strategic product concentration, tangible convenience, presence of competitors, and cross-selling.

5.2 CUSTOMER SERVICE QUALITY (BSPV)

The purpose is to develop a utilitarian multi-dimensional instrument that can be applied to measuring customer service quality as perceived by branch bank customers. The objective is to end up with an efficient set of items that will distinguish between branches, rather than an all-encompassing list of features. The focus of the study is on retail operations as embodied by the branch.

Homogeneity of retail banking products forces customer service quality to emerge as a principal variable to be analysed in competitive strategies. An equally compelling reason for banks to examine their customer service quality is the emergence of discerning consumers with higher expectations from their retail bankers (Kwan and Hee 1994). A recent telephone interview

survey throughout the state of Victoria (Quadrant 1992) identified *poor customer service* as the most frequently given reason by consumers for considering moving accounts. LeBlanc and Nguyen (1988) cite that costs of mediocre quality in service industries can be as high as 40 per cent of revenues. Thus, customer service quality is expected to be a major determinant of branch potential to perform.

5.2.1 CONCEPTUAL FRAMEWORK

The conceptual definition of customer service quality developed by Parasuraman, Zeithaml, and Berry is adhered to, namely,

Perceived service quality is a global judgement, or attitude, relating to superiority of the service, whereas satisfaction is related to a specific transaction. (Parasuraman, Zeithaml, and Berry 1988, p.16)

Those interested in further discussion of definition of service quality should refer to Parasuraman, Zeithaml, and Berry (1988, pp.15-17) and LeBlanc and Nguyen (1988, pp.8-11).³¹ In this study, major amendments were made to the approach used by Parasuraman, Zeithaml, and Berry in their SERVQUAL instrument as explained in the following paragraphs.³²

³¹ LeBlanc and Nguyen arrived at an 37 item instrument based on data collected from credit union customers.

³² SERVQUAL, composed of 22 items, was developed by data collected across five separate firms, namely, a bank, a credit card company, a firm offering appliance repair and maintenance services, and a long distance telephone company (Parasuraman, Zeithaml, and Berry 1988, p.22).

Assessment of customer service quality, defined by Parasuraman, Zeithaml, and Berry (1988) as resulting from a comparison of expectations with perceptions on quality features, that is, arriving at a difference score, requires two statements to assess each item. Carman (1990), Babakus and Boller (1992), and Brown, Churchill, and Peter (1993) raise doubts about the psychometric properties and feasibility of Parasuraman, Zeithaml, and Berry's (1988) approach to measurement. For example, perceptions of quality can be expected to be influenced by the expectations generated by the service setting; a person dining in an up-market French restaurant with expensive furnishings will expect a high quality service, in essence, raising the reference point for perceived quality. Hence, it is doubtful whether there is a clear theoretical separation between perceptions and expectations.

On a more practical level, how does one capture expectations prior to delivery of service and capture perceptions at the end of the service encounter? Also, Wall and Payne's (1973) study on deficiency scores³³ indicate a tendency for respondents to consistently set expectations higher than perceptions, which can be construed as a psychological constraint. For the above reasons and to make the questionnaire more manageable, each item was surveyed directly (see Appendix B). As Babakus and Boller succinctly put it, "... the task would be simpler for respondents and the format would prevent potential problems

33

Originally defined as the difference between the existing level and the desired level of a job characteristic in measuring satisfaction.

with the difference scores" (Babakus and Boller 1992, p.265). The continuing academic debate on difference scores can be followed in papers by Brown, Churchill, and Peter (1993) and Parasuraman, Zeithaml, and Berry (1993).

Although traditionally scale development literature suggests some use of negatively worded items on questionnaires to reduce acquiescence bias (Likert 1932; Churchill 1979b), others in the field advocate omission of negatively worded items (Wason and Johnson-Laird 1975; Howell et al. 1988; Lewis and Mitchell 1990; Babakus and Boller 1992). Parasuraman, Zeithaml, and Berry's (1988) original study on service quality required use of negatively worded items; however, in 1991, part of their proposed refinements included use of positively worded items only. Negatively worded items are considered difficult to comprehend (particularly in the context of Likert-type scales), can invoke negative connotations, and can lead to method factors, casting doubt on the validity of the instrument. In the presence of arguments both for and against inclusion of negative items, it was deemed appropriate to test for acquiescence bias (a type of response bias), where acquiescence bias is defined as "...respondent's tendency to concur with a particular position" (Zikmund 1991, p.149).

The other amendment to Parasuraman, Zeithaml, and Berry's (1988) approach is the direct assessment of importance for the customer service quality items. An importance score was generated for each item, giving higher diagnostic and

prescriptive value to the construct by providing a more refined measure (Kwan and Hee 1994). Collection of socio-economic data could help in further segmenting the customer base according to customers' needs (Keirl and Mitchell 1990).³⁴

It should be noted that the proposed conceptual framework is not a replication of Parasuraman, Zeithaml, and Berry's (1988) work on SERVQUAL. Nevertheless, their now well-recognised work and the criticisms it has attracted are acknowledged in an effort to arrive at a more practical framework with sound psychometric properties, as well as bringing content validity to the measure developed here.

5.2.2 RESEARCH DESIGN

In developing the measurement instrument, results of the first stage scale purification by Parasuraman, Zeithaml, and Berry (1986) was used as the starting point.³⁵ The 34 item instrument was customised for trading banks and further refinement attempted. In this process, findings from a qualitative study commissioned by Para Bank to establish *quality service standards* (Dangar 1991) were used to review the

³⁴ To test questions required to gather such data and gain a better understanding of Para Bank's customers, Part B of the main stage questionnaire included socio-economic questions (see Appendix B for a summary of customer profile).

³⁵ The term *purifying a scale* is used in marketing research to indicate the process of identifying those items in a scale sharing a common core (Churchill 1979a). That is, items belonging to the same concept are expected to be highly intercorrelated.

suitability of the original SERVQUAL items for the setting of trading banks, and to add items to enrich the coverage of the domain of customer service quality, resulting in 56 items.

Pretesting had three discernible stages, namely, evaluation of the questionnaire by fellow researchers, further qualitative assessment of the questionnaire items by the consultative panel formed within the host bank, and self-administering of the questionnaire items by 40 university students. Evaluation of the questionnaire by fellow researchers and the consultative panel facilitated qualitative assessment of the questionnaire, reducing it to a more manageable size while improving wording. For the purpose of testing for acquiescence bias, university students were used to collect data on two different versions of the same questionnaire, that is, one version with 4 negative items and another version with 8 negative items. It was hypothesised that the mean composite score from each version would not be significantly different if there was no acquiescence bias. In the absence of empirical evidence for acquiescence bias, it is reasoned that there would be no need to include negative items.

The instrument was piloted in 9 branches through exit interviews. At the beginning of the pilot stage, there were 27 items in the questionnaire. A total of 159 completed questionnaires were collected; to maintain randomness among the cases, the fifth customer leaving the branch was approached with the exit questionnaire.

The main survey was administered through the customers of 20 randomly chosen branches; data collection methods were triangulated by employing exit interviews, telephone interviews, and mailed questionnaires, in search of method effects (Denzin 1978; Sudman and Bradburn 1984). A total of 791 completed questionnaires were returned, each questionnaire comprised of 22 items; this figure is consistent with Crouch's observation that "Minimum sample sizes for quantitative consumer surveys are of the order of 300 to 500 respondents" (Crouch 1984, p.142). A sample size between 500-1000 is considered as very good to excellent where factor analysis is to be undertaken (Comrey 1973).

Each quality item was surveyed directly on a five-point Likert-type scale; for example, *politeness of branch staff is much worse than I expected to much better than I expected*. All response options were verbally labelled; results of tests carried out by Alwin and Krosnick (1991) support this practice. Similarly, in the pilot stage, a five-point importance scale followed each quality scale, possible responses ranging from *not important* to *very important* (see Appendix B).

Homogeneity of importance scores for each item across cases was probed by examining coefficients of variation; the purpose of this exercise was to omit importance scales in the main survey stage should the scores prove to be homogeneous, hence making the questionnaire more manageable. In such a case, when the purpose is to arrive at an overall customer service quality

score for a particular branch, the research design calls for weighting of quality item scores with mean importance scores (Carman 1990). Mean of importance weighted item scores can also provide a measure of customer service quality along each dimension of the construct.

Additional questions were posed in the main survey stage to empirically probe criterion validity of the instrument, namely,

What is your overall quality rating of your branch?

[OVERALLQ]

Would you recommend your branch to a friend?

[COMMEND]

Did you ever complain about your branch services?

[COMPLAIN]

(designated variable names in SPSS are shown in square brackets)

The following criterion validity hypotheses were formulated:³⁶

H_0 = Correlation between OVERALLQ and SCOREQ is 0
(criterion validity).

where SCOREQ = sum of scores across all items.

OVERALLQ = overall quality rating

H_1 = A positive correlation is expected to be observed
between OVERALLQ and SCOREQ.

³⁶

A discussion of the advantages of stating hypotheses in the null form can be read in *Advanced Questionnaire Design* by Labaw (1985).

H_0 = There is no significant difference between the mean scores of respondents answering Yes to RECOMMEND and No to COMPLAIN, and those answering No to RECOMMEND and Yes to COMPLAIN (criterion validity).

H_1 = A significantly higher mean score is expected with respondents returning a Yes/No combination.

Construct validity was assessed through triangulation of data gathering methods (Straub and Carlson 1989), and by verifying the dimensionality of the overall instrument through factor analysis. In examining triangulated data, differences in variances will be assessed by posing the following hypotheses:

H_0 = Variances of scores from three different data collection methods are the same (construct validity).

H_1 = Variances of scores from three different data collection methods are significantly different.

Coefficient alphas were calculated as a measure of reliability based on internal consistency (Churchill 1979b, and Peter 1979). According to Nunnally, "If it [coefficient alpha] proves to be very low, either the test is too short or the items have very little in common" (Nunnally 1978, p.230). Response bias was further tested by examining the scores on regular and shuffled versions of the questionnaire; in shuffling the questionnaire, questions in the second-half became the first-half, and vice-versa. The response bias hypotheses are:

H_0 = There is no significant difference between scores of respondents answering the regular and those answering the shuffled versions (response bias).

H_1 = There is a significant difference between scores of respondents answering the regular and those answering the shuffled versions.

The purpose of shuffling is to determine whether sequencing of questionnaire items has any significant influence on scoring by respondents. This is described as *order effect* by Sudman and Bradburn (1984).

During surveys, the respondents were screened by inquiring whether they normally banked at that particular branch, with the aim of bringing reliability to the measure. Furthermore, in an effort to capture a certain exposure to branch services, data were collected by administering questionnaires to a sample of branch customers who had been with the branch for at least three months.

5.2.3 RESULTS AND ANALYSIS

In pretesting, Wilcoxon Scores test on sum of scores across all items (defined as variable SCOREQ) for each respondent yielded a significance level of 0.90. This result supported the null hypothesis that the mean composite score from each negatively worded version was not significantly different (see Table 5.1). In this light and in view of other arguments against use of

negative items presented above, it was decided to abandon negative wording in later stages.

Table 5.1: Wilcoxon Scores (Rank Sums) for Variable SCOREQ Classified By Variable CASEID

CASEID	N	SUM OF SCORES	EXPECTED UNDER H_0	STD. DEV. UNDER H_0	MEAN SCORE
4	20	415	410	36.918135	20.75
8	20	405	410	36.918135	20.25
Wilcoxon 2-Sample Test (Normal Approximation)					
S = 415 Z = 0.12189 Prob > Z = 0.9030					
T-Test approx. Significance = 0.9036					

The six conceptualised dimensions (across 27 items) following pretesting are shown below (see Appendix B for details of items):

- D1: *Responsiveness* (items 1,2,4,8,19,25):
Willingness to help customers and provide prompt service*.
- D2: *Empathy* (items 3,5,7,9,10):
Caring, individualised attention the branch provides its customers*.
- D3: *Staff Conduct* (items 6,11,12,13,21):
Civilised conduct and presentation of branch staff that will project a professional image to the customers.
- D4: *Access* (items 16-18):
Ease of accessing branch staff either physically or on the telephone.
- D5: *Communication* (items 15,20,22,23):
Verbal and written communication between branch staff and customers.

D6: Reliability (items 14,24,26,27):

Ability to perform the promised service dependably and accurately*.

(* Concise definition adopted from Parasuraman, Zeithaml, and Berry 1988, p.23)

5.2.3.1 PILOT STAGE

Homogeneity of importance scores for each item was tested by computing coefficients of variation (see Table 5.2). The coefficients were low, indicating homogeneous importance scores. Hence, it was deemed appropriate to abandon the importance scale in the main survey stage, recommending use of mean importance scores on each item as weights when the instrument is applied independently for measuring overall customer service quality at a branch (see Table 5.3).

Table 5.2: Coefficients of Variation on Importance Scores
 of Customer Service Quality Items

VARIABLE	COEFFICIENT OF VARIATION	VARIABLE	COEFFICIENT OF VARIATION
MANAGER	0.24	CLARITY	0.22
LEARN	0.26	INFORMED	0.24
SERVWHEN	0.23	TELEPHONE	0.19
PERSONAL	0.20	GREET	0.21
ACCTYPES	0.24	SYMPATHY	0.20
NEATNESS	0.21	COMPUTER	0.17
ADVICE	0.20	HELP	0.18
SECURITY	0.16	PRIVACY	0.17
STAFFNUM	0.15	LOAN	0.17
PROMISES	0.16	POLITE	0.16
CONCERN	0.16	APOLOGY	0.17
PROMPT	0.16	TELLERS	0.17
QUEUES	0.16	KNOW	0.14
MISTAKE	0.14		
Mean : 0.19		Standard Deviation : 0.03	

Table 5.3: Mean Importance Scores on Customer Service Quality Items

VARIABLE	MEAN	VARIABLE	MEAN
MANAGER	3.79	CLARITY	3.85
LEARN	3.89	INFORMED	3.90
SERVWHEN	3.91	TELEPHONE	3.93
PERSONAL	3.94	GREET	3.97
ACCTYPES	3.98	SYMPATHY	4.02
NEATNESS	4.04	COMPUTER	4.14
ADVICE	4.15	HELP	4.21
SECURITY	4.22	PRIVACY	4.23
STAFFNUM	4.23	LOAN	4.24
PROMISES	4.25	POLITE	4.26
CONCERN	4.26	APOLOGY	4.27
PROMPT	4.28	TELLERS	4.29
QUEUES	4.31	KNOW	4.33
MISTAKE	4.36		

Before further statistical analysis, frequencies were generated on the questionnaire items to assess the integrity of entered data. Next, the first attempt at purifying the customer quality scale involved calculating coefficient alphas on the six conceptualised dimensions. Coefficient alphas were recorded as 0.7393 (D1), 0.7260 (D2), 0.6770 (D3), 0.4730 (D4), 0.7576 (D5), and 0.6785 (D6). Examining the *Alpha If Item Deleted* columns in the SPSS output indicated that deletion of items would not raise dimensional coefficient alphas. It was time to take a closer look at the dimensionality of the scale through factor analysis.

The 27 variables were factor analysed using Principal Axis Factoring (PAF) on SPSS; 6 factors were extracted, which coincided with the number of conceptualised dimensions, thus providing supportive evidence for construct validity. Final statistics showed that 52.2 per cent of variance was explained by the six factors. However, the unrotated factor matrix was difficult to interpret due to the majority of the variables loading on Factor 1. The factor matrix was rotated orthogonally (using Varimax). From Table 5.4, it can be seen that this resulted in an easy-to-interpret matrix, where those variables loading 0.5 or above would be retained (LeBlanc and Nguyen 1988; Lesser and Kamal 1991).³⁷

In order to test whether the observed factor structure was an artefact of the sample size, a second PAF with Varimax rotation was carried out on the reduced item pool (22 items), in effect increasing the cases-to-variables ratio. Results indicate that the structure of the matrix was principally retained, implying that the factor structure was independent of sample size (see Table 5.5).

³⁷ Nunnally (1978, p.434) classifies factor loadings below 0.4 as small.

Table 5.4: Orthogonally Rotated Factor Matrix of Customer Service Quality Items (pilot stage, first PAF)

VARIABLE	F1	F2	F3	F4	F5	F6
POLITE	.7167	.1510	.0186	.2684	.0899	.0911
SECURITY	.6969	.2777	.0416	.0678	.0026	.1386
GREET	.6819	.1425	.0727	.3284	.0905	-.0141
NEATNESS	.6674	.1145	.0029	.1013	.0519	.1674
PRIVACY	.5308	.0559	.1794	.3257	.0329	.0404
COMPUTER	.5121	.2191	.1467	-.1007	.1410	.3478
PERSONAL	.4942	.1787	.0580	.4585	.0505	.1265
SYMPATHY	.4285	.1435	.2345	.2366	.2628	.0835
ACCTYPES	.1213	.6741	.1510	.1474	.0971	.1430
INFORMED	.1704	.6463	.1384	.0929	.1593	.1055
SERVWHEN	.0997	.5584	.1200	.1486	.2597	.0385
LEARN	.1071	.5301	.0813	.3344	.0567	.0604
ADVICE	.1503	.5281	.1844	-.0617	.4291	.0787
KNOW	.2316	.5253	.2567	.1975	.0753	.0352
CLARITY	.1865	.5237	.0688	-.0652	.2502	-.0438
APOLOGY	.0884	.1965	.8770	-.0058	.2037	.0494
CONCERN	.0921	.2765	.7661	.1768	.1282	-.0973
MISTAKE	.0599	.1934	.6711	.0704	.2784	.2153
PROMPT	.2800	.1329	.0939	.7410	-.0434	.0984
HELP	.4305	.2141	-.0435	.5865	.1717	.0902
QUEUES	.1911	.0992	.1091	.4879	.1314	.2478
LOAN	.0943	.2043	.1172	.0107	.6934	-.0211
MANAGER	-.0468	.1991	.1723	.0989	.5566	.0215
PROMISES	.1967	.3753	.2939	.0888	.4732	.0321
TELEPHONE	.1617	.3716	.3002	.0046	.3935	-.0910
STAFFNUM	.2928	.1634	-.0355	.2789	-.1331	.5789
TELLERS	.3006	.0291	.1228	.3004	.0721	.5015

Table 5.5: Orthogonally Rotated Factor Matrix of Customer Service Quality Items (pilot stage, second PAF)

VARIABLE	F1	F2	F3	F4	F5	F6
POLITE	.7444	.1545	.0337	.1839	.0959	.1263
GREET	.7280	.1509	.0819	.2504	.0625	.0260
SECURITY	.6854	.2814	.0484	-.0307	-.0359	.1443
NEATNESS	.6683	.1203	.0126	.0189	.0310	.1888
PRIVACY	.5224	.0837	.1740	.2634	.0184	.1106
HELP	.5063	.2516	-.0173	.4581	.1230	.1331
COMPUTER	.5038	.2294	.1618	-.1545	.0733	.3070
ACCTYPES	.1266	.6842	.1553	.0926	.0560	.1637
INFORMED	.1710	.6443	.1489	.0790	.1537	.1282
SERVWHEN	.1290	.6051	.1375	.0854	.1668	.0022
ADVICE	.1523	.5442	.2117	-.0943	.3656	.0484
CLARITY	.1846	.5352	.0793	-.1320	.1942	-.0584
LEARN	.1222	.5352	.0784	.2947	.0510	.1269
KNOW	.2464	.5326	.2584	.1483	.0249	.0580
APOLOGY	.0971	.1981	.8993	-.0374	.1471	.0227
CONCERN	.1034	.2871	.7662	.1581	.0930	-.0741
MISTAKE	.0653	.2143	.6856	.0189	.2292	.1995
PROMPT	.3289	.1315	.0995	.8123	-.0173	.2198
LOAN	.1205	.2231	.1398	-.0215	.7844	-.0440
MANAGER	-.0266	.2335	.1974	.0756	.5294	.0312
STAFFNUM	.3111	.1499	-.0328	.1525	-.0774	.63144
TELLERS	.3110	.0605	.1272	.1513	.0580	.51654

Comparing the composition of conceptualised dimensions to the groups of variables loading on factors in Table 5.4 necessitated re-evaluation of dimensions. Although some variables maintained their membership, others had changed groups. In light of the factor structure from Table 5.4, dimensions were re-arranged as follows:

F1: Staff Conduct:

Civilised and dependable conduct, and presentation of branch staff that will project a professional image to the customers.

F2: Communication:

Fulfilling banking needs of customers by successfully communicating financial advice and serving timely notices.

F3: Credibility:

Maintaining staff-customer trust by recognising and rectifying mistakes.

F4: Responsiveness:

Willingness to help customers and provide prompt service.

F5: Access to Branch Management:

The ease of contacting branch management, say, for applying for a loan.

F6: Access to Teller Services:

The adequacy of number of staff serving customers throughout business hours and during peak hours.

Factorability of the correlation matrix (strength of linear association among variables) also merits comment. Initial examination of the correlation matrix on the SPSS output revealed a substantial number of correlations to be larger than 0.3 in absolute values which, according to Tabachnick and Fidell (1989), indicates factorability. Following the first factor extraction, Bartlett's test of sphericity was 1959.7227 at an observed significance level of 0, allowing rejection of the hypothesis that the population correlation matrix is an

identity matrix.³⁸ However, it should be noted that Bartlett's test is sensitive to the sample size and has a tendency to give significant results with large samples even when correlations are very low. Tabachnick and Fidell recommend its use when there are less than five cases per variable. In the analysis, there were 159 cases; with 27 variables, this translates into approximately 5.88 cases per variable, a number close to Tabachnick and Fidell's guidelines. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded 0.87134, considered as *meritorious* by Kaiser (1974). KMO is computed to compare the magnitudes of the observed correlation coefficients to that of partial correlation coefficients.

The iterative process continued by re-calculation of coefficient alphas for the smaller item pool of 22 variables. Among the six factors, coefficient alphas were observed as 0.8424 (F1), 0.8302 (F2), 0.8713 (F3), 0.7710 (F4), 0.6628 (F5), and 0.6235 (F6), indicating a general rise in internal consistency for the revised variable groups. The total scale reliability³⁹ was calculated as 0.9494.

³⁸ An identity matrix displays values of 1 on the diagonal and values of zero correlations on the off-diagonal co-ordinates.

³⁹ Calculation of instrument reliability was based on the *Reliability of Linear Combinations* after Nunnally (1978, p.248, equation 7-11). This calculation is illustrated in Appendix H.

5.2.3.2 MAIN STAGE

Using the new larger data set, coefficient alphas were calculated for the six factors to emerge from the pilot stage as part of the scale purification exercise, resulting in 0.8555 (F1), 0.8563 (F2), 0.7979 (F3), 0.7982 (F4), 0.6224 (F5), and 0.8118 (F6). None of the items were indicated for deletion, implying the presence of groups of items sharing a common core under each factor.

The 22 variables were then factor analysed with principal axis factoring using the new data set collected from 791 questionnaires. As in the pilot stage testing, the factor matrix was rotated orthogonally. Table 5.6 shows the 4 factors that emerged. The KMO measure of sampling adequacy had risen to 0.95093, and variance explained increased to 54.3 per cent.

Table 5.6: Orthogonally Rotated Factor Matrix of Customer Service Quality Items (main stage)

VARIABLE	F1	F2	F3	F4
POLITE	.8158	.2310	.1718	.1427
GREET	.6641	.1751	.1782	.2560
HELP	.6617	.2771	.2596	.1480
PROMPT	.5795	.1850	.2871	.3170
NEATNESS	.5576	.3150	.1527	.1710
APOLOGY	.5202	.4070	.2532	.1466
CONCERN	.5183	.3672	.2577	.1891
PRIVACY	.4310	.3397	.2773	.2313
MISTAKE	.3273	.6307	.1641	.1641
SECURITY	.4167	.5715	.2948	.1936
INFORMED	.2705	.5477	.4340	.1424
CLARITY	.2281	.4866	.3516	.1167
MANAGER	.2103	.4842	.1470	.2996
COMPUTER	.4547	.4663	.2326	.1434
LOAN	.3770	.3914	.1789	.1062
ACCTYPES	.1454	.2268	.7418	.1212
ADVICE	.2191	.2146	.6151	.1604
LEARN	.2220	.0848	.6124	.1717
KNOW	.4134	.3515	.5162	.1170
SERVWHEN	.1556	.4185	.5030	.1317
TELLERS	.2677	.1830	.2350	.7770
STAFFNUM	.2931	.2625	.2041	.7072

Overall, factorial membership of the variables is similar to that of the pilot stage but more discriminating (compare Table 5.4 with Table 5.6). This is indicative of external validity of the scale since the pilot stage and main stage factorial analyses were based on separate samples drawn from the same

population.⁴⁰ Refined operational definitions of construct dimensions can be stated as:

F1: Staff Conduct:

Responsiveness, civilised conduct and presentation of branch staff that will project a professional image to the customers.

F2: Credibility:

Maintaining staff-customer trust by rectifying mistakes, and keeping customers informed.

F3: Communication:

Fulfilling banking needs of customers by successfully communicating financial advice and serving timely notices.

F4: Access to Teller Services:

The adequacy of number of staff serving customers throughout business hours and during peak hours.

Coefficient alphas generated for each of the remaining four factors (after deletion of 5 items) were higher and in a smaller range compared to pilot stage findings, namely, 0.8845 (F1), 0.8126 (F2), 0.8014 (F3), 0.8118 (F4), indicating improved and more comparable dimensional reliabilities. The total scale reliability was calculated as 0.9623, an improvement of 0.0129 over the pilot stage instrument.⁴¹

⁴⁰ External validity of the customer service quality instrument is re-visited in Chapter Six, section 6.4.1.

⁴¹ The figure of 0.9623 is also an improvement over the total scale reliability reported by Parasuraman, Zeithaml, and Berry (1988, p.25) for their bank at 0.87.

The hypotheses formulated to evaluate the reliability and validity of the instrument (see section 5.2.2) required a number of tests. Mann-Whitney U test was used to compare the scores from the regular and shuffled versions of the questionnaire as part of testing for response bias (see Table 5.7).

Table 5.7: Mann-Whitney U - Wilcoxon Rank Sum W Test of Customer Service Quality Scores

SCOREQ BY VERID			
MEAN RANK	CASES		
407.58	408	VERID = 1.00 REGULAR	2-TAILED P
383.66	383	VERID = 2.00 SHUFFLED	.1410

The 2-tailed probability returned by SPSS, 0.1410, implied that the null hypothesis could not be rejected at the significance level of 5 per cent. This can be regarded as evidence for instrument reliability.

A further indication of construct validity can be found by looking at scale reliabilities of each data collection method (triangulation). Mailed questionnaires returned the highest scale reliability at 0.9659, followed by telephone questionnaire at 0.9570, and exit interviews at 0.9358. Since the three different applications of the same questionnaire resulted in similar reliability measures, it can at least be argued that the necessary condition for construct validity is present, and that, observed scores are unlikely to be artefacts of the type of data gathering method. However, when triangulated data was subjected to one-way analysis of variance

(F-test), the results were an F-ratio of 46.3174 at a significance level of .0000. These results suggest acceptance of the alternative hypothesis that there is a significant difference between the variances of scores collected through different methods, implying certain violation of construct validity. This aspect of instrument validity is probed again in Chapter Six, section 6.4.1, from the perspective of stability of factor structures by comparing data collected here with new data collected in the main model testing stage of the study.

Criterion validity was also tested by examining the correspondence between answers to the question on overall quality rating (OVERALLQ) and sum of scores across all items (SCOREQ). Spearman's Rho of 0.7216 at an observed significance level of .000 (or, Pearson's r of 0.7198 at $p=.000$) supports the main contention behind criterion validity that the observed results are not an artefact of the instrument, that is, there is a high correlation between results from instruments designed to measure the same construct (Churchill 1979b). Criterion validity was further probed by examining the instrument scores of respondents answering Yes to the question whether they would recommend their branch and No to the question whether they ever complained about branch services, and vice-versa. As expected, the means of variable SCOREQ, were significantly different, with a higher mean on the Yes/No combination (see Table 5.8).

Table 5.8: T-test for Independent Samples of Yes/No Response Combinations

VARIABLE	NUMBER OF CASES	MEAN	SD	SE OF MEAN	
SCOREQ					
YESNO 1 (Y/N)	522	40.0197	8.786	.385	
YESNO 2 (N/Y)	100	26.1193	6.878	.688	
Mean Difference = 13.9004					
Levene's Test for Equality of Variances: F = 7.714					
P = .006					
t-test for Equality of Means					
Variances	t-value	df	2-tail sig	SE of Diff	95% CI for Diff
Equal	14.96	620	.000	.929	(12.076, 15.725)
Unequal	17.64	167.45	.000	.788	(12.344, 15.457)

Response bias in data collected through mailed questionnaires was also tested by computing separate scale reliabilities on the first two-thirds and the last one-third of responses returned; the scale reliabilities emerged as 0.9666 and 0.9649 respectively. The difference is small enough to indicate there was no significant response bias.

5.2.4 CONCLUSION

The outcome is an efficient, easy-to-use set of items tapping into the customer service quality as perceived by the customers (as opposed to branch staff or bank management). The six

dimensions conceptualised at the start of the pilot stage with 27 items were empirically reduced to 17 items across 4 discriminating factors. The observed factors are well-defined as evidenced in the rotated matrix. The dimensions to emerge are *Staff Conduct*, *Credibility*, *Communication*, and *Access to Teller Services*. Instrument's reliability, dimensionality, and validity have been empirically tested; the results are encouraging both in their own right, and when compared to other studies. Further testing of external validity of this construct is attempted in Chapter Six, section 6.4.1, by employing the fresh data collected in the main model testing stage (Cohen and Hammer 1966, p.14).

The study is the first of its kind targeting branches of an Australian commercial bank, with emphasis on retail operations. Equally significant is the instrument investigating the importance of each quality item, providing a more refined measure compared to instruments without importance weights. The emergence of this instrument is particularly timely for Australia and for other countries in a similar position, where deregulation of the banking industry (and the accompanying fiercer competition) is manifesting itself in the form of branch network rationalisation of the major commercial banks.

In addition to integrating the findings of this study into branch performance measurement, applications of the instrument can be further expanded to segmenting the customer base in accordance with customers' needs by attaching socio-economic

items; diagnosing problem service areas by examining scores across dimensions and items; and, considering importance scores in formulating solutions for problem areas. Finally, the seventeen items describing customer service quality are entered into multiple regression analysis in Chapter Six.

5.3 MANAGERIAL COMPETENCE OF THE BRANCH MANAGER (BSPV)

The aim is to develop a multi-dimensional instrument that can measure managerial competence of a branch manager. Once again, the intention is to arrive at an efficient key item pool that will distinguish between branches. The study of managerial competence, as one of the factors defining branch potential to perform, is particularly appropriate if the executive managers are interested in prospective information that can be used in short- to medium-term strategic planning. On the other hand, accounting indicators cannot be confidently used for planning purposes, due to the retrospective nature of such information. An examination of managerial competence can provide insights into why a branch is contributing only a certain amount, and provide direction for remedial action.

5.3.1 CONCEPTUAL FRAMEWORK

Managerial competency can be defined as "...an underlying characteristic of a manager that results in effective and/or superior performance in a managerial job" (Boyatzis 1982, p.21). In this definition, the inherent assumption is that there are no factors in play preventing translation of competencies into superior performance. In practice, there could be organisational and personal factors obstructing such a manifestation (Furnham 1990). Presence of a gap between competencies and performance is expected to be reflected in the Model's measurement of branch potential and branch performance.

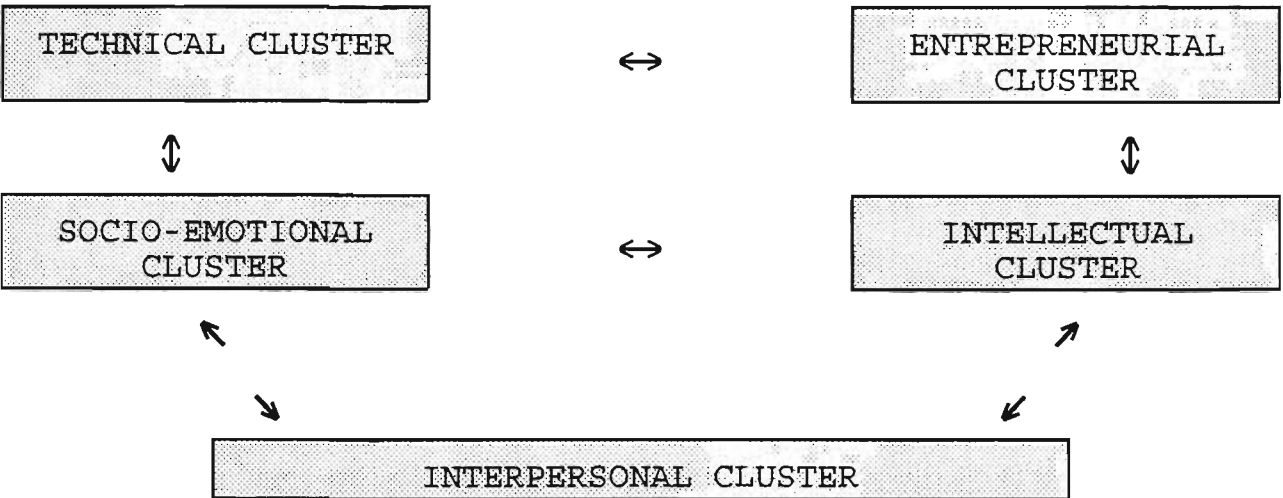
To distinguish managerial competency related potential between branches, findings from Chataway's (1982) naturalistic inquiry was used as the starting point. In his doctoral study of Victorian bank branch managers' competencies, Chataway identified 44 *needed competencies* (see Appendix C). The so-called *needed competencies* of the branch manager are defined as "...those competencies possessed in some degree by all successful [bank branch] managers" (Chataway 1982, p.356). With few exceptions, the original list of needed competencies identified by Chataway (1982) are conducive to direct observation by branch staff in the course of everyday contact.

Chataway classified the needed competencies into core, marginal, and inferred competencies. Core competencies are

those that manifest themselves most intensively during the course of everyday branch work; marginal competencies are competencies observed other than core competencies; inferred competencies encompass those competencies not directly shown by branch managers while under observation, but nevertheless essential to managing the branch.

However, more pertinent to this study is the way Chataway's 44 needed competencies are grouped in terms of purpose, where sets or categories within a cluster are more closely related to each other than to other clusters. These clusters can essentially be construed as the basic dimensions of Chataway's managerial competence model. Integration of bank management competencies by Chataway (1982) is reproduced in Figure 5.1; it should be noted that this model is an adaptation of the general competency model developed by Boyatzis (1982).

Figure 5.1: **Integration of Bank Management Competencies**
(Source: Chataway 1982, p.333)



The *technical cluster* refers to a branch manager's "expertise and knowledge of banking" (Chataway 1982, p.334). Within this cluster, efficiency orientation focuses on highest achievable

standards with best utilisation of resources. The *socio-emotional cluster* refers to the "personal development and maturation of bank managers" (Chataway 1982, p.335). Self-confidence, self-control, and stamina are the three categories under the socio-emotional cluster. The *entrepreneurial cluster* refers to "how a bank manager takes initiative toward his work and the internal and external environment" (Chataway 1982, p.336). The *intellectual cluster* refers to "how managers think and use analytic reasoning" (Chataway 1982, p.337); categories within this cluster are objectivity, and logical thought and use of concepts. Finally, the *interpersonal cluster* refers to "how managers interact with people" (Chataway 1982, p.339); two categories are use of communication, and developing others and managing group processes. The 44 needed competencies and how they relate to the five clusters outlined above can be seen in Appendix C.

It is proposed that immediate subordinates of the branch manager be the appraisers. This approach recognises the fact that managers achieve results through people (Bernardin and Beatty 1987), and that branch staff's perspective of branch manager's performance is crucial to the smooth running of the branch and effective team work. Mount points out that "...the greatest value [of subordinate appraisals] is in highlighting problems or areas of concern for the managers" (Mount 1984a, p.317). Further justification for enlisting the immediate subordinates of branch managers in evaluating competence of the branch manager (rather than directly surveying the manager)

would be the point made by Boyatzis (1982) that some of the characteristics that make up a competent manager may be unknown to the manager. Similarly, appraisals by superiors and peers would be considered equally unacceptable given the nature of the needed competencies and limited contact these people would have with the branch manager on a day-to-day basis. Evaluation of managers' performance by employees is known as *upward evaluation*, and it is an increasingly popular approach used by top American companies such as AT&T, Du Pont, and 3M.

Further support for use of subordinate appraisals can be found in the arguments below:

[subordinates] are often in a good position to observe and evaluate managerial performance on several dimensions...because appraisals are often collected simultaneously from several subordinates, multiple assessments are potentially more accurate than the most commonly used supervisor-only rating...a formal subordinate appraisal system is compatible with employee commitment and involvement models [of management] that are gaining greater support. (Bernardin and Beatty 1987, p.63)

5.3.2 RESEARCH DESIGN

The overall methodology was to solicit feedback on appropriateness and importance of the competency items from bank management, branch managers, and immediate subordinates of branch managers (Jacobs 1989) prior to the main stage survey. In the main stage survey, the questionnaire of the subordinate with less than three months of service with the particular

branch manager was excluded in order to enhance the quality of assessment of the branch manager's competencies.⁴² Anonymity of respondents was maintained to encourage feedback. Furthermore, it was deemed preferable if the branch manager were not present when the subordinate was answering the questionnaire (Bernardin and Beatty 1987). Details of the above outlined procedure follows.

As part of the exercise to streamline the construct's domain, Chataway's 44 needed competencies were regrouped, double-barrelled items separated and reworded. The emerging item pool was presented to the consultative panel, seeking assessment of each item's importance, appropriateness, whether the competence could be observed by an immediate subordinate, and quality of wording. The consultative panel was encouraged to freely comment on possible missing items. Items were also compared with the performance outcomes in the Model in order to build in a close link between potential variables and performance outcomes (see Chapter Three, section 3.4.4). Points to emerge from confidential executive management memoranda were also incorporated in the item pool. Other sources of reference consulted in shaping the item pool include Shtogren (1980), Walton (1985), Bernardin and Beatty (1987), and Donnelly, Gibson, and Skinner (1988-89).

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This assumes that a branch staff who has been supervised by the branch manager for less than three months would not have had the opportunity to observe the full range of competencies surveyed.

In pretesting, the enlarged pool of 72 items was then mailed out to regional managers, branch managers and their immediate subordinates, seeking feedback on questions similar to those posed to the consultative panel (112 responses were received). A five-point importance scale *Not Important* to *Very Important* accompanied the pre-test questionnaire. Based on the returned comments, some items were reworded and others deleted. Deletions were carried out in line with joint consideration of a number of different criteria; for example, those identified as *not appropriate for a branch manager*; *difficult to observe by the subordinate*; or those items scoring, on average, less than 4 on the importance scale (where the maximum possible score was 5).

In the main stage, when only the immediate subordinates of branch managers were surveyed, the questionnaires were addressed to positions rather than names, given the sensitive nature of the survey. Significance of anonymous rating of a manager is also emphasised by Mount (1984b). In the cover letter, a suggestion was made that the questionnaire would best be completed outside the workplace, in order to minimise the possibility of intimidation (Bernardin and Beatty 1987). Three hundred and twenty two (322) immediate subordinates⁴³ of branch

⁴³ The nine branch-classified positions identified for the survey were:

- Manager Customer Service
- Manager Loans
- Assistant Manager Loans
- Supervisor Customer Services
- Supervisor Operations
- Senior Loans Officer
- Loans Officer
- Assistant Accountant
- Supervisor Teller Services

managers were targeted in the Eastern Zone with 158 responding, whereas 224 positions in the Central Zone received a shuffled version of the same questionnaire with 119 responding. The original questionnaire was shuffled by re-ordering the questions in the second-half as the first-half, and vice-versa, as part of the test of response bias. Recipients were asked *To what extent does your branch manager possess the competencies listed?*. A five point scale *Not at all* (0) to *To a great extent* (4) was provided for rating. An additional question accompanied the shuffled version where the respondents were asked to provide an overall rating of the branch manager's competence on a five-point scale of *Poor* (0) to *Excellent* (4); this is part of the research design to test for criterion validity of the instrument. The following null hypotheses were formulated:

$H_0 =$ Correlation between OVERALLC and SCOREC is 0
(criterion validity).

where OVERALLC= overall rating of branch manager's
competence.

SCOREC = total score across all competence
variables.

$H_1 =$ There is a significant correlation between OVERALLC
and SCOREC.

$H_0 =$ There is no significant difference between SCOREC on
the regular and shuffled versions of the
questionnaire (response bias).

H_1 = There is a significant difference between SCOREC on the regular and shuffled versions of the questionnaire.

Coefficient alphas were investigated as a measure of dimensional reliability on the premise of internal consistency (Churchill 1979b, and Peter 1979). Total scale reliability was probed by Reliability of Linear Combinations (Nunnally 1978). Factor analysis was used to verify dimensionality of the instrument and assess construct validity.

5.3.3 RESULTS AND ANALYSIS

During the initial stages of developing the competency item pool, the 44 needed competencies identified by Chataway (1982) in his doctoral thesis had grown to 72 items. At the end of the pretesting stage, feedback from a larger group of bank managers and their immediate subordinates necessitated reduction of the item pool to 58 items, on the premise of certain items being considered inappropriate for a branch manager, difficult to observe by subordinates, or simply not sufficiently important. In summary, the questionnaire used in the main stage gained two more categories over Chataway's needed competencies, namely, *participative management*, and *asset and liability management*. Participative management category was then conceptualised as a separate dimension; asset and liability management category was subsumed to the already

existing dimension of entrepreneurial style. Participative management is also one of the effective bank management behaviours identified by Donnelly, Gibson, and Skinner (1988-89), whereas asset and liability management is an area of competence indicated by Para Bank in their formal performance appraisal system. Furthermore, Chataway's (1982) categories of *entrepreneurial style*, *developing others* and *managing group processes*, and *logical thought and use of concepts* were expanded. The conceptualised dimensions across the 58 items on managerial competence of the branch manager are outlined below (see Appendix C for details of items):

D1: *Entrepreneurial Style* (items 1-20):

Particular disposition toward performing a range of tasks including delivery of customer service, financial management of branch, identifying lending and deposit opportunities, and dealing with change.

D2: *Interpersonal Skills* (items 24-36, 43-46):

Motivating branch staff to work effectively as a team, while fostering a non-discriminatory work environment where staff can develop to their full personal potentials.

D3: *Intellectual Capacity* (items 21-23, 47-51, 57-58):

Identifying and recognising patterns in multitude of information and making appropriate decisions, remaining in touch with changing conditions, and being knowledgeable about banking culture.

D4: *Participative Management Style* (items 37-42):

Encouraging staff to participate in the decision-making processes, maintaining an open relationship with staff, and building trust.

D5: *Emotional Maturity* (items 52-56):

Ability to deal with pressure and demonstrate self-confidence.

From the main stage mail out, 277 cases were collected; this constitutes a response rate of 50.73 per cent. As the first step in testing the scale, coefficient alphas were calculated for each of the five conceptualised dimensions. The results were 0.9478 (D1), 0.9510 (D2), 0.9083 (D3), 0.8538 (D4), and 0.8554 (D5), indicating internally consistent dimensions.

The 58 variables were then factor analysed through Principal Axis Factoring. The factor matrix was rotated orthogonally using the Varimax method. SPSS extracted 7 factors which explained 62.3 per cent of variance. Variables loading less than 0.5 were omitted in the final analysis; this meant that ultimately 45 of the variables across 3 factors would be retained. Table 5.9 shows factor loadings on all variables after orthogonal rotation, highlighting those loadings 0.5 or above.

Table 5.9: Orthogonally Rotated Factor Matrix of Managerial Competence Items

VARIABLE	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
47	0.74102	0.24661	0.28419	-0.06011	0.13312
41	0.69145	0.23492	0.13869	0.10832	-0.00587
46	0.68328	0.18253	0.24776	0.14408	0.29590
48	0.67368	0.10253	0.46213	0.21230	0.06740
31	0.67321	0.22230	0.18704	0.39258	-0.03326
40	0.65141	0.20975	0.07899	-0.01681	0.05467
49	0.64527	0.14743	0.46751	0.13019	0.05316
32	0.62568	0.26355	0.17953	0.27882	0.04902
43	0.60165	0.36136	0.03812	0.29839	-0.13608
44	0.59378	0.24571	0.32119	0.35857	0.08903
34	0.58817	0.32754	0.18559	0.19433	0.05134
36	0.58053	0.16161	0.23567	0.44551	0.09388
29	0.57057	0.32240	0.13128	0.46279	0.07152
33	0.55128	0.19316	0.40813	0.27678	-0.02721
35	0.54783	0.26839	0.31964	0.38976	-0.02913
42	0.54160	0.25410	0.21223	0.08489	-0.04614
45	0.53547	0.09528	0.50863	0.10181	0.19507
39	0.52259	0.30653	0.40588	0.11379	-0.19989
38	0.51559	0.35203	0.23176	0.43661	-0.16919
51	0.51554	0.34560	0.31073	0.21061	-0.28760
19	0.19726	0.79826	0.15659	0.09785	-0.03177
20	0.20132	0.78941	0.08582	0.07747	-0.03349
15	0.12367	0.65677	0.42347	0.13880	-0.02657
04	0.28898	0.64135	0.15299	0.08014	0.07520
21	0.39711	0.63684	0.21092	0.21169	0.13789
26	0.30835	0.62822	0.21089	0.28559	0.11753
27	0.40909	0.62321	0.28830	0.22608	0.07030
16	0.25804	0.57165	0.22387	0.15742	0.10289
18	0.25537	0.57059	0.30284	0.09955	0.03019
17	0.15729	0.56186	0.39597	0.24103	0.10857

28	0.49491	0.55026	-0.05165	0.18841	-0.02772
24	0.38152	0.53299	0.31580	0.41714	0.20311
06	0.18141	0.52907	0.42395	0.24909	-0.02693
02	0.28509	0.52364	0.36037	0.16827	-0.04860
01	0.20262	0.52180	0.42669	0.18817	-0.06557
07	0.12941	0.51952	0.40910	0.07959	-0.02148
37	0.46849	0.50862	0.24474	0.18550	-0.17912
05	0.23911	0.49102	0.47688	0.06029	0.17493
03	0.23720	0.45826	0.38723	0.25705	0.12053
23	0.33974	0.45489	0.28174	0.17867	0.10764
57	0.25228	0.06108	0.78200	0.06783	0.21522
58	0.17173	0.32422	0.69344	-0.04754	-0.04224
14	0.09751	0.35952	0.65628	0.27706	-0.01947
56	0.39840	0.23211	0.61963	0.36153	0.08532
50	0.37563	0.27774	0.60452	0.21695	-0.10225
55	0.39363	0.18809	0.58073	0.41622	0.03921
09	0.14764	0.38926	0.57271	0.29315	0.06834
53	0.38264	0.42950	0.55914	0.23883	0.04179
52	0.37859	0.25208	0.46563	0.09371	-0.01424
22	0.27163	0.38249	0.41366	0.39312	0.01361
12	0.19288	0.33369	0.38352	0.14916	-0.06907
30	0.50676	0.31840	0.18720	0.59234	-0.02948
08	0.27508	0.24599	0.48217	0.49869	0.14610
13	0.18405	0.25117	0.39646	0.44570	0.00955
10	0.40427	0.34773	0.28374	0.43818	0.18453
54	0.18416	0.24965	0.31612	0.17288	0.38554
VARIABLE	FACTOR 6	FACTOR 7	VARIABLE	FACTOR 6 (cntd.)	FACTOR 7 (cntd.)
47	0.01357	-0.06922	18	0.02703	-0.36571
41	0.00149	-0.04623	17	-0.16478	-0.11107
46	-0.09337	0.06997	28	-0.00254	0.02955
48	0.01332	-0.05559	24	-0.02315	0.06502
31	0.00325	-0.00650	06	0.17557	0.14841

40	0.02377	-0.14457	02	0.19600	0.00594
49	0.08040	-0.11725	01	0.02393	0.17178
32	0.20450	0.00978	07	0.27241	0.01620
43	0.02777	0.17514	37	0.07627	0.19409
44	0.00168	0.03624	05	0.29043	0.02997
34	0.24320	-0.00962	03	0.07889	0.03852
36	0.10533	0.02336	23	-0.10164	-0.13441
29	-0.05475	-0.01597	57	0.13845	-0.02918
33	0.30762	-0.12622	58	-0.00943	0.02066
35	0.00660	-0.00288	14	-0.00663	-0.04218
42	0.10236	0.19674	56	0.05619	0.07788
45	-0.10859	-0.05122	50	-0.03881	-0.04329
39	-0.00284	0.06712	55	0.07525	0.11054
38	0.11784	0.11840	09	0.08479	-0.01832
51	-0.09614	0.12204	53	-0.02662	0.17235
19	-0.10106	-0.13796	52	-0.16557	-0.02768
20	0.02065	-0.12626	22	-0.04955	-0.05279
15	0.05511	0.05794	12	0.23058	-0.26171
04	0.24127	-0.00538	30	-0.04647	0.07310
21	-0.04998	0.01813	08	0.21356	-0.04862
26	0.00095	0.25507	13	0.00161	-0.20009
27	0.05244	0.21917	10	0.13156	-0.00162
16	-0.00592	0.01512	54	0.01361	0.01430

Close inspection of the variables retained indicated conceptualised dimension 2 (Interpersonal Skills) losing a small number of items to factor 2 (Entrepreneurial Style); dimension 3 (Intellectual Capacity) being shared between factor 1 (Interpersonal Skills) and factor 3 (Emotional Maturity and Experience); and, dimension 4 (Participative Management Style) migrating to factor 1 (Interpersonal Skills). This is not an altogether unexpected result since participative management of

the branch manager is likely to be regarded as part of his or her interpersonal skills by those subordinates making the appraisal. The overall change from conceptualised dimensions to the three retained factors is best interpreted as consolidation of conceptually related items; this can be construed as supportive evidence for construct validity. Consistent with the rotated factor matrix, operational definitions of the scale factors were re-stated as:

F1: *Interpersonal Skills:*

Ability to respond to staff's needs positively, fostering a non-discriminatory work environment where staff can develop to their full personal potentials, and delegating authority.

F2: *Entrepreneurial Style:*

Particular disposition towards performing a range of tasks including delivery of customer service, identifying market opportunities, practicing proactive decision-making, setting achievable goals, motivating staff to work as a team, and dealing with change.

F3: *Emotional Maturity and Experience:*

Ability to focus on central issues under pressure while maintaining a sense of humour, demonstrating initiative, perseverance, and knowledge of banking.

Factorability of the correlation matrix was further tested by instructing SPSS to calculate Bartlett's Test of Sphericity; at an observed significance level of 0, 12425.823 was returned. Hence, the hypothesis that *the population correlation matrix is*

an identity matrix was clearly rejected (Norusis 1992). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was recorded at 0.96127, regarded as *marvellous* by Kaiser (1974); according to Tabachnick and Fidell (1989), values of 0.6 or above are needed for good factor analysis.

Coefficient alpha was re-visited for the 3 factors retained following rotation. Factor reliabilities were recorded as 0.9597 (F1), 0.9523 (F2), 0.9284 (F3). In measuring total scale reliability, Nunnally's (1978) equation for Reliability of Linear Combinations was used; an equally gratifying scale reliability was noted as 0.9872.

Validity and reliability of the scale was further probed on two fronts, namely, criterion validity and response bias, by testing the two null hypotheses put forward under Research Design. Spearman's Rho of 0.8695 at an observed significance level of 0 (or, Pearson's r of 0.8657 at $p=.000$) on OVERALLC against SCOREC is highly indicative of criterion validity, where it can be argued that the observed results are *not* an artefact of the instrument; that is, there is a high correlation between findings from the two instruments intended to measure the same construct (Churchill 1979b). The second null hypothesis, stating that there is no difference between scores on the regular and shuffled versions of the questionnaire, was tested through Mann-Whitney U. The two-tailed probability is 0.1693, implying that the null hypothesis

cannot be rejected at 5 per cent level of significance (see Table 5.10). This is evidence for absence of response bias.

Table 5.10: Mann-Whitney U - Wilcoxon Rank Sum W Test of Managerial Competence Scores

SCOREC BY VERID			
MEAN RANK	CASES		
144.74	158	VERID = 1.00 REGULAR	2-TAILED P
131.38	119	VERID = 2.00 SHUFFLED	.1693

5.3.4 CONCLUSION

A group of three factors with 45 variables emerged as the managerial competence instrument. Reliability, dimensionality, and validity of the instrument have been tested with gratifying results. Further testing of external validity and reliability of this construct is attempted in Chapter Six by employing the fresh data collected in the main model testing stage (see sections 6.4.2 and 6.4.3 respectively). The three factors, namely *interpersonal skills, entrepreneurial style, and emotional maturity and experience* define the key competencies of a branch manager as appraised by immediate subordinates. The scale measures *that* part of branch potential attributable to managerial competency of branch manager.

In addition to measuring the branch manager's competence, the recommended application of the scale is for diagnosing problem areas in management of the branch, rather than remuneration.

As such, the branch manager can be informed about the overall findings in an appropriate language and invited to comment. This is an integral part of any upward evaluation. Depending on how open an organisation is, it is also conceivable, yet highly politically sensitive, to encourage respondents to identify themselves. Nevertheless, experience shows that this is not a practical proposition unless the organisation is already familiar and comfortable with the use of upward evaluations. It would be advisable to interpret the findings of the instrument in the context of organisational constraints and personal limitations.

In measuring the managerial competence of a branch manager, the questionnaire should preferably be forwarded to four branch-classified supervisory positions at the branch. Latham and Wexley (1981) suggest a minimum of 3 subordinate ratings per manager; sum of ratings can provide an overall branch managerial competence score. In organisations experimenting with upward evaluation, every effort should be made to assure confidentiality of responses, given the sensitive nature of the questionnaire.

As in development of the previous construct, customer service quality, the major application of the managerial competence construct is two-fold: a) using the construct independently to measure overall managerial competence, and b) entering the emerging 45 competency items into multiple regression analysis

in Chapter Six, with the aim of identifying those items explaining various measures of branch performance.

5.4 EFFECTIVE PRACTICE OF BENCHMARKING (BSPV)

The aim of this construct is to measure the extent of effective practice of benchmarking, that is, proactive searching behaviour related to improving branch operations and performance. A group of branch staff⁴⁴ were consulted to determine the items defining the domain of this construct. A mean effectiveness rating was calculated for each of the incidents identified in an effort to quantify the construct. Branch managers were surveyed for final scoring on branches.

5.4.1 CONCEPTUAL FRAMEWORK

Camp provided a simple definition for benchmarking as "...the search for industry best practices that will lead to superior performance" (Camp 1989a, p.68).

An expanded definition from the benchmarking menu of Spendolini is adapted for this construct:

A continuous systematic process for comparing the work processes and key performance factors of organisations that are recognised as representing

⁴⁴ Comprised of branch manager, manager customer service, manager loans, and supervisor operations.

best practices, for the purpose of meeting or surpassing overall industry best practices. (Spendolini 1992, p.10)

An example of work processes would be the way a personal or small business loan is processed. Examples of key performance factors can be number of customer complaints, cross-selling ratios, deposit growth, number of non-performing loans, fee income and so on.⁴⁵ As part of the benchmarking process, the best practices uncovered internally, among industry leaders, and among other industries are adopted or adapted; benchmarking can be further regarded as devising practices to exceed the best practices.

The importance of studying benchmarking as part of the Model can be further highlighted by listing the five principal benefits:

1. End-user requirements are more adequately met.
2. Goals based on a concerted view of external conditions are established.
3. True measures of productivity are determined.
4. A competitive position is attained.
5. Industry best practices are brought into awareness and sought. (Camp 1989b, p.76)

An organisation exhibiting benchmarking behaviour will have a better appreciation of the need for continuous change to achieve superior performance in constantly shifting market conditions. McNair and Leibfried (1992) refer to benchmarking

⁴⁵

As part of theoretical integration of potential variables and performance outcomes, the key performance factors suggested as examples correspond to the performance outcomes identified in Chapter Three, section 3.4.4.

as an excellent tool for fostering a continuous improvement culture in an organisation.

The following dimensions are envisaged as part of sampling the benchmarking domain:

Table 5.11: Matrix of Conceptualised Dimensions

	Level of Benchmarking		
Area Benchmarked	Internal	Against Industry Leaders	Against Other Industries
Key Performance Factors	D1	D2	D3
Work Processes	D4	D5	D6

D1: Internally comparing outcomes on key performance factors in different functional areas of a branch:

Internal benchmarking is normally regarded as the starting point where the focus is on different parts of the benchmarking organisation (Spendolini 1992). Examples of functional areas are customer services, operations, loans, and deposits. An example of this benchmarking dimension would be *number of active deposits is compared to that of branches with similar socio-demographic profiles.*

D2: Comparing outcomes on key performance factors in different functional areas of a branch with that of industry leaders:

For example, non-performing loans and that of the perceived competitor in the same catchment area are monitored simultaneously.

D3: *Extending comparisons of key performance factors of a branch to other industries:*

For example, cross-selling ratios are compared with that of successful corporations in other industries.

D4: *Internally comparing work processes of a branch:*

For example, manner of customer service delivery to clients wanting to establish home loans is benchmarked against training guidelines.

D5: *Comparing work processes of a branch with that of industry leaders:*

For example, selling skills of branch staff are upgraded by observing better practices in the industry.

D6: *Extending comparisons of work processes of a branch to other industries:*⁴⁶

For example, cross-selling procedures are reviewed against practices in other industries.

5.4.2 RESEARCH DESIGN

A behaviourally anchored scale was devised to measure the extent of effective practice of benchmarking. This type of

⁴⁶ According to Camp, "...people are more receptive to new ideas and their creative adoption when those ideas did not necessarily originate in their own industry" (Camp 1989a, p.66).

scale requires determining the behavioural incidents defining the domain of construct under investigation, and assigning effectiveness ratings. A behaviourally anchored scale was deemed appropriate for the following reasons:

- a. Avoids use of arbitrary adjectives. Higher instrument reliability can be expected if the scale can be written in Banking jargon.
- b. It can isolate behaviours relevant to benchmarking.
- c. The participatory nature of item generation should result in an instrument with content validity (Schwab, Heneman, and DeCotiis 1975).

The proposed procedure for developing a behaviourally anchored scale is outlined below (framework adapted from Smith and Kendall 1963; Schwab, Heneman, and DeCotiis 1975; Atkin and Conlon 1978; Dickinson and Zellinger 1980):

- a. A group of 18 branch-classified managers/supervisors are asked to generate a range of typical incidents that represent actual examples of the six conceptualised dimensions or more. This step is expanded below:
 - i. In the first stage, 18 participants are asked to independently write typical examples (behavioural incidents) for each dimension in Banking jargon. Participants are also encouraged to identify those examples that may not belong to the conceptualised dimensions.
 - ii. In the second stage, participants are placed into groups of three; people who may be acquainted with

each other are seated in different groups (Fern 1982). Within each group, participants are asked to compare notes and generate a joint list of typical benchmarking examples.⁴⁷

iii. In the third stage, the researcher qualitatively assesses the lists and composes a single list of incidents to be presented to the group of three experts.

The researcher's role is no more than that of a moderator during the group meeting. Only a small number of examples and simple guidelines are provided to the participants in order to minimise biasing the thought processes. The normative nature of the exercise is explained to the participants.

b. An independent group of 3 banking experts retranslates the incidents as follows:

Each incident is independently assigned to one of the dimensions. An incident allocated to the same dimension by at least 2 of the experts is retained (Schwab, Heneman, and DeCotiis 1975, suggest a minimum of 50-80 per cent agreement before retention).

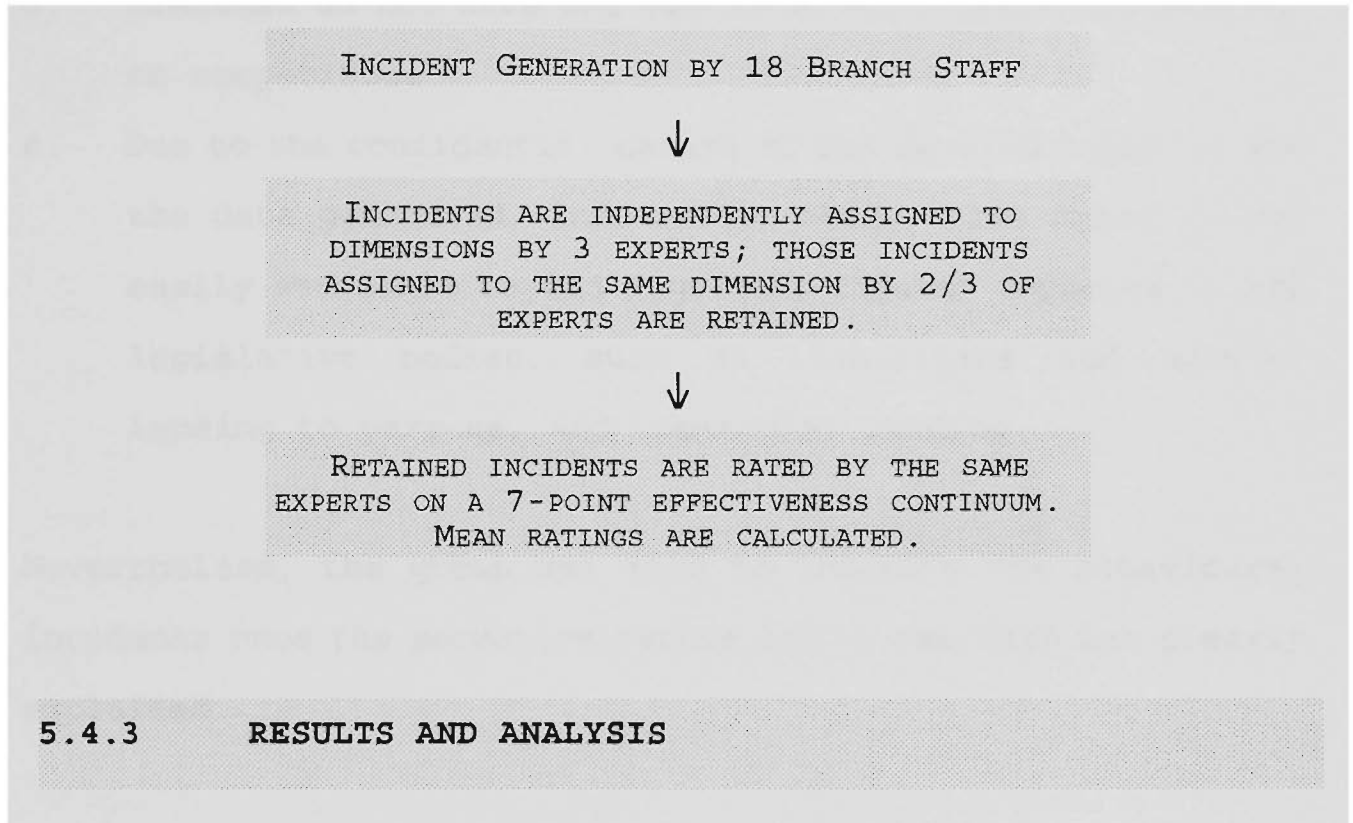
c. The group of experts from the previous step is then asked to rate the retained incidents on the basis of their degree of association with their corresponding dimensions. For example, on a 7-point scale, a certain incident may be rated as 1, indicating the behaviour described to be an

⁴⁷

At the end, there should be (at least) six incident lists covering six dimensions.

ineffective representation of that dimension, or 7, indicating effective representation. A mean rating is calculated for each incident.

Figure 5.2: Summary of Developing a Behaviourally Anchored Scale



Sixteen participants showed up on the day of the meeting, and the group discussions yielded 34 behavioural incidents (see Appendix D). The number of incidents was rather less than anticipated for the first stage of scale development. Probing of participants and perusal of their meeting notes revealed that benchmarking existed only at a primitive level at Para Bank's branches. The following reasons were detected:

- a. To date, there has been no official branch level training on how to benchmark.

- b. The current management style is top-down and centralised; therefore, the branch working environment is not conducive to benchmarking activities.
- c. Branch managers have little discretion in goal-setting.
- d. Branches do not have the resources to collect information on competitors.
- e. Due to the confidential nature of the banking industry and the data generated, information about other banks is not easily available beyond aggregate figures reported to the legislative bodies, such as liabilities and assets, lending to persons, and commercial lending.

Nevertheless, the group was able to generate the behavioural incidents once the normative nature of the exercise was clearly explained.

Analysis of items revealed a total of six multiple-item dimensions. The third conceptualised dimension (D3), that is, *extending comparisons of key performance factors of a branch to other industries*, dropped out, and a new dimension came in, named *identifying sources of benchmarking information*. The third conceptualised dimension (D3) was omitted because only one of the incidents could be traced to it.

In the retranslation stage, all the incidents passed the threshold of 2/3, that is, incidents were allocated to the same dimensions by at least 2 of the 3 experts (a listing of the incidents is provided in Appendix D). The same group of

experts then independently rated each item on a 7-point scale of effective representation of their corresponding dimensions. The mean incident ratings are reported in Appendix D against each item.

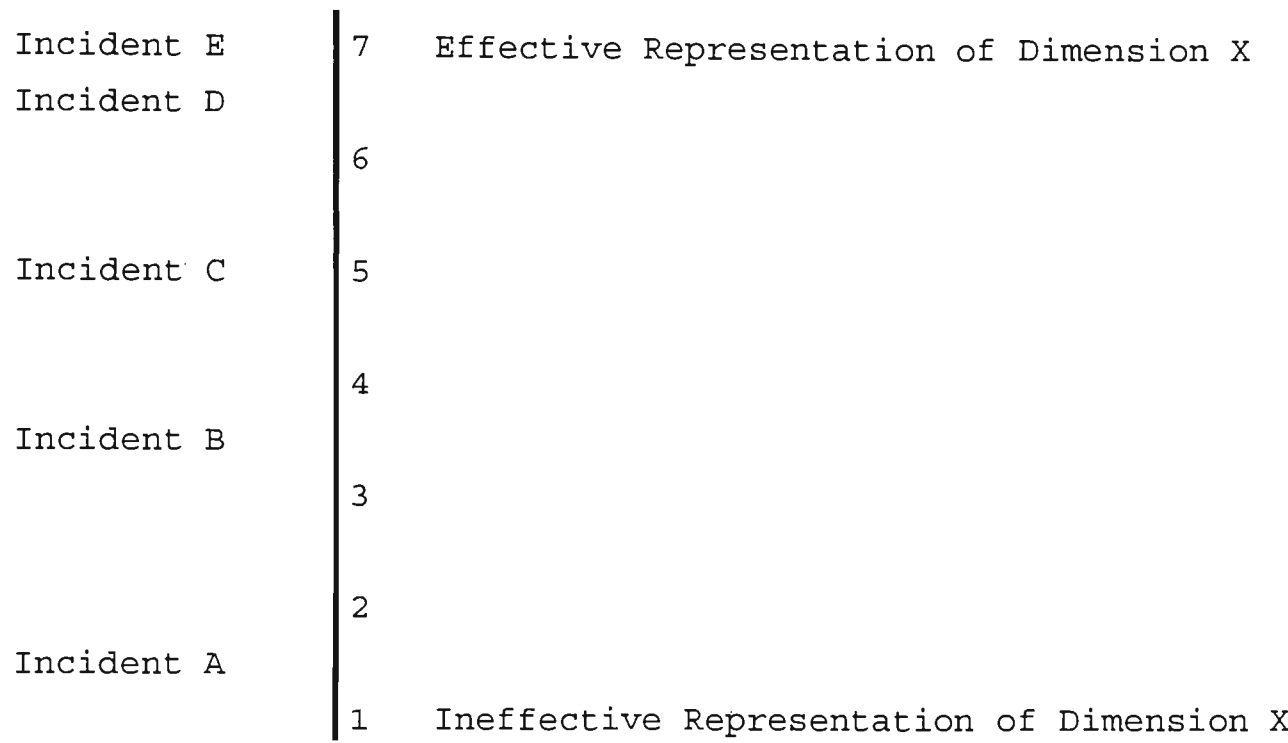
5.4.4 CONCLUSION

Six dimensions composed of 34 behavioural incidents define the instrument. Statement of incidents in Banking jargon and use of branch staff in incident generation brings reliability and content validity to the instrument. The behavioural incidents are of a universal nature in banking. However, this should not preclude different institutions adding other items of interest to the list of behavioural incidents to reflect particular mixes of business activities. The simple nature of the methodology should also facilitate replication of the study for businesses other than banking.

The scale can be applied by asking the branch manager to identify the incident that best describes the branch on a dimension. However, the mean incident effectiveness ratings should not be revealed to the branch manager, in order to eliminate bias, due to the tendency to choose those incidents with higher ratings. The sum of the mean incident ratings across all dimensions provides a benchmarking score for the branch. The branch under scrutiny can be provided with more detailed feedback by charting its position on different

dimensions. A vertical scale for each dimension, anchored by the retained behavioural incidents, can be used for this purpose (see Figure 5.3 below).

Figure 5.3: A Behaviourally Anchored Scale



Note: The number of anchors on the vertical scale will depend on the number of incidents retained in a dimension.

The value of the instrument lies not only in the benchmarking score generated, which can be used as part of an overall measure of branch potential, but in the message conveyed to the branch managers in the process. The process becomes an important awareness-raising exercise. As indicated by Pryor, "...Much of the benefit comes from the required analysis of your company's own operations and the external orientation that benchmarking engenders" (Pryor 1989, p.31).

5.5 USE OF THE DECISION SUPPORT SYSTEM (BSPV)

The aim of this scale is to accommodate in performance measurement branch-classified managers' use of Para Bank's decision support system.⁴⁸ Inclusion of this potential factor in the Model is justified by the intuitive assumption that use of DSS improves the accuracy and quality of managerial decision-making, in the process enhancing the capacity of the branch to perform. Empirical support can be found for this assumption in the study by Plath and Kloppenborg (1989); similar but anecdotal evidence is provided by Carpenter (1991-92). According to Cale and Eriksen (1994, p.18), the decision support system is meant to improve the effectiveness of the decision-making process.

5.5.1 CONCEPTUAL FRAMEWORK

The DSS is defined as "...an interactive [computer-based] system that provides the user with easy access to decision models and data in order to support semi-structured and unstructured decision-making tasks" (Mann and Watson 1984, p.27). Bearing in mind that the objective of the study is to

⁴⁸

Those familiar with DSS research will recognise that use of DSS is often employed as a surrogate measure for assessing DSS success when use of the system is voluntary (Lucas 1978; Fuerst and Cheney 1982; Hogue 1989). However, the purpose of this scale is not to measure system success.

distinguish between branches rather than assess the organisational effectiveness of the bankwide decision support systems, it is deemed appropriate to limit the perspective on DSS to measurement of frequency of use of key reports/systems by branch management. The DSS technology and training opportunities are assumed to be equally available to all branches of Para Bank.

5.5.2 RESEARCH DESIGN

Although DSS has traditionally been used in higher echelons of management, the researcher is initially interested in discovering the extent DSS has permeated down to the branch level.⁴⁹ Here, the inherent assumption is that decision support is needed at every management level. The following criteria guided the analysis:

Essential Criteria For A DSS

- Supports but does not replace decision-making.
- Directed toward semistructured and/or unstructured decision-making tasks.
- Data and models organized around the decision(s).
- Easy to use software interface.

Additional Criteria For A DSS

- Interactive processing.
- DSS use and control is determined by the user.

⁴⁹ It is worth noting that EDP did start at lower operational levels, and MIS, which was originally practiced at middle levels (Sprague 1989, p.11-12), is now also part of decision-making at lower levels.

- Flexible and adaptable to changes in the environment and decision maker's style.
- Quick ad hoc DSS building capacity. (Hogue 1989, p.54) ⁵⁰

Senior management were interviewed, on-site inspections carried out, and relevant bank documents perused. Departmental managers involved in this area and a cross-section of branch management were also interviewed to determine the extent decision support systems can be found at branch level, those reports/systems deemed most important to decision-making at branch level, and the most likely users (see Appendix E).

5.5.3 RESULTS AND ANALYSIS

The search revealed the presence of the *essential criteria* only, with Para Bank's plans for the intermediate-term covering the *additional criteria*. This was considered an adequate basis to proceed with the study of the concept.

The following reports/systems were identified as supporting branch level managerial decision-making:

1. Reference Report
2. Exceptions Report
3. General Ledger Report
4. Savings Account Ledger

⁵⁰

Essential criteria are accepted as the minimum criteria for the presence of DSS at branch level to be considered significant.

5. Journal of Transactions Report
6. Balance of Accounts
7. Out of Order Report
8. Personal Loans Arrears Report
9. Manager's Performance Report
10. Branch Information System
11. Home Loan Simulator
12. ASSIST Terminal
13. Discovery (Telecom) Terminal

The branch-classified staff most likely to use them were determined as the *branch manager*, *manager customer service*, *supervisor operations*, and *manager loans*. A total of 40 such positions were surveyed by mailed questionnaire (see Appendix E) to identify the key reports/systems used in managerial decision-making, in the process refining the initial list of 13 reports. The emerging set of 7 reports/systems formed part of the questionnaire to be mailed to branches whose performances are scrutinised in cross-sectional testing of the Model (see Appendix E); once again, the branch-classified personnel are targeted. Scores for each branch are then aggregated and averaged by the number of respondents to standardise the final branch score.⁵¹

⁵¹ Although it would be outside the immediate scope of this study, it is also conceivable to investigate differences between branches by looking at the characteristics influencing DSS usage as identified by Fuerst and Cheney (1982, p.556) (see Appendix E, Table E.1).

5.6 PROFITABLE PRODUCT CONCENTRATION (PPC) (PeO)

The aim is to capture that part of branch performance attributable to the extent of presence of most profitable products. Product profitability is measured by *branch interest margin*. To preserve confidentiality, actual interest margins are not reported.⁵² Instead, those products with an interest margin of 4 per cent or more are ranked and used as part of the scoring scheme, where higher weights are assigned to the more profitable products. This profitability index is then multiplied by the corresponding number of products originated in the branch. A product profitability score for a branch can be arrived at in the following manner (this is only a limited example):

PRODUCT	B	A	D	C	E	
PROFITABILITY INDEX (1)	5	4	3	2	1	
NUMBERS ORIGINATED IN BRANCH (2)						TOTALS
X	50	100	150	400	500	1,200
Y	100	50	100	300	350	900
Z	250	200	200	150	100	900
(1) x (2)						
X	250	400	450	800	500	2,400
Y	500	200	300	600	350	1,950
Z	1,250	800	600	300	100	3,050
PPC						
X	2,400 / 1,200 = 2.00					
Y	1,950 / 900 = 2.17					
Z	3,050 / 900 = 3.39					

⁵² However, where the Model is applied internally, PPC score can be improved by using actual interest margins rather than rankings.

From the PPC scores in the above example, it can be inferred that there is a higher concentration of more profitable products in Branch Z.

Perusal of Para Bank's State Branch Performance Report revealed the following top nine products (ranked in descending order):

- Streamline Debit Balances
- Personal Credit Lines
- Small Business Loans
- Approved Advances (Business Overdraft)
- Residential Property Investment Loans
- Fully Drawn Loans
- Personal Loans
- Current Accounts Not-Bearing Interest
- Home Loans

Brief descriptions of these products can be read in Appendix F.

5.7 STRATEGIC PRODUCT CONCENTRATION (SPC) (PeO)

The purpose of generating the strategic product concentration score is to acknowledge *that* part of branch performance contributing to the direction provided by Para Bank on promotion of strategically significant products. The strategically significant products were defined and ranked in importance by Para Bank's executive management by considering

the main thrust from Head Office, targeted market segments, and market shares. They are:

Home Loans

Fixed Rate Term Advances

Residential Property Investment Loans

Streamline Accounts

Carded Term Deposits

Personal Loans

Approved Advances (Business Overdraft)

Brief descriptions of these products can be read in Appendix F. It should be noted that four of these strategic products, namely, home loans, residential property investment loans, personal loans, and approved advances also appear on the *most profitable products* list. A scoring procedure similar to that of the profitable product concentration (in the previous section) is used, where the profitability index is replaced by the importance index.

5.8 TANGIBLE CONVENIENCE (BSPV)

The single-item dimensions identified are surveyed by the questionnaire sent to branch managers, complemented by interviews whenever necessary. A weight has been assigned to each item based on importance ranking provided by 163 random exit interviews of Para Bank's customers. In the survey, customers were asked to rank the most important tangible

convenience feature as 1, the second most important feature as 2, and so on. Items ranked in order of importance (with average rankings indicated in brackets) are listed below:

$I_1(2.27)$: location at a regional shopping centre; 1 for 'Yes', 0 for 'No' (Clawson 1974, Soenen 1974).

$I_2(2.82)$: number of teller windows.

$I_3(3.42)$: location adjacent to or within walking distance of a regional shopping centre; 1 for 'Yes', 0 for 'No' (Clawson 1974, Soenen 1974).

$I_4(3.51)$: number of ATMs.

$I_5(4.04)$: presence of a free car park; 1 for 'Yes', 0 for 'No' (Heald 1972, Clawson 1974).⁵³

$I_6(5.18)$: proximity to public transportation (1 km or less); 1 for 'Yes', 0 for 'No'.

Hence, item 1 is allocated the highest importance weight (6), item 2 is given the weight (5), and so on. Collation of data will take the following format (scores shown are for demonstration purposes only):

⁵³ In an operational research study by Heald, it is reported that "...good car parking facilities could add as much as 20 percent to the turnover of outlets" (Heald 1972, p.446).

ITEMS AND THEIR IMPORTANCE WEIGHTS							
	I_1	I_2	I_3	I_4	I_5	I_6	
	(6)	(5)	(4)	(3)	(2)	(1)	
BRANCH	ITEM SCORE (unweighted)					BRANCH SCORE (Σ {weight x item score})	
B_1^a	1	0	1	4	0	0	22
B_2^b	0	1	1	3	1	0	20
B_3^c	0	1	2	6	0	1	32

^a suburban branch; ^b rural branch; ^c urban branch

Less tangible convenience items are surveyed under the *customer service quality* construct; for example, promptness of service, number of open tellers during busy hours, and telling customers when services will be performed.

5.9 PRESENCE OF COMPETITORS (CASPV)

The presence of competitors is expected to have a negative influence on the performance of a branch (Olsen and Lord 1979; Chelst, Schultz, and Sanghvi 1988). The following items are surveyed through the branch managers:

- I_1 : number of competitors within 200 metres (Heald 1972)
employing more staff than the branch
- I_2 : number of competitors within 200 metres employing
equal or smaller number of staff
- I_3 : total number of competitor branches in the branch's
catchment area outside a 200 metre radius

Branch managers were asked to exclude one- or two-person operations from their count of competitors since such outlets tend to be agencies providing a very small portion of the retail banking services covered in this study.

If an overall score on presence of competitors is desired, items one to three can be ranked in terms of the magnitude of expected negative influence on performance. For example, larger competitors closest to the branch can be said to be in a stronger position than smaller competitors to take away branch business. Thus, following this intuitive reasoning, I_1 is allocated the highest importance weight, I_2 the second highest weight, and I_3 the lowest weight.

Example of scoring:

ITEMS AND THEIR IMPORTANCE WEIGHTS				
	I_1	I_2	I_3	
	(3)	(2)	(1)	
BRANCH	ITEM SCORE (unweighted)			BRANCH SCORE (Σ {weight x item score})
B_1^a	1	1	3	8
B_2^b	0	0	1	1
B_3^c	2	1	6	14

^a suburban branch; ^b rural branch; ^c urban branch

Thus, from the branch scores, it can be inferred that the urban branch is facing a stronger competition that can take away branch business.

5.10 CROSS-SELLING (PeO)

Cross-selling is defined as "...selling related products off of a lead product" (Ritter 1991, p.99). Cross-selling is normally carried out by customer service personnel or relationship managers. It requires a thorough understanding of the so-called lead products.⁵⁴

Cross-selling is the central activity of relationship banking, where the needs of the customer and the services provided by the bank are brought together in such a manner as to generate optimum benefit to both parties (Davis 1989). Cross-selling is included in recognition of its importance to relationship banking. Furthermore, KPMG Peat Marwick (1991) forecast an increase in relationship banking.

Cross-selling activities of the branch can be assessed by measuring its cross-selling ratio, defined as the average number of accounts per branch customer, that is, the ratio of total number of accounts to total number of customers at a branch.

⁵⁴

Those products comprising the majority of products demanded by customers are known as *lead products*. Ritter (1991) identifies four lead products in retail banking, namely, checking, savings, certificates of deposits (i.e. negotiable term deposits), and loans.

5.11 OTHER VARIABLES OF INTEREST

Investment centre referrals was nominated by Para Bank as the core referral activity at its branches. Investment centre referrals are comprised of such financial services as superannuation, rollovers, annuities, unit trusts, and insurance bonds.

Another variable of interest was *insurance*. In the Monthly Trend Report used to extract financial data, the item *insurance* covers home and contents insurance offered by Para Bank. Insurance is an area of increasing importance, in particular, vis-à-vis cross-selling to home loan customers. Insurance was thus added to the original pre-test list of performance outcomes first reported in Chapter Three, section 3.4.4.

5.12 CONCLUSION

This Chapter delivers multiple-item instruments, with tested reliabilities and validities, for the various constructs scaled, that is, abstract variables such as customer service quality, and managerial competence. The Chapter also identifies the items to comprise those variables that can be observed more directly, for example, tangible convenience. Literature search, focus group, and study-bank-specific

information assisted in the identification of items describing each variable's domain. In essence, the findings of this Chapter represent the tools for collecting data on variables, in preparation for testing of the Model reported in Chapter Six.

CHAPTER SIX

TESTING THE MODEL

6.1 INTRODUCTION

Testing the Model begins with piloting the data collection exercise in one of the branches from the target population, with the principal purpose of identifying bottlenecks. Main testing of the Model is then administered through 137 branches and their supervisory staff who receive various questionnaires. Financial data are extracted from internal reports. Having set up the data bank, processing of the data starts with multiple regression analysis, exploring the relationships between potential and performance variables. Discriminant analysis is then carried out on potential variables with the aim of developing a classification model and profiling branches. In the final section of this Chapter, the instruments of *customer service quality* and *managerial competence* are revisited to further investigate their external validities.

6.2 PILOTING THE MODEL

The Model was piloted at Branch 47.⁵⁵ The principal purpose of piloting was to clarify the sources of data, remove any ambiguity in the banking jargon used, and seek further confirmation of the variables and their measures. Following initial correspondence with the branch, a series of meetings were held. The branch manager and the *business development group* of the branch provided input.

The variables in the Model were systematically scrutinised for feasibility. In the process, a problem was encountered with operationalising the cross-selling ratio. It was discovered that there was no means of disaggregating the total number of customers at branch level in a timely manner; that is, it was not feasible to generate a list of customers with all their corresponding account holdings. It was thus necessary to improvise and ask the branch managers to calculate the cross-selling ratio by examining the 300 accounts identified in the catchment area exercise (see Appendix G).

The management of branch 47 easily identified their catchment area by the suggested method (see Chapter Four, section 4.5). The catchment area was defined by six postcodes, capturing 69.5 per cent of the 300 sampled accounts; smaller proportions were

⁵⁵

For reasons of confidentiality, the identity of this branch will be preserved.

collected under the *miscellaneous* category. To minimise the possibility of excluding significant proportions, the method of catchment area delineation was amended by the additional criterion that at least 80 per cent of the sampled accounts should be captured by the postcodes defining the catchment area.

6.3 MAIN TESTING OF THE MODEL

Data to be collected from the branches were solicited through two separate mailings; 137 branch managers and 552 branch-classified supervisory staff were sent various questionnaires (the text of the questionnaires can be perused in Appendix G). Potential variables were measured during the period under consideration to maintain theoretical integrity.⁵⁶ These questionnaires generated the values for the items comprising the dimensions of *presence of competitors, tangible convenience, customer service quality, managerial competence of the branch manager, use of the decision support system, and effective practice of benchmarking*.

The financial data were manually extracted from each branch's Monthly Trend Report and then keyed into its corresponding SPSS file. Similarly, values for population, population growth rate, average age, average annual family income, proportion of

⁵⁶

Theory of the Model argues that the potential variables lead to performance outcomes.

private dwellings rented, and number of small business establishments were extracted from customised data provided by the Australian Bureau of Statistics. The variable cross-selling ratio was omitted from testing as a result of a very low response rate. The next section provides a more detailed account of data collection and processing. For ease of reference, the variable names will be reproduced first, with corresponding explanations as appropriate (see Table 6.1).

Table 6.1: Variables in the Model

POTENTIAL VARIABLES*	EXPLANATION
population [POP]	Number of persons aged 15 years or more: persons younger than 15 years were deemed not relevant in view of bank products/services.
population growth rate [POPGR]	Growth rate in the 15 years or more age group as compared between 1986 and 1991 Censuses.
average age [AGE]	Average age of persons aged 15 years or more.
average annual family income [INCOME\$]	
proportion of private dwellings rented [DWELL]	
number of small business establishments [SBEST#]	For statistical purposes, ABS defines an <i>small business</i> as employing less than 20 people for non-manufacturing enterprises (excluding agriculture), and less than 100 people for manufacturing enterprises.
presence of competitors [COMPETI]	This is a composite dimension comprised of three items. For items, see Appendix A. Items tested individually.
tangible convenience [CONVENIE]	This is a composite dimension comprised of six items. For items, see Appendix A. Items tested individually.

<i>staff numbers, full-time equivalent</i> [STAFFNUM]	Full-time equivalent which combines full-time and part-time employee numbers (summed for 8 months).
<i>customer service quality</i> [CUSSERQ]	This is a composite dimension comprised of seventeen items. For items, see Appendix A. Items tested individually.
<i>managerial competence of the branch manager</i> [MANCOMP]	This is a composite dimension comprised of forty-five items. For items, see Appendix A. Items tested individually.
<i>use of the decision support system</i> [DSS]	This is a composite dimension comprised of seven items. For items, see Appendix A. Items tested individually.
<i>effective practice of benchmarking</i> [BENCH]	This is a composite dimension comprised of six items. For items, see Appendix A. Items tested individually.
PERFORMANCE VARIABLES*	EXPLANATION
<i>total average deposit balances held</i> [DEPOBAL\$]	Averaged over 8 months (corresponding to the reporting period of Para Bank's Monthly Trend Report).
<i>total number of new deposit accounts</i> [NEWDEPO#]	Summed for 8 months.
<i>total average lending balances outstanding</i> [LENDBAL\$]	Averaged over 8 months.
<i>total number of new lending accounts</i> [NEWLEND#]	Summed for 8 months.
<i>number of new referrals</i> [INCREFER]	Represented by investment centre referrals. Summed for 8 months.
<i>profitable product concentration</i> [PPC]	Using number of new accounts summed for 8 months. This is a composite dimension comprised of nine items. For items, see Appendix A. Items tested individually.
<i>strategic product concentration</i> [SPC]	Using number of new accounts summed for 8 months. This is a composite dimension comprised of seven items. For items, see Appendix A. Items tested individually.

<i>fee income</i> [FEEINC\$]	Averaged over 8 months.
<i>insurance</i> [INSURE]	Number of new home and contents insurance policies summed for 8 months.

*Names used in SPSS are indicated in square brackets.

Actual numbers from one of the surveyed branches, Branch 47, will be used to demonstrate processing of the data. The catchment area of Branch 47 is identified in Table 6.2 below:

Table 6.2: Catchment Area of Branch 47

POSTCODES	PROPORTION OF ACCOUNTS THEREIN (%)
3150	57.7
3170	7.3
3149	6.0
3133	5.0
3152	2.3
3151	2.0
3178	1.7
3175	1.3
3131	1.0
3137	1.0
3174	1.0
SUBTOTAL	86.3
Miscellaneous	13.7
TOTAL	100.0

In determining the population in a catchment area, the methodology calls for summation of population levels in each of the postcodes identified. Since population is theorised as a

potential variable, the presence of 7 postcodes with less than 5 per cent of branch's business (see Table 6.2) can lead to an overstatement of branch potential. The solution devised was to calculate the average population in postcodes with less than 5 per cent and more than 1 per cent of branch business and add it to the rest of the postcodes; any postcode reported as carrying less than 1 per cent of branch business was ignored. The unadjusted population for the catchment area is 233,427, as compared to a figure of only 122,094 after implementing the above approach. Clearly, there is scope for considerable overstatement. The same procedure was followed for the number of small business establishments, unadjusted and adjusted figures being 11,995 and 5,588 respectively.

Population and number of small business establishments required one more adjustment before being entered into the Model, namely, linear extrapolation. It was necessary to standardise the percentage of business captured by postcodes identified within each branch, where this percentage ranged from 44.24 per cent to 100.00 per cent, with the great majority of branches placed above 70 per cent. Returning to the case of Branch 47, population number was extrapolated to 141,476 ($100 \times 122094 / 86.3$), and the number of small business establishments was extrapolated to 6,475 ($100 \times 5588 / 86.3$).

Population growth rate, average age, family income, and proportion of private dwellings rented were generated by

calculating the mean figures for postcodes identified as part of a branch's catchment area.⁵⁷

6.3.1 TESTING MEASURES OF BRANCH PERFORMANCE AND POTENTIAL: MULTIPLE LINEAR REGRESSION ANALYSIS

Three of the key research objectives investigated in this study are addressed through multiple linear regression analysis. These key research objectives are listed below:

- a. Determine sets of potential variables explaining each of the theorised performance variables (see Table 6.4);
- b. Develop a measure of overall branch performance (see Table 6.5); and
- c. Develop a measure of overall branch potential (see Table 6.6).

Therefore, the objective of this section is to explore the relationships between potential and performance variables in more detail, while developing overall measures of branch performance and potential. The theory developed in this study postulates that potential variables give rise to performance outcomes.

⁵⁷ In the case of family income, *mean* implies the average of mid-points of median income ranges. ABS records incomes of families surveyed only as a range.

6.3.1.1 DETERMINING POTENTIAL VARIABLES EXPLAINING EACH OF THE PERFORMANCE VARIABLES

After the Model dimensions were scaled in Chapter Five, a total of 91 potential variables were theorised to generate 20 performance outcomes (one of which, namely, cross-selling ratio, was not included in the analysis due to insufficient data). Hence, the first aim of testing was to examine how well the potential variables explained the performance variables. In terms of multiple regression analysis, potential variables became the independent variables, and each performance variable consecutively became the dependent variable.

Due to varying response rates on different questionnaires, the number of cases (that is, branches) entering regression analyses ranged from 93 to 115, most instances being above 110 cases. However, since there were a total of 91 independent variables (that is, potential variables), it was not acceptable to regress all the potential variables in a single run. Instead, each potential dimension's constituent variables were regressed as individual groups of independent variables against each of the 19 performance variables; that is, the components of the dimensions *presence of competitors*, *tangible convenience*, *customer service quality*, *managerial competence*, *use of the decision support system*, and *effective practice of benchmarking* were regressed as separate groups on each of the 19 performance variables. In the case of the managerial

competence dimension, the forty five items comprising the dimension were further divided into four blocks of independent variables in the regression procedure, in order to improve the cases-to-variables ratio. The results are shown in Table 6.3 below.

Table 6.3: Regressing Items in Potential Dimensions on Each of the Theorised Performance Variables

Dependent Variable	VARIABLES ENTERING THE REGRESSION EQUATION FROM THE POTENTIAL DIMENSION...					
	COMPETI	CONVENIE	CUSSE	MANCOMP ⁵⁸	DSS	BENCH ⁵⁹
DEPOBAL\$	MORSTAFF TOTCOMP#	TELLWIN# PUBTRANS	INFORMED SERVWHEN	MC1 MC22 MC7 MC29 MC8 MC30 MC9 MC34 MC18 MC37	MANPERFO	None
NEWDEPO#	MORSTAFF TOTCOMP#	TELLWIN# ATMS PUBTRANS	ADVICE	MC1 MC9 MC3 MC12 MC6 MC18 MC7 MC36 MC8 MC38	LEDGER MANPERFO	None
LENDBAL\$	TOTCOMP#	TELLWIN# CARPARK PUBTRANS	INFORMED	MC1 MC22 MC7 MC25 MC8 MC29 MC9 MC38 MC15 MC39 MC18 MC44	LEDGER MANPERFO ASSIST	None
NEWLEND#	TOTCOMP#	TELLWIN#	INFORMED	MC1 MC29 MC8 MC32 MC23 MC40 MC28 MC44	LEDGER OUTORDER MANPERFO	None
FEEINC\$	TOTCOMP#	TELLWIN# CARPARK	LEARN	MC1 MC21 MC7 MC22 MC8 MC40 MC9	LEDGER MANPERFO	None

⁵⁸ As there are 45 items on the managerial competence questionnaire, it is not practical to allocate a name for each variable. Instead, the first questionnaire item is designated MC1, the second item designated MC2, and so on. These items are detailed in Appendix A, as well as in the alphabetical legend at the beginning of the thesis.

⁵⁹ There are six dimensions in the benchmarking construct, labelled BD1 to BD6 in SPSS (see Appendix A).

INSURE	TOTCOMP#	TELLWIN# ATMS PUBTRANS	None	MC7 MC9	LEDGER MANPERFO	None
INCREFER	TOTCOMP#	TELLWIN# ATMS	None	MC18	MANPERFO	None
STREAMDR	TOTCOMP#	None	SECURITY SERVWHEN	None	EXCEPT MANPERFO	None
PERCLINE	TOTCOMP#	TELLWIN# ATMS PUBTRANS	None	MC3 7 MC44	LEDGER OUTORDER MANPERFO	BD1
SBUSLOAN	TOTCOMP#	TELLWIN#	SECURITY	MC6 MC23	LEDGER	BD4
FULDLOAN	TOTCOMP#	TELLWIN#	None	MC6 MC24 MC9 MC25 MC15 MC40 MC22 MC44	LEDGER	None
PERLOAN	TOTCOMP#	TELLWIN#	APOLOGY	MC28 MC40 MC29	EXCEPT MANPERFO	None
CANBI	MORSTAFF TOTCOMP#	TELLWIN# PUBTRANS	SECURITY	MC1 MC8 MC3 MC9 MC6 MC18 MC7 MC38	LEDGER MANPERFO	None
HOMELOAN	TOTCOMP#	TELLWIN# ATMS PUBTRANS	NEATNESS	MC1 MC13 MC3 MC23 MC6 MC36 MC7 MC38 MC8 MC44 MC9	LEDGER MANPERFO	None
FIXEDADV	EQUSTAFF TOTCOMP#	TELLWIN# CARPARK	KNOW	MC14 MC32 MC19 MC42	None	BD3
APPRDADV	TOTCOMP#	TELLWIN# ATMS	None	None	EXCEPT LEDGER	BD4
RESILOAN	TOTCOMP#	ATMS PUBTRANS	None	MC6 MC9	MANPERFO	BD1 BD2
CARDEDTD	MORSTAFF TOTCOMP#	TELLWIN# PUBTRANS	INFORMED	MC18 MC29 MC22	LEDGER MANPERFO	None
STREAM	TOTCOMP#	TELLWIN# ATMS PUBTRANS	None	MC1 MC12 MC3 MC18 MC6 MC22 MC7 MC38 MC8 MC44 MC9	LEDGER MANPERFO	None

In an effort to identify the complete sets of potential variables explaining each of the nineteen performance variables, the next stage of the analysis involved regressing variables entering the equation from Table 6.3, grouped with

the potential variables POP, POPGR, AGE, INCOME\$, DWELL, SBEST#, and FULLTIME, on each of the performance variables. The results are depicted in Table 6.4, with F-statistics and corresponding probabilities for total adjusted R squared values indicated in brackets.

Table 6.4: Complete Sets of Potential Variables Explaining Each of the Theorised Performance Variables

Dependent Variable	POTENTIAL VARIABLES ENTERING THE STEPWISE REGRESSION EQUATION	REGRESSION COEFFICIENTS	CUMULATIVE ADJUSTED R SQUARED ⁶⁰
DEPOBAL\$	FULLTIME POPGR POP TOTCOMP# MORSTAFF	222409.514000 -347232.699100 202.459201 1173168.362900 -4430880.117000	0.78508 0.80670 0.81856 0.82466 0.82825 (87.80, 0.0000)
NEWDEPO#	FULLTIME INCOME\$ POP SBEST#	5.122115 -0.013845 0.009778 -0.149624	0.87151 0.87687 0.88686 0.91500 (243.22, 0.0000)
LENDBAL\$	FULLTIME SBEST# TELLWIN#	164708.629180 3778.826460 1824362.084200	0.76472 0.79185 0.80950 (128.48, 0.0000)
NEWLEND#	TELLWIN# FULLTIME LEDGER	57.126058 0.740744 -26.664129	0.32373 0.40515 0.43400 (24.00, 0.0000)
FEEINC\$	FULLTIME TOTCOMP# SBEST#	144.913718 1756.047418 3.715143	0.71697 0.77398 0.79846 (119.86, 0.0000)
INSURE	FULLTIME POP INCOME\$ SBEST#	0.104316 0.000498 -0.001400 -0.003629	0.45347 0.49034 0.56967 0.58040 (32.47, 0.0000)

⁶⁰

R squared is the goodness of linear fit of the Model to the data. However, an R squared of 0 does not necessarily indicate an absence of any association between variables; instead, there may well be a non-linear relationship (Norusis 1993).

INCREFER	FULLTIME INCOME\$ TOTCOMP# SBEST# POPGR POP	0.161337 -0.001171 1.446708 -0.007511 -0.266743 0.000247	0.53819 0.59159 0.60737 0.62049 0.63058 0.64075 (28.05, 0.0000)
STREAMDR	FULLTIME EXCEPT POP INCOME\$	0.067743 -3.438998 -0.000174 0.000629	0.16919 0.19707 0.21316 0.23355 (8.01, 0.0000)
PERCLINE	FULLTIME TELLWIN# ATMS MC44 BD1	0.008036 0.427230 -1.401557 1.431260 0.319567	0.18890 0.21045 0.24013 0.26023 0.27532 (7.91, 0.0000)
SBUSLOAN	FULLTIME POPGR	0.016156 0.051679	0.20436 0.22664 (14.19, 0.0000)
FULDLOAN	FULLTIME MC25 MC9 INCOME\$ MC44	0.031584 4.462847 -4.276131 -0.000311 2.985153	0.23767 0.26594 0.31160 0.34739 0.36115 (11.29, 0.0000)
PERLOAN	FULLTIME INCOME\$ APOLOGY DWELL POP	0.180886 -0.002442 -16.152280 -0.877598 0.000232	0.44553 0.52634 0.54040 0.55488 0.56809 (24.68, 0.0000)
CANBI	FULLTIME TELLWIN# MC7 TOTCOMP#	0.245703 -1.484387 4.891829 -0.771692	0.76396 0.77332 0.78007 0.78635 (83.81, 0.0000)
HOMELOAN	FULLTIME POP DWELL NEATNESS	0.383638 0.000396 -1.408453 -28.540883	0.73824 0.75493 0.76743 0.78359 (82.47, 0.0000)
FIXEDADV	TOTCOMP# MC42 MC14 MC32 CARPARK	0.044109 -0.496787 0.545190 -0.386634 -0.446801	0.17223 0.24732 0.26654 0.29070 0.30550 (9.20, 0.0000)

APPRDADV	AGE	1.003683	0.26714
	FULLTIME	0.142361	0.35671
	BD4	-8.532752	0.39822
	LEDGER	-4.203510	0.42512
	INCOME\$	-0.001858	0.44544
			(15.94, 0.0000)
RESILOAN	POP	0.000025	0.08464
	POPGR	0.024669	0.11293
	MANPERFO	-0.995750	0.13065
			(5.56, 0.0015)
CARDEDTD	FULLTIME	0.754455	0.76572
	POP	-0.000787	0.78546
			(165.75, 0.0000)
STREAM	FULLTIME	1.149647	0.82047
	POP	0.001208	0.83068
	INCOME\$	-0.005298	0.84437
	MC7	36.003303	0.84844
	MC18	-24.397611	0.85202
	TOTCOMP#	-3.030429	0.85501
			(90.44, 0.0000)

6.3.1.2 MEASURE OF OVERALL BRANCH PERFORMANCE

The measure of overall performance explained well by the Model's potential variables was named PERFORZ. Initially those performance variables with total adjusted R squared values of 0.5 or more were selected. These performance variables are shown in Table 6.5.

Table 6.5: Measure of Overall Performance (PERFORZ)

DEPOBAL\$	Total average deposit balances held
NEWDEPO#	Total number of new deposit accounts
LENDBAL\$	Total average lending balances outstanding
FEEINC\$	Fee income
INSURE	Number of new insurance policies originated
INCREFER	Number of new investment centre referrals
PERLOAN	Number of new personal loans
HOMELOAN	Number of new home loans
CANBI	Number of new current accounts not-bearing interest*
STREAM	Number of new streamline accounts*
CARDEDTD	Number of new carded term deposits*

* Omitted from the final definition.

Current accounts not-bearing interest (CANBI), Streamline accounts (STREAM), and carded term deposits (CARDEDTD) were then deleted from the above list, since these were already accounted for in the total number of new deposit accounts (NEWDEPO#). The remaining variables were grouped together by summing their standardised scores, thus arriving at a single measure of overall performance.⁶¹

⁶¹ It is necessary to use standardised scores since different variables are measured in different units. Standardised scores have a mean of 0 and a standard deviation of 1.

6.3.1.3 MEASURE OF OVERALL BRANCH POTENTIAL

The potential variables explaining each of the performance variables comprising PERFORZ (as per Table 6.4) were then joined in one group, and regressed on PERFORZ through the stepwise method. That is, potential variables FULLTIME, POPGR, POP, TOTCOMP#, MORSTAFF, INCOME\$, SBEST#, TELLWIN#, APOLOGY, DWELL, and NEATNESS were designated the independent variables, and PERFORZ as the dependent variable. The cumulative adjusted R squared values and regression coefficients for the potential variables entering the equation are recorded in Table 6.6. The potential variables entering the regression equation in Table 6.6 are grouped to create a measure of overall potential, named POTENZ, where the sum of the standardised values provide a yardstick for a comparison of overall potential across branches.

Table 6.6: Arriving at a Measure of Overall Potential (POTENZ)

POTENTIAL VARIABLES ENTERING THE STEPWISE REGRESSION EQUATION	REGRESSION COEFFICIENTS (significance of t shown in brackets)	CUMULATIVE ADJUSTED R SQUARED
FULLTIME	0.029808 (.0000)	0.80083
APOLOGY	-1.858986 (.0003)	0.82870
TELLWIN#	0.260466 (.0013)	0.84473
POP	0.000054 (.0000)	0.85740
INCOME\$	-0.000114 (.0061)	0.87359
TOTCOMP#	0.088612 (.0203)	0.87866
SBEST#	-0.000473 (.0397)	0.88175
MORSTAFF	0.500135 (.0819)	0.88427

6.3.2 INTERPRETING RESULTS OF MULTIPLE REGRESSION ANALYSIS

The results to emerge from multiple linear regression analysis are interpreted in two steps. The first step assesses the statistical significance of variables comprising the measures of overall performance and overall potential. The second step attempts to interpret the sets of potential variables explaining each of the performance variables in the context of retail banking.

6.3.2.1 STATISTICAL SIGNIFICANCE OF VARIABLES

The list of variables defining the measure of overall performance (PERFORZ) can be given further support by examining the significance of R squared. In Table 6.4, the F-statistic and the probability associated with the F statistic corresponding to each dependent variable's total cumulative adjusted R squared were reported in brackets. F-statistic is a test of the null hypothesis that there is no linear relationship between the dependent and independent variables, that is, R squared equals 0.0 (Norusis 1993). In this context, the F-statistic becomes the ratio of observed variability in the dependent variable attributable to regression to residual variability. Perusal of Table 6.4 for the F-statistics and their observed significances reveals high ratios and significances equal to zero, leading to rejection of the null hypothesis. This can be construed as empirical evidence for significance of R squared values on the performance variables selected to define PERFORZ.

Similarly, perusal of significance of t-statistics in Table 6.6 lends support to selection of those potential variables through stepwise regression. The T-statistic is generated in order to test the null hypothesis that the regression coefficient is zero (Lewis-Beck 1982). In this instance, the first seven variables defining overall potential have regression coefficients larger than zero at significance levels less than

5 per cent, whereas the regression coefficient of the eighth variable is significant between 5-10 per cent.

According to Tabachnick and Fidell (1989), multivariate normality is assumed in conducting multivariate significance tests. However, the significance of violation of this assumption is currently not known. Appendix K provides an examination of normality of data used.

6.3.2.2 INTERPRETING POTENTIAL VARIABLES EXPLAINING PERFORMANCE

Table 6.4 in section 6.3.1.1 summarises the results of tests conducted for the purpose of determining sets of potential variables explaining each of the performance variables. The majority of these potential variables are dominated by FULLTIME (staff numbers), which has a positive relationship with all the performance variables.⁶² This can be construed as the continuing importance of branch staff for retail banking in the face of technological development.

A descriptive summary of the relationships between each of the eleven performance variables (with adjusted R squared values of 0.5 or above) and their corresponding potential variables as per results reported in Table 6.4 can be read in Appendix J.

⁶² Hence, variables entering the equation following FULLTIME are of lesser relative importance, and they should be interpreted cautiously.

The set of regression results reported in Appendix J indicate a complex relationship between potential and performance variables. Nevertheless, certain patterns can be seen. For example, POP (number of persons aged 15 years or more) has a positive relationship with the performance variables, with the exception of CARDETD (number of new carded term deposits). On the other hand, INCOME\$ (average annual family income) has a negative sign in all the regression equations in which it appears. Similarly, the potential variable MC7 (the branch manager persevering with an issue to its conclusion) has a positive relationship with the number of new current accounts and streamline accounts.

6.3.3 DEVELOPING A PREDICTIVE MODEL TO CLASSIFY BRANCHES AND PROFILING GROUPS: DISCRIMINANT ANALYSIS

A key research objective in this study is to develop a model for classifying branches into expected high, medium, and low performers based on a small number of predictors selected from the Model's pool of potential variables. A concomitant objective is that of profiling the characteristics of different groups by interpreting the discriminant model developed, with the objective of focusing managerial attention on raising branch performance.

The first step was to compute the measure of overall performance developed in the previous section, PERFORZ, for

each of the cases with complete data, giving an initial sample size of 119 branches. This sample was then divided into three groups by taking 2 standard deviations from the mean. As a result, 34 branches were classified as high performers, 29 branches as medium performers, and 56 branches as low performers (a list of grouped branches is presented in Appendix I, Table I.2). Hence, these formed the cases of known group memberships to be used for deriving discriminant functions.

The next step involved determining the independent variables to enter stepwise discriminant analysis. The potential variables explaining each of the performance variables comprising PERFORZ (see section 6.3.1.3) provided the initial list of independent variables. They are:

- FULLTIME : Staff numbers, full-time equivalent.
- POPGR : Growth rate in the 15 years or more age group between 1986-1991.
- POP : Number of persons aged 15 years or more.
- TOTCOMP# : Total number of competitor branches in the branch's catchment area outside a 200 metre radius.
- MORSTAFF : Number of competitors within 200 metres employing more staff than the branch.
- INCOME\$: Average annual family income.
- SBEST# : Number of small business establishments.
- TELLWIN# : Number of teller windows.
- APOLOGY : Ability of branch staff to apologise for a mistake.

DWELL : Proportion of private dwellings rented.
NEATNESS : Neat appearance of branch staff.

According to Klecka, one of the limitations on statistical properties of variables entering discriminant analysis is "...two variables which are perfectly correlated cannot be used at the same time" (Klecka 1982, p.9). Hence, correlation coefficients (Pearson's r) of the 11 potential variables were examined for collinearity. Overall, the correlations were low, with the exception of POP and SBEST# returning 0.8503. In order to choose between POP and SBEST#, stepwise discriminant analysis was repeated twice, omitting POP in the first run, and omitting SBEST# in the second run (while POP was returned to the list of independent variables). Based on a higher correct classification rate observed with POP, SBEST# was permanently dropped from the discriminant analysis.

When the ten remaining independent variables were brought together, only the data from 104 of the 119 branches were useable; in this sample, 30 were high performers, 24 medium performers, and 50 low performers. Stepwise discriminant analysis with the categories of high, medium, and low performers led to selection of 5 predictors, namely, FULLTIME, APOLOGY, POP, TELLWIN#, and INCOME\$, entering in that order.⁶³ The percentage of grouped cases correctly classified was 76.92 per cent; the classification results are reported in Table 6.7. Using the leave-one-out method described in section 4.8.4, the

⁶³

Lachenbruch (1975) believes the maximum number of variables that can be safely selected through stepwise procedures in discriminant analysis normally lies between three and five.

unbiased correct classification rate was estimated as 69.23 per cent.

Table 6.7: Classification Matrix

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIPS		
		1	2	3
1: high performers	30	25	5	0
		83.3%	16.7%	0.0%
2: medium performers	24	1	18	5
		4.2%	75.0%	20.8%
3: low performers	50	0	13	37
		0.0%	26.0%	74.0%
Percentage of "grouped" cases correctly classified: 76.92%				

The two canonical discriminant functions to emerge are depicted in Table 6.8 in section 6.3.3.1.⁶⁴ Interpretation of these orthogonal functions is addressed in the next section. However, as part of discriminant analysis, stability of coefficients needs to be tested in an effort to ascertain possible effects of the sample size, that is, validation (Crask and Perreault 1977). In this study, the method of validation used is jackknifing, first outlined in section 4.8.4; the actual procedure of jackknifing unstandardised coefficients and arriving at confidence intervals is detailed in Appendix H. At this point, the unstandardised coefficients fall within the computed confidence intervals, implying stable coefficients and thus, adequate sample size.

⁶⁴ The maximum number of discriminant functions is given by the smaller of *total number of categories minus one* or *number of predictor variables* (Huberty 1984; Tabachnick and Fidell 1989).

6.3.3.1 INTERPRETING RESULTS OF DISCRIMINANT ANALYSIS

The discriminating power or effectiveness of the two functions can be assessed by noting the unbiased correct classification rate, eigenvalues, and canonical correlations (Klecka 1982; Green, Tull, and Albaum 1988; Norusis 1992). In this case, the unbiased classification rate of 69.23 per cent compares favourably with 33.33 per cent expected by chance alone (assuming equal prior probabilities for the three categories).

An eigenvalue of 2.0171 was recorded for the first function (the most discriminating function), with a much lower eigenvalue of 0.0641 for the second function. Eigenvalue is the ratio of between-groups to within-groups sums of squares, where a large eigenvalue is indicative of good discriminating power. Nevertheless, the eigenvalue is a relative measure, and it is possible to observe large eigenvalues when between-group variance is small. To better ascertain the effectiveness of a function, canonical correlations are scrutinised. Canonical correlation of a function is the square root of between-groups to total sums of squares, and it is a measure of how well a function distinguishes between categories under study.⁶⁵ For function 1, the canonical correlation is 0.8177, and for function 2 canonical correlation drops to 0.2455. In essence,

⁶⁵ An alternative interpretation is to square the canonical correlation, in which case it becomes a measure of the proportion of variation in the discriminant function explained by the categories (Klecka 1982).

the relationship between the two functions, as suggested by the eigenvalues, is confirmed by the canonical correlations.⁶⁶

At the beginning of this section, one of the key research objectives stated was *profiling the characteristics of different groups of branches* by interpreting the discriminant functions. Looking at Table 6.8, the unstandardised coefficient of TELLWIN# on function 1 means *for a unit change in a branch's score on TELLWIN#, the discriminant score of the branch will change by 0.1078311*. For example, if the number of teller windows in a particular branch was to increase by 2 (assuming all other predictors are held constant), the discriminant score of the branch will rise by 0.2156622 (2×0.1078311). However, since the units of the predictor variables are different, it is not possible to assess the relative importance of predictors by merely looking at their unstandardised coefficients. For this, it is necessary to calculate the standardised canonical discriminant function coefficients (see Table 6.9).

⁶⁶

An alternative approach to the three-group analysis reported here is a two-group discriminant analysis reported in Appendix H.

Table 6.8: Unstandardised Canonical Discriminant Function Coefficients

Predictors	Function 1	Function 2
FULLTIME	7.61705416E-03	1.69246298E-03
APOLOGY	-0.7482149	1.3217031
POP	1.51488250E-05	-1.97895981E-05
TELLWIN#	0.1078311	0.1301888
INCOME\$	-3.16264422E-05	1.16830909E-04
Constant	-0.4252136	-8.2894976

Table 6.9: Standardised Canonical Discriminant Function Coefficients

Predictors	Function 1	Function 2
FULLTIME	0.82192	0.18263
APOLOGY	-0.34026	0.60105
POP	0.46443	-0.60671
TELLWIN#	0.29897	0.36096
INCOME\$	-0.20603	0.76111

Function 1, the most discriminating function in the analysis, is dominated by FULLTIME and POP. The implication is, high and medium performing branches already have good customer service quality (see APOLOGY), have an adequate number of teller windows (see TELLWIN#), and are located in neighbourhoods where the average annual family income is high (see INCOME\$). Hence, the predictors that are most important in distinguishing high performing branches from medium performers are FULLTIME (staff numbers) and POP (number of persons aged 15 years or more). Looking at function 2, the dominant predictors are INCOME\$ (average annual family income), POP, and APOLOGY (ability of

branch staff to apologise for a mistake).⁶⁷ The non-dominant predictors of FULLTIME and TELLWIN# in function 2 indicate that medium and low performers already possess adequate staff numbers and teller windows.

The significance of the above interpretation for this study is two-fold. Firstly, if management is interested in lifting a branch from the medium performers category to the high performers category, attention should principally be focused on FULLTIME and POP. Similarly, if management is considering moving a low performer into the medium performers category, efforts should be focused on INCOME\$, POP, and APOLOGY; in other words, short of relocating the branch into an area with higher family income and larger population, a more immediate course of action would be to improve the quality of customer service.

6.4 REVISITING INSTRUMENTS OF MEASUREMENT

In Chapter Five, the instruments of customer service quality and managerial competence were developed through various stages of data collection and testing. It is now possible to further investigate the external validity of these scales by employing the data collected in the main model testing stage reported in

⁶⁷

Unlike multiple regression coefficients, signs of discriminant function coefficients are arbitrary and should not be interpreted as a relationship (Norusis 1992).

this Chapter. The approach is one of comparing the stability of factor structures from scale development stage data in Chapter Five with those to emerge here.⁶⁸ Customer service quality is factor analysed first.

6.4.1

CUSTOMER SERVICE QUALITY: A FURTHER TEST OF EXTERNAL VALIDITY

A total of 1586 cases were collected in the main model testing stage across 115 branches using the customer service quality instrument. When these responses were analysed through principal axis factoring across the seventeen items comprising the instrument (see Appendix A), SPSS extracted 3 factors, explaining 54.6 per cent of the variance. These results compare very favourably with results obtained from scale development stage data at 54.3 per cent across 3 factors. A comparison of the factors extracted is presented next.

Table 6.10: Comparing Orthogonally Rotated Factor Matrices on Customer Service Quality Data Across Different Samples

On data from main model testing stage...			
VARIABLE	FACTOR 1 *(43.7%)	FACTOR 2 (5.9%)	FACTOR 3 (5.0%)
CONCERN	0.71443	0.25290	0.04652
APOLOGY	0.69636	0.25693	0.07536
HELP	0.67078	0.26075	0.23313
MISTAKE	0.66241	0.27664	0.14715
POLITE	0.65265	0.21901	0.19919

⁶⁸ By using the data collected in the main model testing stage, it would also be possible to test for the inter-rater agreement in the managerial competence instrument, explained in section 6.4.3.

GREET	0.61431	0.25110	0.20389
SECURITY	0.61187	0.28251	0.21601
NEATNESS	0.53734	0.23581	0.15453
PROMPT	0.50483	0.22262	0.38497
SERVWHEN	0.46879	0.44429	0.22940
ACCTYPES	0.24597	0.72393	0.15379
ADVICE	0.28665	0.71611	0.14339
LEARN	0.25686	0.68991	0.16837
KNOW	0.43366	0.57474	0.20238
INFORMED	0.46515	0.48593	0.18746
STAFFNUM	0.20915	0.18942	0.79793
TELLERS	0.17879	0.19436	0.79159
On data from scale development stage...			
VARIABLE	FACTOR 1 (43.3%)	FACTOR 2 (5.9%)	FACTOR 3 (4.6%)
POLITE	0.78758	0.16391	0.21368
HELP	0.68393	0.26108	0.20486
GREET	0.64014	0.16721	0.24771
APOLOGY	0.63581	0.34317	0.06518
CONCERN	0.60956	0.32571	0.15761
NEATNESS	0.59621	0.16363	0.18522
SECURITY	0.58368	0.41726	0.21862
PROMPT	0.57528	0.27222	0.36224
MISTAKE	0.53303	0.35379	0.10626
KNOW	0.50479	0.49652	0.14669
ACCTYPES	0.15076	0.75872	0.13259
ADVICE	0.25587	0.62090	0.17847
LEARN	0.19018	0.61593	0.19284
SERVWHEN	0.27667	0.59772	0.12782
INFORMED	0.38617	0.57175	0.15516
TELLERS	0.23809	0.23608	0.76066
STAFFNUM	0.30543	0.22335	0.75210

* Percentage of variance explained.

The 3 factors retained the same composition across the two separate data sets, with the exception of variables SERVWHEN and KNOW switching places. Percentages of variance explained by each factor in each case is also very similar; in fact, this percentage is the same in each case for factor 2 (see numbers

in brackets under headings in Table 6.10). These observations form supportive empirical evidence for external validity of the customer service quality instrument, that is, the customer service quality instrument can be used with other samples drawn from the population.⁶⁹

6.4.2 MANAGERIAL COMPETENCE OF THE BRANCH MANAGER: A FURTHER TEST OF EXTERNAL VALIDITY

This section continues to probe the external validity of another instrument developed in Chapter Five, namely, the managerial competence of the branch manager. In the main model testing stage reported in this Chapter, the managerial competence questionnaire (comprised of 45 items) was returned by a total of 339 immediate subordinates of branch managers across 125 branches. Five factors were extracted through principal axis factoring with a cumulative percentage of variance explained at 67.5 per cent. Employing data from the scale development stage in Chapter Five, four factors were extracted explaining 60.7 per cent of the variance. Table 6.11 depicts the rotated factor matrices.

⁶⁹

The same argument can also be extended to construct validity since both types of validity share the common purpose of making generalisations (Cook and Campbell 1979).

Table 6.11: Comparing Orthogonally Rotated Factor Matrices on Managerial Competence Data Across Different Samples

<i>On data from main model testing stage...</i>					
VARIABLE	FACTOR 1 *(56.6%)	FACTOR 2 (5.5%)	FACTOR 3 (2.4%)	FACTOR 4 (1.6%)	FACTOR 5 (1.4%)
VAR00032	0.86288	0.17825	0.21370	0.03098	0.11860
VAR00019	0.81288	0.22970	0.21073	0.18858	0.00502
VAR00027	0.79550	0.23816	0.17987	0.11718	-0.08080
VAR00020	0.79104	0.20316	0.18382	0.23218	0.09249
VAR00033	0.79093	0.19901	0.22795	0.10135	0.16630
VAR00042	0.75915	0.16257	0.21917	-0.06385	0.13781
VAR00016	0.75351	0.36919	0.13771	0.26602	-0.07117
VAR00025	0.75216	0.25147	0.14606	0.12428	-0.16961
VAR00017	0.74811	0.33982	0.13545	0.27478	-0.12377
VAR00040	0.72466	0.23273	0.29850	0.13348	0.07593
VAR00024	0.72391	0.21561	0.17486	0.14261	0.06714
VAR00035	0.70798	0.18732	0.38259	0.12836	0.14902
VAR00021	0.70239	0.25571	0.21507	0.25684	0.05568
VAR00030	0.68294	0.26886	0.29965	0.16913	-0.06783
VAR00026	0.67320	0.44710	0.15675	0.12654	-0.16015
VAR00022	0.65702	0.40868	0.28019	0.24647	-0.05164
VAR00015	0.65205	0.41401	0.18482	0.39003	0.11663
VAR00043	0.64770	0.35180	0.24565	0.12327	0.34179
VAR00037	0.64144	0.23413	0.43875	0.24708	0.19404
VAR00018	0.64117	0.38834	0.20796	0.31619	-0.18444
VAR00023	0.62973	0.46701	0.13961	0.21894	-0.16500
VAR00029	0.62235	0.35725	0.30572	0.10277	-0.14514
VAR00014	0.60076	0.43623	0.29363	0.26000	0.04725
VAR00041	0.58486	0.43055	0.24147	0.25732	0.31752
VAR00038	0.57890	0.30517	0.51432	0.18941	0.08592
VAR00036	0.56461	0.43237	0.37980	0.20700	0.03867
VAR00028	0.53081	0.32172	0.27522	0.24669	-0.11388
VAR00009	0.52290	0.36039	0.35024	0.28284	0.01944
VAR00031	0.51735	0.16279	0.22899	-0.19451	0.04320
VAR00004	0.51462	0.45793	0.26051	0.32446	0.04536
VAR00001	0.46528	0.42748	0.28648	0.38393	0.08238
VAR00006	0.45721	0.44971	0.23379	0.42736	0.02961
VAR00013	0.32380	0.78220	0.15399	0.00428	-0.08281
VAR00011	0.15441	0.76639	0.16560	0.08396	0.27426
VAR00012	0.31452	0.71716	0.19699	0.00436	0.02961
VAR00002	0.17247	0.68987	0.17412	0.16422	-0.09656
VAR00010	0.13734	0.68926	0.20071	0.09918	0.36229

VAR00005	0.12851	0.61494	0.38426	0.13183	0.06574
VAR00008	0.41762	0.56291	0.28273	0.18820	-0.08049
VAR00003	0.32108	0.54253	0.07802	0.11236	-0.15198
VAR00044	0.24756	0.28671	0.71612	0.03138	0.03679
VAR00034	0.54502	0.23438	0.55537	-0.02287	0.00439
VAR00039	0.42211	0.37299	0.55308	0.17236	0.03027
VAR00045	0.26807	0.29445	0.52908	0.25296	-0.02716
VAR00007	0.31602	0.37962	0.29588	0.42089	0.06703
On data from scale development stage...					
VARIABLE	FACTOR 1 (48.6%)	FACTOR 2 (5.8%)	FACTOR 3 (4.4%)	FACTOR 4 (1.9%)	
VAR00020	0.74661	0.24252	0.21179	0.05371	
VAR00037	0.69202	0.11645	0.47203	-0.12016	
VAR00025	0.68780	0.19046	0.27578	0.10585	
VAR00035	0.68535	0.17667	0.25816	-0.12575	
VAR00030	0.68106	0.23663	0.13106	-0.16247	
VAR00021	0.67959	0.27564	0.20392	0.03350	
VAR00036	0.66952	0.24232	0.26790	-0.34609	
VAR00019	0.66939	0.34239	0.17261	0.08042	
VAR00033	0.66856	0.25962	0.35381	0.03806	
VAR00032	0.66363	0.37225	0.04845	0.16741	
VAR00038	0.63761	0.15842	0.47011	-0.17706	
VAR00024	0.63441	0.29783	0.32702	0.11164	
VAR00027	0.62652	0.37676	0.24910	0.26214	
VAR00023	0.61772	0.33427	0.20478	-0.00141	
VAR00029	0.60166	0.21193	0.06780	-0.33728	
VAR00022	0.59428	0.22852	0.43436	-0.00425	
VAR00031	0.54975	0.25472	0.19118	0.05052	
VAR00040	0.53891	0.36401	0.27676	0.08129	
VAR00034	0.52390	0.10154	0.51276	-0.21444	
VAR00028	0.51411	0.32689	0.37142	0.00281	
VAR00012	0.19550	0.80531	0.12994	-0.11217	
VAR00013	0.19481	0.80004	0.07490	-0.12281	
VAR00008	0.14647	0.67699	0.41822	0.04314	
VAR00014	0.43525	0.63805	0.21657	-0.02469	
VAR00003	0.30535	0.63419	0.15648	-0.05266	
VAR00017	0.46305	0.63094	0.27797	0.13240	
VAR00016	0.39088	0.62935	0.21805	0.20980	
VAR00011	0.24588	0.57605	0.30586	-0.26144	
VAR00010	0.20263	0.57428	0.40425	-0.04950	
VAR00009	0.29582	0.56857	0.22867	0.00520	
VAR00018	0.52214	0.55258	-0.05330	0.01224	
VAR00004	0.25367	0.54729	0.44248	0.20168	
VAR00015	0.48310	0.54634	0.36283	0.12031	

VAR00001	0.24709	0.54098	0.41857	0.15174
VAR00002	0.32375	0.54002	0.34930	0.01166
VAR00005	0.14923	0.53107	0.39855	0.01325
VAR00026	0.50597	0.52076	0.22346	0.14117
VAR00044	0.25053	0.07932	0.79314	-0.15205
VAR00007	0.15746	0.39259	0.68052	0.08414
VAR00043	0.48252	0.25850	0.65471	0.11462
VAR00045	0.13583	0.33752	0.64589	-0.09874
VAR00042	0.49797	0.21917	0.62115	0.17471
VAR00039	0.40249	0.30261	0.59798	-0.00978
VAR00006	0.22010	0.41701	0.59688	0.07771
VAR00041	0.43052	0.44648	0.56372	0.09648

* Percentage of variance explained.

A closer inspection of the factor matrices revealed that the first 3 factors had the only easily interpretable clusters of variables in each case. Neither factors 4 and 5 from the main model testing stage data, nor factor 4 from the scale development stage data exhibited clear patterns. In terms of factorial compositions, three variables from factor 3, and eight variables from factor 2 of the scale development stage migrated to factor 1 in the main model testing stage, the rest of the factorial compositions remaining the same. The net effect was strengthening of factor 1 at the expense of factors 2 and 3; this was evidenced in the percentage of variance explained by factor 1 increasing from 48.6 per cent to 56.6 per cent. In conclusion, external validity of the managerial competence instrument can be argued to exist but not as strongly as that observed for the customer service quality instrument.

6.4.3 **MANAGERIAL COMPETENCE OF THE BRANCH MANAGER: A FURTHER TEST OF RELIABILITY**

Reliability tests implemented in Chapter Five on the managerial competence instrument produced gratifying results in the form of high factorial coefficient alphas and scale reliability, and no evidence of response bias (see Chapter Five, section 5.3.3). However, it was not possible to determine inter-rater agreement in the scale development stage when complete anonymity of respondents was observed, and responses could not be traced back to branches. In the scale development stage, the questionnaire on upward evaluation of managerial competence was breaking new ground in Para Bank, thus requiring complete confidentiality. Therefore, it was deemed appropriate to further probe reliability through examining inter-rater agreement using the data collected in the main model testing stage in this Chapter.

Inter-rater agreement principally looks at the extent raters differ in their assessment of, in this case, competencies of the branch manager. Thus, if subordinates rating the same branch manager are giving dissimilar assessments, then there is a chance that the researcher is recording people's idiosyncratic views.

An F-test (one-way analysis of variance) was run to investigate the homogeneity of within-manager and between-manager variances

(Mount 1984a). If the between-manager variance is significantly greater than the within-manager variance, then inter-rater agreement can be said to exist. The F-ratio, defined as the ratio of between-manager variance to within-manager variance, produced a result of 3.0517, at a significance level of 0.0, indicating existence of inter-rater agreement.

6.5 CONCLUSION

Main testing of the Model through multiple regression analysis results in development of statistically significant measures for *overall branch performance* and *overall branch potential*, each measure consisting of eight variables.⁷⁰ An adjusted R squared value of 88.43 per cent illustrates a high predictive relationship between overall potential and overall performance; this empirically demonstrates the successful integration of potential and performance variables in the Model. Furthermore, discriminant analysis of potential variables reveals five predictors distinguishing between high performers, medium performers, and low performers, with an unbiased correct classification rate of 69.23 per cent. Branches can be profiled on the predictors of FULLTIME, APOLOGY, POP, TELLWIN#, and INCOME\$, with an eye on lifting their performance.

⁷⁰

The equal number of variables is a coincidence.

CHAPTER SEVEN

THE CONCLUSION

7.1 THE MAJOR FINDINGS

The major findings in this study can be traced back to the key research objectives first mentioned in Chapter One, namely,

- a. Determine sets of potential variables explaining each of the theorised performance variables;
- b. Develop a measure of overall branch performance;
- c. Develop a measure of overall branch potential; and
- d. Develop a predictive model for classifying and profiling branches.

Table 6.4 depicts the sets of potential variables explaining each of the theorised performance variables. Eleven of these performance variables are explained by potential variables at adjusted R squared levels above 0.5, whereas eight performance variables are below 0.5. The potential variable FULLTIME (staff numbers) accounts for the greater proportion of variance explained in each case and has a positive relationship with all the performance variables; that is, additional staff lead to higher performance. This is interpreted as a consequence of the nature of personal banking which involves frequent contact

with branch staff. Dominance of the potential variable FULLTIME underlines the fundamental importance of service. However, while the regression coefficients provide insight to the relationship between potential variables and individual performance variables, it is more practical to seek a measure of overall performance when the managerial intention is to compare branches.

The measure of overall performance, PERFORZ, is defined as the sum of the standardised scores of the following variables:

DEPOBAL\$:	Total average deposit balances held
NEWDEPO#	:	Total number of new deposit accounts
LENDBAL\$:	Total average lending balances outstanding
FEEINC\$:	Fee income
INSURE	:	Number of new insurance policies originated
INCREFER	:	Number of new investment centre referrals
PERLOAN	:	Number of new personal loans
HOMELOAN	:	Number of new home loans

In this group of variables, in addition to the more traditional measures of performance such as deposit and lending balances, one can see such business drivers as fee income, referrals, and home loans. Table I.2 in Appendix I illustrates a list of branches sorted on overall performance. Thus, branches can be distinguished on their overall performance, which was one of the aims of this study.

The measure of overall potential, POTENZ, is defined as the sum of the standardised scores of the following variables:

FULLTIME	:	Staff numbers, full-time equivalent
APOLOGY	:	Ability of branch staff to apologise for a mistake
TELLWIN#	:	Number of teller windows
POP	:	Number of persons aged 15 years or more
INCOME\$:	Average annual family income
TOTCOMP#	:	Total number of competitor branches in the branch's catchment area outside a 200 metre radius
SBEST#	:	Number of small business establishments
MORSTAFF	:	Number of competitors within 200 metres employing more staff than the branch

The first three of these potential variables (explaining 84.47 per cent of variance in overall performance) are controllable by bank management. This provides a tool for executive decision-making regarding reconfiguring branches, in terms of observing the effect on overall performance of changing staff numbers, staff attitudes toward customers, and number of teller windows. The cumulative adjusted R squared value of 88.43 per cent for the eight variables is evidence of successful integration of potential and performance variables. It is also possible to distinguish between branches on overall potential scores (see Appendix I, Table I.1).

The difference between overall potential and overall performance gives a measure of unrealised performance.⁷¹ This is an important measure that places branch performance in the context of its potential, thus providing a focus for executive management concerned with the scope of raising a branch's performance. As well as helping rank branches in terms of their scope for improving performance (see Appendix I, Table I.3), measure of unrealised performance can also assist decisions on reconfiguring branches. This point is expanded in the next section, under the heading of Principal Applications of the Model.

Finally, the five predictors to emerge from discriminant analysis provide the means for management to classify branches into low, medium, or high performers; these predictors are FULLTIME, APOLOGY, POP, TELLWIN#, and INCOME\$. The unbiased correct classification rate is 69.23 per cent. Beyond classification, discriminant analysis draws a profile of each group, thus indicating which variables should be scrutinised if a branch's performance is to be lifted (see Chapter Six, Table 6.9). Results of discriminant analysis reported in section 6.3.3.1 indicate FULLTIME and POP as the predictors most significant in distinguishing high performing branches from medium performers. Similarly, predictors most important in distinguishing medium performers from low performers are reported as INCOME\$, POP, and APOLOGY.

⁷¹ Unrealised performance has been expressed as a proportion of overall potential (see Appendix I, Table I.3), in order to enhance interpretability.

7.2 THE PRINCIPAL APPLICATIONS OF THE MODEL

In the process of identifying controllable potential variables, the Model's utilitarian appeal to bank management is considerably expanded. As well as measuring overall branch performance and overall branch potential, management is presented with an integrated tool to assist in reconfiguring a branch according to the dictates of the market, and the resource and policy constraints. By designating the values of potential variables, management can predict performance as per regression analysis. Further analysis of the difference between the overall branch potential and the overall performance, that is, the unrealised performance or performance gap, would provide valuable information regarding the future of a branch.⁷² For example, if the performance gap is small and the branch potential is also small, then the branch may be a candidate for closure in a consolidation exercise, or a candidate for downsizing. Conversely, if the performance gap is large and the branch potential is also large, then the indication to management is to reconfigure that branch in an effort to close the performance gap.

It should also be noted that the gap between overall branch potential and overall branch performance, when expressed as a

⁷²

It is the researcher's view that interbranch comparison of branches' contribution to profits, although unavoidable, serves little purpose unless the potential variables are considered concurrently.

proportion of branch potential, would allow an easy-to-interpret relative measure of unrealised branch performance. The measure of unrealised performance would, in turn, provide an indication of possible performance growth rates over time. In the case of the study bank, performance growth rates will have to be targeted by management within the prudential guidelines laid down in the key performance objectives of Para Bank which state, "...manage our business with prudence to avoid levels of risk that could threaten our profitability" (Annual Report 1992, p.12). The importance of performance growth rates can be emphasised by considering their implications for preparing branch budgets and determining staff requirements, physical facilities, and marketing strategies (Kramer 1971).

The discriminant functions developed in section 6.3.3 allow an overall perspective to be taken on the branch network. For example, how many of the branches are classified as low performers, medium performers, or high performers? (see Appendix I, Table I.2). More importantly, the discriminant functions point the way for lifting the performance of branches by focusing on the profile of each group. For example, if management wanted to lift a branch from the medium performers category to the high performers category, this can be achieved by increasing the number of staff, and to a lesser extent, by relocating the branch to an area with higher catchment population.

Depending on the managerial focus, it is also conceivable to use the scales developed in Chapter Five independently, rather than regarding these as simply creating an item pool for the multiple regression analysis in Chapter Six. Although the independent application of instruments was not depicted as one of the key research objectives, it is an important outcome of the study that should be recognised. For example, to compare branches on the customer service quality or to form an overall picture of customer service quality in the branch network, the questionnaire developed (see Appendix B) can be put to customers. Similarly, branch personnel can be asked to respond to the managerial competence questionnaire (see Appendix C) in an effort to gauge the managerial competence of branch managers, and look for areas that can be improved.

Although a focus on customer service quality has become a hallmark of Australian banks since the early 1990s, scrutiny of managerial competence by upward evaluation is still a politically sensitive proposition for most banks. Such an approach has to be assessed in the context of its policy implications for the bank, rather than being treated as an exercise not to be repeated. Upward evaluation recognises the tenet that *managers achieve results through people*.

Another area of management currently missing from bank branches is the practice of benchmarking detailed in Chapter Five, section 5.4. While a substantial amount of literature on other industries detail the benefits of benchmarking, Australian

banks have been slow in adopting this practice. Primarily, this points to a lack of support among executive management for activities with less tangible results. Some of the obstacles to benchmarking identified in the study bank were lack of training on how to benchmark, a top-down and centralised management style, and branch managers with little discretion in goal-setting. Clearly, application of the benchmarking instrument developed in this study will bring the above issues into awareness, with the ultimate reward of fostering a proactive culture in relation to improving branch operations and performance.

It should also be noted that since this study was implemented in branches of Para Bank only, it would be prudent not to generalise the findings from *multiple regression analysis* and *discriminant analysis* to other banks. However, what can be adopted by other banks is the *process* behind the Model and the individual scales developed in Chapter Five, such as the customer service quality and managerial competence instruments.

The main steps required to apply the Model are listed below:

- a. Review corporate objectives and strategies.
- b. Define branch performance in tandem with corporate objectives, and identify those performance variables that emphasise business drivers critical to bank success and reflect the mix of personal banking business at branches.

- c. Identify the potential variables that can be theorised to manifest themselves in branch performance, that is, integrate the performance and potential variables. Also, identify those potential variables controllable by management.
- d. Determine the sources of data for performance and potential variables.
- e. Develop multivariate measures for data collection.
- f. Analyse data through multiple regression and discriminant analysis with the purpose of addressing the following key research objectives:
 - i. Determine sets of potential variables explaining each of the theorised performance variables;
 - ii. Develop a measure of overall branch performance;
 - iii. Develop a measure of overall branch potential; and
 - iv. Develop a predictive model for classifying and profiling branches.
- g. Examine the results of analysis with an eye on raising performance through reconfiguring branches.

7.3 THE ADVANTAGES OF THE MODEL DEVELOPED OVER EXISTING MEASURES OF BRANCH PERFORMANCE

This study follows an interdisciplinary, multivariate approach to performance analysis. By grouping such branch-specific potential variables as customer service quality, managerial competence of the branch manager, use of the decision support system, and effective practice of benchmarking, the Model takes analysis of branch potential beyond market potential and other traditional measures such as physical features. In this process of integration, the Model acknowledges a certain dynamism in analysis of branch performance as reflected by the skills and practices of branch personnel. More to the point, this dynamism would, to a considerable extent, be controlled by management, and herein lies an advantage of the proposed Model over application of accounting ratios to performance analysis. The Model would allow management to focus attention, in particular on the controllable variables, with the aim of assessing the effectiveness of their decisions.

Such performance measures as branch profits or various accounting ratios are summary indices that are of limited use in identifying explanations for specific outcomes. While calculating profits is beset with difficulties of equitable allocation of revenues and expenses, a substantial amount of information is lost on performance of different functions as accounting ratios tend to aggregate results. These traditional

measures rely upon historical data generated within the organisation and usually serve little more than comparison yardsticks, whereas integration of potential and performance analysis, introduces the anticipation element, a crucial function in the management process. Thus, the emphasis within the proposed study is more on information which is prospective to management, rather than retrospective.

The unique features of the Model developed in this study can be summarised as follows:

- a. Focuses on branch-specific potential variables controllable by bank management such as customer service quality, managerial competence, and effective practice of benchmarking;
- b. Recognises corporate objectives and strategies, and critical business drivers; and
- c. Taps into various disciplines in formulating a multivariate study.

It is suggested that a periodic review of the Model variables and items takes place to check whether they are still relevant to the corporate objectives and directions of the retail banking business investigated. According to Eccles, "...methods for taking new performance measures should evolve as the company's expertise increases" (Eccles 1991, p.134).

7.4 THE LIMITATIONS

A number of limitations of the study need to be recognised. For example, delineation of the catchment area for data collection (see Chapter Four, section 4.5) cannot be used with branches from the central business district since it is not possible to define their catchment areas in terms of postcodes. In this study, this proved to be a minor limitation, with only six central business district branches omitted.

Another limitation of this study is the aim to distinguish between performance of different branches rather than design an all-encompassing performance model. Hence, certain items which could qualitatively be deemed important, for example, in developing the customer service quality or the managerial competence instruments, are omitted based on statistical criteria.

The variable of cross-selling ratio introduced in Chapter Five, section 5.10, was later abandoned in testing due to a very low response rate. Follow-up interviews with branch management revealed that the manual nature of screening 300 branch accounts to arrive at an average number of accounts per branch customer was considered too onerous. Given that cross-selling is the central activity of relationship banking, omission of this variable needs to be acknowledged as a limitation of the study.

Finally, in Chapter One, section 1.4, it was stated that because pricing and product design decisions are made at the Head Office, these can be regarded as constants in the overall equation of branch performance. Therefore, product profitability was not studied as part of branch performance. If the focus of the study is shifted from the individual branch to the overall performance of the bank, product profitability will have to be introduced.

7.5 DIRECTIONS FOR FUTURE RESEARCH

In the previous section, it was pointed out that a theoretically important variable, namely, the cross-selling ratio, was abandoned in the testing stage due to a very low response rate. As the bank develops a more sophisticated relational data base that can generate information on customers and accounts held at individual branches, the variable of cross-selling ratio should be re-introduced into the Model.

Another avenue for future research is to replicate, for example, the customer service quality, and managerial competence instruments in another bank. It would be of interest to discover whether the variance explained by the factors in each construct can be improved without increasing the number of items. It is also conceivable to re-design these constructs for industries other than banking.

Finally, in Chapter Three, Figure 3.1, the overall conceptual framework for evaluating branch performance illustrated the focus of this study as Personal Banking (Retail Banking). As a natural progression of this study, it would be logical to devise studies of Business Banking Performance, and Operations Performance. Once these are achieved, a further research topic would be how to integrate Personal Banking, Business Banking, and Operations performance in an effort to arrive at a measure of *overall bank performance*.

APPENDIX A

ITEMS COMPRISING THE MODEL'S DIMENSIONS

ITEMISED POTENTIAL DIMENSIONS⁷³

PRESENCE OF COMPETITORS

1. Number of competitors within 200 metres employing more staff than the branch [MORSTAFF]
2. Number of competitors within 200 metres employing equal or smaller number of staff [EQUSTAFF]
3. Total number of competitor branches in the branch's catchment area outside a 200 metre radius [TOTCOMP#]

TANGIBLE CONVENIENCE

1. Location at a regional shopping centre [REGSHOP]
2. Number of teller windows [TELLWIN#]
3. Location adjacent to or within walking distance of a regional shopping centre [ADJASHOP]
4. Number of ATMs [ATMS]
5. Presence of a free car park [CARPARK]
6. Proximity to public transportation (1 km or less) [PUBTRANS]

⁷³ Variable names given in SPSS are indicated in square brackets. These names cannot exceed eight characters.

THE CUSTOMER SERVICE QUALITY INSTRUMENT

1. Politeness of branch staff [POLITE]
2. Branch staff greeting me when it's my turn to be served [GREET]
3. Willingness of branch staff to help me [HELP]
4. Promptness of service from branch staff [PROMPT]
5. Neat appearance of branch staff [NEATNESS]
6. Ability of branch staff to apologise for a mistake [APOLOGY]
7. Expression of genuine concern if there is a mistake in my account [CONCERN]
8. Ability of branch staff to put a mistake right [MISTAKE]
9. Feeling of security in my dealings with the branch staff [SECURITY]
10. Branch staff keeping me informed about matters of concern to me [INFORMED]
11. Branch staff telling me about the different types of accounts and investments available [ACCTYPES]
12. Quality of advice given about managing my finances [ADVICE]
13. Branch staff helping me learn how to keep down my banking costs [LEARN]
14. Branch staff's knowledge of bank's services and products [KNOW]
15. Branch staff telling me when services will be performed [SERVWHEN]

16. Number of open tellers during the busy hours of the day
[TELLERS]
17. Number of staff behind the counter serving customers
[STAFFNUM]

THE MANAGERIAL COMPETENCE OF THE BRANCH MANAGER

1. Manages change [MC1]
2. Seeks to develop branch's customer profile in line with the customer groups targeted by the Bank [MC2]
3. Encourages customers to provide feedback on quality of service [MC3]
4. Practices proactive decision-making [MC4]
5. Closely follows developments in the branch's catchment area [MC5]
6. Wants to take action to solve problems and overcome obstacles to achieve goals [MC6]
7. Perseveres with an issue to its conclusion [MC7]
8. Establishes action priorities for achievable goals [MC8]
9. Is conscious of time management needs [MC9]
10. Identifies lending opportunities [MC10]
11. Develops strategies to maximise lending [MC11]
12. Identifies deposit gathering opportunities [MC12]
13. Develops strategies to maximise deposit gathering [MC13]
14. Matches management style to changing situations [MC14]
15. Leads by example [MC15]
16. Motivates staff through constructive criticism and positive feedback [MC16]

17. Stimulates others to work effectively together in group settings [MC17]
18. Determines objectives with subordinate staff to develop team effort [MC18]
19. Contributes to harmonious and supportive banking environment [MC19]
20. Is sensitive in implementing executive decisions [MC20]
21. Is effective in handling industrial relations in the branch [MC21]
22. Provokes thoughtful reactions to important issues [MC22]
23. Counsels staff on full utilisation of personal potential [MC23]
24. Fosters a non-discriminatory work environment [MC24]
25. Recognises and acknowledges good work of staff [MC25]
26. Manages the branch relying on goals and values shared with staff [MC26]
27. Fosters a high level of trust among staff [MC27]
28. Informs staff of organisational plans and programs that impact their work lives [MC28]
29. Encourages input from staff on organisational plans and programs [MC29]
30. Conveys staff's concerns to higher management [MC30]
31. Delegates decision-making authority [MC31]
32. Has interpersonal sensitivity [MC32]
33. Listens [MC33]
34. Can communicate in writing for two-way understanding [MC34]
35. Can communicate orally for two-way understanding [MC35]

36. Generates ideas for use at appropriate time [MC36]
37. Exercises common sense in decision-making and problem-solving [MC37]
38. Marshals relevant arguments for decision-making negotiations [MC38]
39. Focuses on central issues [MC39]
40. Discards preconceived ideas when made aware [MC40]
41. Responds positively to pressures [MC41]
42. Maintains a sense of humour [MC42]
43. Remains stable in pressure situations [MC43]
44. Has knowledge of banking culture: its norms, values, attitudes, customs and language [MC44]
45. Has knowledge of banking procedures: work flows, systems processing, and technicalities [MC45]

USE OF THE DECISION SUPPORT SYSTEM

1. Reference Report [REFER]
2. Exceptions Report [EXCEPT]
3. General Ledger Report [LEDGER]
4. Out of Order Report [OUTORDER]
5. Personal Loans Arrears Report [ARREARS]
6. Manager's Performance Report [MANPERFO]
7. ASSIST Terminal [ASSIST]

EFFECTIVE PRACTICE OF BENCHMARKING

Dimension 1: Internally Comparing Outcomes on Key Performance Factors in Different Functional Areas of Branch [BD1]

Use of products is monitored to gauge their user-friendliness to customers.

Number of active deposits is compared within the bank to that of branches with similar demographic profiles.

Lending approvals are compared against that of other branches of the bank in the same region.

Non-interest revenue of branch is compared with that of fellow branches.

Recognisable outcomes of in-house staff training are compared across fellow branches.

Budgetary achievements of branch are compared with fellow branches.

Number of referrals generated in the branch are compared with that of fellow branches.

This branch practices none of the above.

Dimension 2: Comparing Outcomes on Key Performance Factors in Different Functional Areas of Branch with that of Industry Leaders [BD2]

Performance of small business loans is continually reviewed in light of industry leader's performance in the area.

Branch's non-performing loans and that of the perceived competitor in the same catchment area are monitored simultaneously.

Marketing displays of branch are compared with that of local competitors.

Staff numbers of perceived competitor in catchment area is compared with that of the branch.

Overheads of perceived competitor in catchment area is compared with that of the branch.

This branch practices none of the above.

Dimension 3: Internally Comparing Work Processes of Branch
[BD3]

Manner of customer service delivery to clients wanting to establish home loans is benchmarked against training guidelines.

Decision-making process is scrutinised for improved productivity.

Adequacy of systems to respond to client needs is questioned and various departments are consulted.

Discussions are held to bring together branch's efforts to enhance communication with clients.

This branch practices none of the above.

Dimension 4: Comparing Work Processes of Branch with that of
Industry Leaders [BD4]

Speed of processing small business loan applications is compared to the industry leader.

Best teamwork practices in the industry are openly discussed in the branch.

Selling skills of branch staff are upgraded by observing better practices in the industry.

Marketing ideas used by leading financial institutions are closely followed.

The process of defining a mission statement for branch is examined against the best industry practices.

Reward and incentive schemes operating at branch level are compared with that of industry leader.

Convenience of trading hours is compared with similar service providers of recognisable success.

This branch practices none of the above.

Dimension 5: Extending Comparisons of Work Processes of Branch to Other Industries [BD5]

A proactive approach to customer service is adopted by examining practices of leading retail businesses.

New ideas are sought in motivating branch staff by looking beyond the banking industry.

Comparative organisations from non-banking industries are identified for benchmarking work processes.

Cross-selling procedures are reviewed against practices in other industries.

Process of dealing with customer complaints is benchmarked against practices of other industries.

Coordination of marketing, sales and work loads is compared to businesses in other industries such as Myers and McDonalds.

This branch practices none of the above.

Dimension 6: Identifying Sources of Benchmarking Information
[BD6]

Good rapport is maintained with Marketing Services of the bank to gain access to studies not widely or routinely circulated.

Subscriptions to professional journals by individuals is encouraged by branch manager.

Branch-classified staff hold meetings to discuss what needs to be benchmarked.

Internal reports are perused for benchmarking ideas.

Branch manager circulates information on seminars that are relevant to running of the branch.

This branch practices none of the above.

ITEMISED PERFORMANCE DIMENSIONS

PROFITABLE PRODUCT CONCENTRATION

1. Streamline Debit Balances [STREAMDR]
2. Personal Credit Lines [PERCLINE]
3. Small Business Loans [SBUSLOAN]
4. Approved Advances [APPRDADV]
5. Residential Property Investment Loans [RESILOAN]
6. Fully Drawn Loans [FULDLOAN]
7. Personal Loans [PERLOAN]
8. Current Accounts Not-Bearing Interest [CANBI]
9. Home Loans [HOMELOAN]

STRATEGIC PRODUCT CONCENTRATION

1. Home Loans [HOMELOAN]
2. Fixed Rate Term Advances [FIXEDADV]
3. Residential Property Investment Loans [RESILOAN]
4. Streamline Accounts [STREAM]
5. Carded Term Deposits [CARDEDTD]

- 6. Personal Loans [PERLOAN]
- 7. Approved Advances [APPRDADV]

APPENDIX B

THE CUSTOMER SERVICE QUALITY INSTRUMENT
AND PARA BANK'S CUSTOMER PROFILE

THE CUSTOMER SERVICE QUALITY INSTRUMENT

1. "Willingness of branch staff to help me" is [HELP]

1	2	3	4	5
<i>Much worse than I expected</i>	<i>Worse than I expected</i>	<i>About what I expected</i>	<i>Better than I expected</i>	<i>Much better than I expected</i>

1	2	3	4	5
<i>Not important</i>	<i>Slightly important</i>	<i>Moderately important</i>	<i>Important</i>	<i>Very important</i>

2. "Promptness of service from branch staff" is [PROMPT]

3.* "Concern shown by branch staff if queues get too long" is [QUEUES]

4. "Branch staff helping me learn how to keep down my banking costs" is [LEARN]

5. "Branch staff greeting me when it's my turn to be served" is [GREET]

6.* "Respect for privacy of my financial affairs when I am standing at the counter" is [PRIVACY]

7.* "Personal attention I receive from branch staff" is [PERSONAL]

- 8.* "Branch staff being sympathetic when I have problems" is
[SYMPATHY]
9. "Expression of genuine concern if there is a mistake in my
account" is
[CONCERN]
- 10.* "Branch staff making me feel at ease when applying for a
loan" is
[LOAN]
11. "Politeness of branch staff" is
[POLITE]
12. "Neat appearance of branch staff" is
[NEATNESS]
13. "Ability of branch staff to apologise for a mistake" is
[APOLOGY]
14. "Branch staff's knowledge of bank's services and products"
is
[KNOW]
15. "Quality of advice given about managing my finances" is
[ADVICE]
16. "Number of open tellers during the busy hours of the day"
is
[TELLERS]
- 17.* "Ease of contacting the branch manager" is
[MANAGER]
- 18.* "Ease of getting through to the branch on the telephone"
is
[TELEPHONE]
19. "Number of staff behind the counter serving customers" is
[STAFFNUM]
20. "Branch staff telling me about the different types of
accounts and investments available" is
[ACCTYPES]
21. "Branch staff telling me when services will be performed"
is
[SERVWHEN]
- 22.* "Clarity of correspondence I receive from my branch" is
[CLARITY]
23. "Branch staff keeping me informed about matters of concern
to me" is
[INFORMED]

- 24.* "Branch staff keeping their promises to me" is [PROMISES]
25. "Ability of branch staff to put a mistake right" is [MISTAKE]
26. "Feeling of security in my dealings with the branch staff" is [SECURITY]
- 27.* "Ability of branch staff to get information quickly from the computer" is [COMPUTER]

Notes: Deleted items are marked with an asterisk. Variable names used in SPSS are indicated in square brackets.

PARA BANK'S CUSTOMER PROFILE

Average Age:	43.89
Male:	46.7%
Female:	53.3%
Marital Status:	
Married/De Facto	74.7%
Single/Divorced	25.3%
Highest Level of Education Attained:	
High School	45.7%
Diploma/Certificate	16.8%
Degree	16.4%
Trade Qualification	14.5%
Primary School	6.0%
Other	0.6%
Occupation:	
Skilled Professional	19.7%
Pensioner	17.6%
Home Duties	15.2%
Clerical	11.8%
Trade	11.1%
Other	8.5%
Sales	6.2%

Labourer	4.8%
Transport	2.8%
Unemployed	2.4%

APPENDIX C

DEVELOPING THE MANAGERIAL COMPETENCY INSTRUMENT

NEEDED COMPETENCIES

(reproduced from Chataway 1982, p.517)

TECHNICAL CLUSTER

KNOWLEDGE

1. of banking culture: its norms, values, attitudes, customs and language
2. of banking procedures, technicalities, systems processing, and work flows
3. ascertain real needs of customers in the financial world

EFFICIENCY ORIENTATION

4. realistic in goal-setting
5. establish action priorities for achievable goals
6. achieve results using efficient methods
7. maintain acceptable performance standards
8. conscious of time management needs

INTERPERSONAL CLUSTER

USE OF COMMUNICATION

9. written communication for two-way understanding
10. verbal communication for two-way understanding
11. handling of reporting to more senior management

DEVELOPING OTHERS, AND MANAGING GROUP PROCESSES

12. give directives to obtain compliance
13. counsel where and when required
14. motivate staff through constructive criticism
15. interpersonal sensitivity
16. stimulate others to work effectively together in group settings
17. provoke thoughtful reactions to important issues
18. instructional skills to facilitate on-the-job training
19. determine objectives with subordinate staff to develop team effort
20. contribute to harmonious and supportive banking environment
21. uphold the image and reputation of the Bank
22. sensitive handling of critical incidents, and executive decisions and awkward circumstances

SOCIO-EMOTIONAL CLUSTER

SELF-CONFIDENCE

23. curb customer demands when warranted, and say No
24. respond positively to pressures
25. mix with many types of people

- 26. confident by example

SELF-CONTROL

- 27. maintain personal well-being, grooming and presentation, health, balance, and sense of humour
- 28. remain stable in pressure situations
- 29. integrate personal needs and desires with Bank's welfare

STAMINA

- 30. persevere with issue to its logical conclusion
- 31. ability to sustain long hours of work

ENTREPRENEURIAL CLUSTER

ENTREPRENEURIAL STYLE

- 32. want to take action to solve problems, overcome obstacles, and achieve goals
- 33. enthusiastic rather than a bureaucratic orientation to service
- 34. regards branch as a (potential) profit centre

INTELLECTUAL CLUSTER

OBJECTIVITY

- 35. focus on reality of management issues
- 36. appraise his/her management strengths and weaknesses realistically
- 37. match management style to changing situations
- 38. conscious of objectives of other party during negotiations

LOGICAL THOUGHT AND USE OF CONCEPTS

- 39. generate ideas for use at appropriate time
- 40. exercise common sense in decision-making and problem-solving
- 41. marshall relevant argument for decision-making negotiations
- 42. sift through cause-and-effect relationships, then focus on central issue
- 43. recognise new patterns in an assortment of information
- 44. discard preconceived ideas

THE MANAGERIAL COMPETENCY INSTRUMENT

0	1	2	3	4
Not at all				To a great extent

KEY COMPETENCIES IN A BRANCH MANAGER

To what extent does the manager of your branch/outlet possess the competencies listed below? For each item, use the scale shown at the top of the page to pick a rating; insert your answer in the box to the left of each item in the space provided.

- 1. ___ manages change
- 2. ___ seeks to develop branch's customer profile in line with the customer groups targeted by the Bank
- 3.* ___ sets branch targets on quality of customer service to be attained
- 4. ___ encourages customers to provide feedback on quality of service

- 5.* ☐ emphasises dynamic objectives oriented toward the Bank's marketing initiatives
6. ☐ practices proactive decision-making
7. ☐ closely follows developments in the branch's catchment area
- 8.* ☐ maintains good customer relations
9. ☐ wants to take action to solve problems and overcome obstacles to achieve goals
- 10.* ☐ has an enthusiastic rather than a bureaucratic orientation to service
- 11.* ☐ regards branch as a revenue centre where controllable revenues and expenses are monitored
- 12.* ☐ regards branch as a revenue centre where volume and mix of sales are monitored
- 13.* ☐ upholds the image and reputation of the Bank
14. ☐ perseveres with an issue to its conclusion
15. ☐ establishes action priorities for achievable goals
16. ☐ is conscious of time management needs
17. ☐ identifies lending opportunities
18. ☐ develops strategies to maximise lending
19. ☐ identifies deposit gathering opportunities
20. ☐ develops strategies to maximise deposit gathering
21. ☐ matches management style to changing situations
- 22.* ☐ is conscious of objectives of other party during negotiations
- 23.* ☐ ascertains real financial needs of customers
24. ☐ leads by example
- 25.* ☐ achieves results through others
26. ☐ motivates staff through constructive criticism and positive feedback
27. ☐ stimulates others to work effectively together in group settings

28. _____ determines objectives with subordinate staff to develop team effort
29. _____ contributes to harmonious and supportive banking environment
- 30.* _____ is sensitive in handling critical incidents, and awkward circumstances
31. _____ is sensitive in implementing executive decisions
32. _____ is effective in handling industrial relations in the branch
33. _____ provokes thoughtful reactions to important issues
34. _____ counsels staff on full utilisation of personal potential
35. _____ fosters a non-discriminatory work environment
36. _____ recognises and acknowledges good work of staff
37. _____ manages the branch relying on goals and values shared with staff
38. _____ fosters a high level of trust among staff
39. _____ informs staff of organisational plans and programs that impact their work lives
40. _____ encourages input from staff on organisational plans and programs
41. _____ conveys staff's concerns to higher management
42. _____ delegates decision-making authority
43. _____ has interpersonal sensitivity
44. _____ listens
45. _____ can communicate in writing for two-way understanding
46. _____ can communicate orally for two-way understanding
47. _____ generates ideas for use at appropriate time
48. _____ exercises common sense in decision-making and problem-solving
49. _____ marshals relevant arguments for decision-making negotiations
50. _____ focuses on central issues

- 51. ____ discards preconceived ideas when made aware
- 52.* ____ knows when to say No to customers
- 53. ____ responds positively to pressures
- 54.* ____ is confident
- 55. ____ maintains a sense of humour
- 56. ____ remains stable in pressure situations
- 57. ____ has knowledge of banking culture: its norms, values, attitudes, customs and language
- 58. ____ has knowledge of banking procedures: work flows, systems processing, and technicalities

PLEASE CONSIDER YOUR ANSWER TO THE FOLLOWING QUESTION SEPARATELY FROM YOUR ANSWERS IN THE PRECEDING SECTION:

"Overall, how would you rate the competence of your branch/outlet manager?"

0	1	2	3	4
Poor				Excellent

* Variables omitted in the final analysis are marked with an asterisk.

APPENDIX D

THE BENCHMARKING DIMENSIONS AND BEHAVIOURAL INCIDENTS

(Mean incident ratings are indicated in square brackets.)

D1: *Comparing outcomes on key performance factors in different functional areas of branch internally:*

Number of referrals generated in the branch are compared with that of fellow branches. [4.00]

Number of active deposits is compared within the bank to that of branches with similar demographic profiles[5.33]

Lending approvals are compared against that of other branches of the bank in the same region. [4.67]

Non-interest revenue of branch is compared with that of fellow branches. [4.67]

Recognisable outcomes of in-house staff training are compared across fellow branches. [4.33]

Budgetary achievements of branch are compared with fellow branches. [4.00]

Use of products is monitored to gauge their user-friendliness to customers. [6.00]

D2: *Comparing outcomes on key performance factors in different functional areas of branch with that of industry leaders:*

Staff numbers of perceived competitor in catchment area is compared with that of the branch. [3.67]

Performance of small business loans is continually reviewed in light of industry leader's performance in the area. [6.33]

Overheads of perceived competitor in catchment area is compared with that of the branch. [3.33]

Marketing displays of branch are compared with that of local competitors. [4.33]

Branch's non-performing loans and that of the perceived competitor in the same catchment area are monitored simultaneously. [6.33]

D3: *Comparing work processes of branch internally:*

Manner of customer service delivery to clients wanting to establish home loans is benchmarked against training guidelines. [6.67]

Decision-making process is scrutinised for improved productivity. [6.00]

Discussions are held to bring together branch's efforts to enhance communication with clients. [4.33]

Adequacy of systems to respond to client needs is questioned and various departments are consulted. [5.00]

D4: *Comparing work processes of branch with that of industry leaders:*

Speed of processing small business loan applications is compared to the industry leader. [6.00]

The process of defining a mission statement for branch is examined against the best industry practices. [4.33]

Reward and incentive schemes operating at branch level are compared with that of industry leader. [4.00]

Best teamwork practices in the industry are openly discussed in the branch. [6.00]

Convenience of trading hours is compared with similar service providers of recognisable success. [4.00]

Selling skills of branch staff are upgraded by observing better practices in the industry. [5.67]

Marketing ideas used by leading financial institutions are closely followed. [5.33]

D5: *Extending comparisons of work processes of branch to other industries.*

Cross-selling procedures are reviewed against practices in other industries. [5.33]

Process of dealing with customer complaints is benchmarked against practices of other industries. [4.00]

Coordination of marketing, sales and work loads is compared to businesses in other industries such as Myers and McDonalds. [4.00]

A proactive approach to customer service is adopted by examining practices of leading retail businesses. [6.67]

Comparative organisations from non-banking industries are identified for benchmarking work processes. [5.67]

New ideas are sought in motivating branch staff by looking beyond the banking industry. [6.33]

D6. *Identifying sources of benchmarking information:*

Branch manager circulates information on seminars that are relevant to running of the branch. [2.33]

Internal reports are perused for benchmarking ideas. [3.67]

Good rapport is maintained with Marketing Services of the bank to gain access to studies not widely or routinely circulated. [5.00]

Subscriptions to professional journals by individuals is encouraged by branch manager. [4.00]

Branch-classified staff hold meetings to discuss what needs to be benchmarked. [3.67]

APPENDIX E

DEVELOPING THE DECISION SUPPORT SYSTEM INSTRUMENT

DSS INTERVIEW QUESTIONNAIRE

1. What are the top six routinely generated computer reports used at the branch level, ranked in terms of their importance to decision-making?
2. What are the personally initiated requests for additional information not ordinarily provided in routine reports?
e.g. Branch Information System.
3. What are some of the discernible components of DSS at Para Bank? e.g. ASSIST, Discovery, Home Loan Simulator etc.
4. Who are the most likely users of DSS at branch level?
5. Does the existing (or proposed?) DSS at Para Bank allow the branches to be run as revenue centres?

6. Can front-end customer-oriented tasks be handled by DSS at branch level? e.g. customer profile showing all of customer's accounts; online customer statement starting from any given date; accepting loan applications etc.

QUESTIONNAIRE MAILED TO BRANCH-CLASSIFIED SUPERVISORS

THE FOLLOWING LIST OF REPORTS/SYSTEMS HAVE BEEN IDENTIFIED AS SUPPORTING
MANAGERIAL DECISION-MAKING AT BRANCH LEVEL:

1. Reference Report
2. Exceptions Report
3. General Ledger Report
4. Savings Account Ledger
5. Journal of Transactions Report
6. Balance of Accounts
7. Out of Order Report
8. Personal Loans Arrears Report
9. Manager's Performance Report
10. Branch Information System
11. Home Loan Simulator
12. ASSIST Terminal
13. Discovery (Telecom) Terminal

You are kindly asked to evaluate this list by answering:

- a. Do you consider any of the reports/systems as unimportant in branch level managerial decision-making? If so, please explain.
- b. Do you feel any of the reports have been superseded by, say, ASSIST? If so, please explain.

- c. Taking into account your answers to questions 1 and 2, please identify those reports/systems you consider as providing key support to branch level managerial decision-making.

THE FINAL DSS INSTRUMENT

"On average, how often do you obtain information from the following reports/systems? (Assume a time-frame of one week)."

<u>Report/System</u>	<u>Frequency of Use</u>
Reference Report.....	_____
Exceptions Report.....	_____
General Ledger Report.....	_____
Out of Order Report.....	_____
Personal Loans Arrears Report.....	_____
Manager's Performance Report.....	_____
ASSIST Terminal.....	_____

Table E.1: Characteristics Influencing DSS Usage (Source: Fuerst and Cheney 1982, p.556)*

CHARACTERISTICS OF THE DECISION MAKER	CHARACTERISTICS OF THE IMPLEMENTATION PROCESS	CHARACTERISTICS OF THE DECISION SUPPORT SYSTEM
Age	User involvement	Length of time
Years of education	User training	Response time
Educational background	Top management support	Distance travelled to interact
Years of experience with company		Accuracy
Years of experience in position		Relevancy
Cognitive style		Format
		Mode of input/output

* Also see Yaverbaum (1988).

APPENDIX F

BRIEF DESCRIPTIONS OF BANKING PRODUCTS

(Source: Product Reference Handbook, by courtesy of Para Bank)

STREAMLINE ACCOUNT

An everyday interest bearing account.

Benefits

- * market related interest rates that grow as the balance increases;
- * can conduct all your day to day banking from just one account;
- * funds available at call;
- * one simple statement for all your transactions (excluding credit card transactions) issued regularly at least every 4 months or upon request;
- * card (Keycard/Credit Card) access through branch, Autobank, electronic funds transfer at point of sale/banking and Westpac Handybank;
- * customer has choice of wide range of options:
 - cheque book;
 - link your Streamline Account to your MasterCard or Bankcard;
 - conduct your banking over the phone via "Phonebank" or at home via "Telebank";
 - direct crediting of salaries, allowances, pensions, allotments, dividends, etc - alleviates the possible loss of cheques/cash;
 - payment of regular bills by periodical payments;
 - establish card links with certain other accounts, Keycard Savings account, other Streamline account or Cheque Account; and
 - overdraft available to approved customers.

Features

- * interest calculated daily on daily balance and paid quarterly (March, June, September, December);
- * no passbook, however, statements are issued periodically;
- * accounts where only one signature is required, can be linked to a plastic card;
- * special deposit/withdrawal booklet has provision for transaction/balance record;
- * no withdrawal limit when signature is recorded on card for branch transactions;
- * electronic card limit \$400 per day (standard for automatic teller machine and electronic funds transfer at point of sale/banking);
- * agency access only available where electronic funds transfer at point of banking terminals installed;
- * transaction fee based;
- * 7 free transactions per month for balances less than \$5,000;
- * 21 free transactions per month for balances \$5,000 or over.

CHEQUE ACCOUNT (CANBI)

A standard cheque account delivers an at call cheque issuing facility for non-personal customers. A simple, safe and convenient account for processing and organising of funds, with the benefit of a payment mechanism for settlement of accounts. Accounts are available for a variety of organisations including sole traders, partnerships, businesses, companies, executors or trustees of estates, and clubs (refer also Society Cheque Accounts).

Benefits

- * statements provide a record of receipts and payment for budget, audit or taxation purposes;
- * Telebank access/electronic accounting is available; and
- * direct crediting of income;

- * regular periodical debiting for payment of regular expenses eg. fortnightly, monthly etc. (Weekly payments only available manually via periodical payments); and
- * for personal accounts - automatic teller machine, electronic funds transfer at point of sale/banking and Phonebank access can be arranged.

Features

- * fees represent the lowest available for non-personal accounts from the major trading banks;
- * regular issue of statements;
- * personalised cheque and deposit books available;
- * overdrafts available in certain circumstances;
- * accounts can have individual or joint operation;
- * encashment of own cheques at any branch in Australia upon arrangement and/or presentation of suitable identification eg. Keycard;
- * existing personal cheque accounts become Charge-Free Cheque Accounts automatically, provided a minimum quarterly balance of \$250 is retained in the account; and
- * personal accounts can be linked to Keycard, MasterCard, Bankcard for automatic teller machine and electronic funds transfer at point of sale/banking access.

(CARDED) TERM DEPOSIT

An investment account in which funds are deposited for a fixed term and receive a guaranteed rate of interest.

Benefits

- * high interest rates;
- * flexibility to choose any term from 1 month to 5 years;
- * flexibility to add or withdraw funds at maturity;
- * choice of 4 interest payment options;
- * no bank fees; and
- * funds are guaranteed by the Commonwealth Government.

Features

- * minimum lodgement of \$1,000;
- * concessional lodgement of \$200 for Club Australia members;

- * interest is fixed for the term of the lodgement and calculated daily;
- * lodgements of \$100,000 and over are subject to quoted interest rates from Money Market Operations Centre;
- * full or partial prepayments may be granted in extreme circumstances; and
- * 4 types of interest payment options:

Regular: Interest is paid every 28 days and at maturity;

Standard: Interest is paid every 6 months and at maturity;

Compound: Interest is added to the principal every 6 months and at maturity so the interest earns interest;

Deferred: The payment of interest can be deferred until maturity for terms greater than 6 months up to 12 months.

OVERDRAFT

An overdraft is available to approved personal customers on a Streamline Account or for business purposes on their working account.

Benefits

- * provides, on a fluctuating basis, working capital requirements; and
- * interest is only charged on the daily debit balance.

Features

- * there is no preferred minimum or maximum amount. The limit is determined by the Bank's assessment of the customer's needs;
- * interest calculated on a daily basis and charged quarterly;
- * arrangements reviewed annually;
- * interest rate is variable; and
- * statements provided half-yearly or as necessary.

SMALL BUSINESS LOANS

Small Business Loans may be granted for any reasonable purpose of a non-personal nature including investments and consolidation of existing business related indebtedness.

Benefits

- * available to any creditworthy customer or non customers;
- * interest only loans available;
- * can be redrawn to within original approval at the Bank's discretion; and
- * interest only option available.

Features

- * preferred maximum term of 7 years (up to 10 years on a selective basis);
- * funded on a fully drawn and 'in reduction basis' usually with monthly repayments, however quarterly and half-yearly repayments will be considered;
- * interest rate is variable;
- * repayments may be made directly from statement based accounts; and
- * statements provided half-yearly or as necessary.

FIXED RATE TERM ADVANCE (summary extracted from product brochure)

- * provides an opportunity to borrow \$50,000 or more at a fixed rate for a specific term;
- * available for most business and rural capital expenditure (excludes working capital and bridging finance);
- * minimum term is one year;
- * maximum term is seven years (25 years for rural loans);
- * principal repayments on monthly, quarterly, half yearly or yearly basis are acceptable;
- * client will need to ensure sufficient funds are always maintained in the related nominated account to meet monthly interest charged, loan repayments, and Government charges.

FULLY DRAWN LOANS

Fully Drawn Loans are flexible, variable rate loan facilities which are suited to personal, business and rural clients for a wide variety of purposes.

Benefits

- * repayments can be flexible and geared to borrower's cash flow;
- * available with interest only option; and
- * competitive interest rates, calculated daily and charged quarterly.

Features

- * preferred maximum term of 5 years (up to 10 years on a selective basis);
- * generally funded on a fully drawn and 'in reduction' basis usually with monthly repayments, however quarterly and half-yearly repayments will be considered;
- * repayments may be made directly from statement based accounts; and
- * statements provided half-yearly or as necessary.

PERSONAL LOAN

Loans provided for any reasonable personal or domestic expenditure.

Benefits

- * security is not required;
- * equity not necessarily required;
- * competitive fixed interest rates with simple repayment programme;
- * loan funds usually available to approved applicants within 24 hours of application; and
- * in the event of the death of the nominated borrower, the loan outstanding is automatically cleared providing repayments are up-to-date.

Features

- * loans are granted to credit worthy persons with a regular income;
- * amount - minimum \$2,000, preferred maximum \$20,000;

- * customers and non-customers are eligible;
- * repayments are made via the direct entry system (free of charge) or, in special cases, repayment booklet;
- * fixed monthly instalments over terms from 12 to 84 months; and
- * loans repaid before final instalment due date may be entitled to a rebate.

PERSONAL CREDIT LINE

Personal Credit Lines are available to credit-worthy individuals with regular income for any reasonable personal or domestic expenditure and for refinancing of existing debts.

Benefits

- * flexible repayment arrangements are available to suit borrower's cash flow;
- * can redraw to within original approval at the Bank's discretion which means "new" loans do not have to be completely re-documented; and
- * competitive interest rates, calculated daily and charged quarterly.

Features

- * loans are not to be written in firm or company name;
- * amount - minimum \$15,000;
- * preferred maximum term 15 years;
- * acceptable security required;
- * interest rate is variable at the Bank's discretion;
- * funded on an "in reduction" basis with regular repayments;
- * repayments may be deducted from Streamline, Keycard Savings account or cheque accounts; and
- * statements provided periodically.

RESIDENTIAL PROPERTY INVESTMENT LOAN

Available to credit-worthy applicants to assist in the purchase/development of residential property for rental accommodation.

Residential property is defined as houses, town houses, villa units and home units intended for domestic occupation and land on which such residences are to be constructed for rental (not sale).

Benefits

- * flexible repayment arrangements (including an interest only option) are available to suit borrowers' needs;
- * interest rates are calculated daily and charged quarterly; and
- * there are no valuation fees, Bank legal fees or on-going loan administration charges. A competitive once only establishment fee applies.

Features

- * loans are available to individuals, firms or companies;
- * mortgage over residential property is required as security for the loan;
- * amount - generally from \$15,000 up to 70% of the purchase price/valuation (whichever is the lesser), or more in some cases;
- * maximum term of 20 years for principal and interest loans, 5 years for interest only;
- * repayments may be deducted from Streamline, Keycard Savings account or cheque account; and
- * statements provided periodically.

HOME LOANS

The bank provides loans for owner-occupied housing requirements. (Refer "Residential Property Loan" for leased property finance).

Home Seeker Loan

Allows applicants to look for a suitable property with a firm indication that finance is available.

Credit Foncier (Traditional) Home Loan

Provides finance to construct a dwelling or purchase a new/existing dwelling, including the purchase of a weekender. Interest rates are variable.

Fixed Rate Home Loan

A variation of the traditional home loan where the interest rate (and therefore repayments) are set for periods of five years. Fees apply for early repayment of Fixed Rate Loans.

Step-by-Step (Low Start) Home Loan

Lower repayments in the initial stages of the loan to help people on lower incomes to obtain finance.

Land Loan

Provides for the purchase of a block of land on which it is intended to erect a dwelling in the next 5 years.

Home Improvement Loan

Provides for additions or renovations to existing homes, including the construction of in-ground swimming pools.

Features

- * Term
 - Home Loans - minimum 5 years, maximum 30 years;
 - Land Loans - minimum 1 year, maximum 20 years;
 - Step-by-step loans - only written for 15 years or 20 years.
- * repayments should generally be no more than 30% of total gross basic income;
- * monthly repayments are fixed for 3 yearly periods, (5 years for fixed rate loans) regardless of interest rate movements, assisting borrowers to plan their budgets;
- * fortnightly repayment option (one half normal monthly repayment paid each fortnight) is available. A saving in interest is achieved and the loan term can be reduced considerably;
- * required security is generally first mortgage over the property to be purchased;
- * maximum loan generally 80% of the market value, 95% if mortgage insurance arranged (Land Loans up to a maximum 90% with mortgage insurance);
- * interest calculated daily and charged to the loan account monthly on the instalment due date; and

- * Mortgage Interest Saver Account (MISA) - an interest off -set arrangement whereby funds held in this account are applied directly against the home loan balance. This reduces the interest payable on the loan so it is repaid faster. As no interest is earned, no tax should be payable. Funds are available at call.

HOMEOWNERS (BUILDINGS) INSURANCE

Buildings Insurance is available to new, existing and former home loan borrowers. (A separate contents insurance package is also available - see under Homeowners (Contents Insurance)).

Benefits

- * competitive premium rates;
- * annual indexation of the sum insured to help keep pace with inflation; and
- * cover of \$5m for legal liability as owner or occupier.

Features

- * choice of replacement or indemnity cover;
- * ability to pay premiums monthly with home loan repayments at no extra charge. (Repaid loan customers can also arrange to pay premiums monthly); and
- * claims can be lodged at any branch.

HOMEOWNERS (CONTENTS) INSURANCE

Homeowners (Contents) Insurance offers home loan borrowers wide and practical cover for their home contents. This flexible insurance package is underwritten by QBE Insurance Limited, the largest Australian-owned international general insurance company.

Benefits

- * competitive premium rates;
- * compensation for fatal injury due to fire or burglary;
- * cover for accidental loss of frozen foods due to breakdown;
- * worldwide legal liability cover for \$5m;
- * credit card indemnity up to \$500; and

- * up to \$1,200 towards the cost of hiring domestic help/child minding services as a result of leisure time accidents.

Features

- * complements and supplements the Bank's own Building Insurance (see under Homeowners (Buildings) Insurance);
- * replacement cover on contents not more than twenty years old (other than clothing and personal effects);
- * premiums may be paid either annually in advance by cheque, Bankcard/MasterCard or by monthly instalments using the Direct Debit System; and
- * Optional Valuables - Multi Risks Cover which enables customers to insure personal effects taken out of the home against accidental loss or damage anywhere in the world.

APPENDIX G

SURVEY QUESTIONNAIRES

QUESTIONNAIRES AND INSTRUCTIONS MAILED TO BRANCH MANAGERS

DELINEATING THE BRANCH CATCHMENT AREA IN TERMS OF POSTCODES

"Survey about 300 branch accounts and determine the proportion (%) of accounts in particular postcode areas. It is important that these accounts are representative of branch's overall business, and certain types of accounts are not introduced into the group at the expense of others. Very small proportions can be aggregated in a single category e.g. 30% of accounts in postcode area 3049, 25% in postcode 3048, 20% in postcode 3047, 18% in postcode 3046, and 7% in others. Make sure at least 80% of the surveyed accounts are captured by the postcodes identified."

TANGIBLE CONVENIENCE

- _____ Location at a regional shopping centre; 1 for 'Yes', 0 for 'No'.
- _____ Number of teller windows.
- _____ Location adjacent to or within walking distance of a regional shopping centre; 1 for 'Yes', 0 for 'No'.
- _____ Number of ATMs.
- _____ Presence of a free car park; 1 for 'Yes', 0 for 'No'.
- _____ Proximity to public transportation (1 km or less); 1 for 'Yes', 0 for 'No'.

PRESENCE OF COMPETITORS

- _____ number of competitors within 200 metres employing more staff than the branch

- _____ number of competitors within 200 metres employing equal or smaller number of staff
- _____ total number of competitor branches in the branch's catchment area outside a 200 metre radius

You are requested to exclude one- or two-person operations from the count of competitors. Where exact numbers are not known, please put down your best estimate.

CROSS-SELLING RATIO

Cross-selling ratio is defined as the average number of accounts per branch customer, that is, the ratio of number of accounts to number of customers at a branch. This ratio can be approximated by examining the list of 300 accounts identified for the branch catchment area exercise. In calculating the number of customers on your list of 300 accounts, look out for names appearing more than once. Unless no customer name is repeated on your list, you should end up with a number of customers less than the number of accounts.

EFFECTIVE PRACTICE OF BENCHMARKING AT BRANCH LEVEL

Benchmarking is defined by the six dimensions listed below (D1 to D6). In turn, each dimension is followed by a number of benchmarking practices that represent examples on that dimension. These examples were generated by a focus group comprised of Para Bank branch managers and branch-classified staff. You are required to *select one practice from each dimension* by ticking on the left; identify the practice that most closely describes your branch's activities in a particular benchmarking dimension.

D1: *"Internally Comparing Outcomes on Key Performance Factors in Different Functional Areas of Branch":*

- _____ Use of products is monitored to gauge their user-friendliness to customers.

- _____ Number of active deposits is compared within the bank to that of branches with similar demographic profiles.
- _____ Lending approvals are compared against that of other branches of the bank in the same region.
- _____ Non-interest revenue of branch is compared with that of fellow branches.
- _____ Recognisable outcomes of in-house staff training are compared across fellow branches.
- _____ Budgetary achievements of branch are compared with fellow branches.
- _____ Number of referrals generated in the branch are compared with that of fellow branches.
- _____ *This branch practices none of the above.*

D2: "Comparing Outcomes on Key Performance Factors in Different Functional Areas of Branch with that of Industry Leaders":

- _____ Performance of small business loans is continually reviewed in light of industry leader's performance in the area.
- _____ Branch's non-performing loans and that of the perceived competitor in the same catchment area are monitored simultaneously.
- _____ Marketing displays of branch are compared with that of local competitors.

_____ Staff numbers of perceived competitor in catchment area is compared with that of the branch.

_____ Overheads of perceived competitor in catchment area is compared with that of the branch.

_____ *This branch practices none of the above.*

D3: "Internally Comparing Work Processes of Branch":

_____ Manner of customer service delivery to clients wanting to establish home loans is benchmarked against training guidelines.

_____ Decision-making process is scrutinised for improved productivity.

_____ Adequacy of systems to respond to client needs is questioned and various departments are consulted.

_____ Discussions are held to bring together branch's efforts to enhance communication with clients.

_____ *This branch practices none of the above.*

D4: "Comparing Work Processes of Branch with that of Industry Leaders":

_____ Speed of processing small business loan applications is compared to the industry leader.

_____ Best teamwork practices in the industry are openly discussed in the branch.

- _____ Selling skills of branch staff are upgraded by observing better practices in the industry.
- _____ Marketing ideas used by leading financial institutions are closely followed.
- _____ The process of defining a mission statement for branch is examined against the best industry practices.
- _____ Reward and incentive schemes operating at branch level are compared with that of industry leader.
- _____ Convenience of trading hours is compared with similar service providers of recognisable success.
- _____ *This branch practices none of the above.*

D5: "Extending Comparisons of Work Processes of Branch to Other Industries":

- _____ A proactive approach to customer service is adopted by examining practices of leading retail businesses.
- _____ New ideas are sought in motivating branch staff by looking beyond the banking industry.
- _____ Comparative organisations from non-banking industries are identified for benchmarking work processes.
- _____ Cross-selling procedures are reviewed against practices in other industries.
- _____ Process of dealing with customer complaints is benchmarked against practices of other industries.

_____ Coordination of marketing, sales and work loads is compared to businesses in other industries such as Myers and McDonalds.

_____ *This branch practices none of the above.*

D6. "Identifying Sources of Benchmarking Information":

_____ Good rapport is maintained with Marketing Services of the bank to gain access to studies not widely or routinely circulated.

_____ Subscriptions to professional journals by individuals is encouraged by branch manager.

_____ Branch-classified staff hold meetings to discuss what needs to be benchmarked.

_____ Internal reports are perused for benchmarking ideas.

_____ Branch manager circulates information on seminars that are relevant to running of the branch.

_____ *This branch practices none of the above.*

USE OF THE DECISION SUPPORT SYSTEM

Your branch-classified staff will be surveyed separately.
Please answer based on your personal usage.

*"On average, how many times a week do you obtain information
from the following reports/systems?"*

<u>Report/System</u>	<u>Frequency of Use</u>
Reference Report.....	_____
Exceptions Report.....	_____
General Ledger Report.....	_____
Out of Order Report.....	_____
Personal Loans Arrears Report.....	_____
Manager's Performance Report.....	_____
ASSIST Terminal.....	_____

CUSTOMER SERVICE QUALITY

The branch staff member to implement the telephone interviews is required to read the following:

"Each call is expected to take about 10 minutes. It is important that a *minimum of 15* fully completed questionnaires are returned i.e. where a score is recorded against each item. A master copy of the questionnaire is attached.

You should expect a high incidence of refusal and not be discouraged. In order to generate consistent responses, please avoid leading the customer by your tone of voice or changing the wording of the questionnaire items. Similarly, also avoid concentrating on one group at the expense of others, for example, where majority are pensioners or homemakers. Making your calls at different hours of the day is one way of getting around this problem.

Introduce yourself in a professional and courteous manner. Explain to the customer that the survey will register his/her opinions about the quality of services at his/her *branch*. Tell the customer that answers will be treated in strict confidence.

If the customer questions you about item 15 on the questionnaire, you can give examples such as 'when my cheque will be cleared' or 'when the account statement will be mailed out'.

A dry run with a friend or colleague is highly recommended."

QUESTIONNAIRE ON CUSTOMER SERVICE QUALITY

1	2	3	4	5
Much worse than I expected	Worse than I expected	About what I expected	Better than I expected	Much better than I expected

1. "Politeness of branch staff" is
2. "Branch staff greeting me when it's my turn to be served" is
3. "Willingness of branch staff to help me" is
4. "Promptness of service from branch staff" is
5. "Neat appearance of branch staff" is
6. "Ability of branch staff to apologise for a mistake" is
7. "Expression of genuine concern if there is a mistake in my account" is
8. "Ability of branch staff to put a mistake right" is
9. "Feeling of security in my dealings with the branch staff" is
10. "Branch staff keeping me informed about matters of concern to me" is
11. "Branch staff telling me about the different types of accounts and investments available" is
12. "Quality of advice given about managing my finances" is
13. "Branch staff helping me learn how to keep down my banking costs" is
14. "Branch staff's knowledge of bank's services and products" is
15. "Branch staff telling me when services will be performed" is
16. "Number of open tellers during the busy hours of the day" is
17. "Number of staff behind the counter serving customers" is

QUESTIONNAIRES MAILED TO BRANCH-CLASSIFIED SUPERVISORS

USE OF THE DECISION SUPPORT SYSTEM

Other branch-classified staff will be surveyed separately. Please answer based on your personal usage.

"On average, how many times a week do you obtain information from the following reports/systems?"

<u>Report/System</u>	<u>Frequency of Use</u>
Reference Report.....	_____
Exceptions Report.....	_____
General Ledger Report.....	_____
Out of Order Report.....	_____
Personal Loans Arrears Report.....	_____
Manager's Performance Report.....	_____
ASSIST Terminal.....	_____

0	1	2	3	4
Not at all				To a great extent

KEY COMPETENCIES IN A BRANCH MANAGER

To what extent does the manager of your branch/outlet possess the competencies listed below? For each item, use the scale shown at the top of the page to pick a rating; insert your answer in the box to the left of each item in the space provided.

1. manages change
2. seeks to develop branch's customer profile in line with the customer groups targeted by the Bank
3. encourages customers to provide feedback on quality of service
4. practices proactive decision-making
5. closely follows developments in the branch's catchment area
6. wants to take action to solve problems and overcome obstacles to achieve goals
7. perseveres with an issue to its conclusion
8. establishes action priorities for achievable goals
9. is conscious of time management needs
10. identifies lending opportunities
11. develops strategies to maximise lending
12. identifies deposit gathering opportunities
13. develops strategies to maximise deposit gathering
14. matches management style to changing situations
15. leads by example
16. motivates staff through constructive criticism and positive feedback
17. stimulates others to work effectively together in group settings
18. determines objectives with subordinate staff to develop team effort

19. ___ contributes to harmonious and supportive banking environment
20. ___ is sensitive in implementing executive decisions
21. ___ is effective in handling industrial relations in the branch
22. ___ provokes thoughtful reactions to important issues
23. ___ counsels staff on full utilisation of personal potential
24. ___ fosters a non-discriminatory work environment
25. ___ recognises and acknowledges good work of staff
26. ___ manages the branch relying on goals and values shared with staff
27. ___ fosters a high level of trust among staff
28. ___ informs staff of organisational plans and programs that impact their work lives
29. ___ encourages input from staff on organisational plans and programs
30. ___ conveys staff's concerns to higher management
31. ___ delegates decision-making authority
32. ___ has interpersonal sensitivity
33. ___ listens
34. ___ can communicate in writing for two-way understanding
35. ___ can communicate orally for two-way understanding
36. ___ generates ideas for use at appropriate time
37. ___ exercises common sense in decision-making and problem-solving
38. ___ marshals relevant arguments for decision-making negotiations
39. ___ focuses on central issues
40. ___ discards preconceived ideas when made aware
41. ___ responds positively to pressures
42. ___ maintains a sense of humour
43. ___ remains stable in pressure situations
44. ___ has knowledge of banking culture: its norms, values, attitudes, customs and language

45. _____ has knowledge of banking procedures: work flows, systems processing, and technicalities

APPENDIX H

FURTHER NOTES ON QUANTITATIVE TECHNIQUES USED IN THE STUDY

COEFFICIENT ALPHA AND RELIABILITY OF LINEAR COMBINATIONS

Coefficient alpha was introduced in Chapter Four, section 4.8.1. In this section, more technical details are presented, including equations.

Coefficient alpha is generated in an effort to determine measurement error. The theory behind coefficient alpha rests on the domain-sampling model of measurement error, which regards a measure as consisting of "...a random sample of items from a hypothetical domain of items" (Nunnally 1978, p.193). As the number of items sampled increases, so does the reliability of scores.

Another way of looking at coefficient alpha or reliability coefficients, is to say that it represents the expected correlation of a k-item test with another k-item test selected from the same domain, that is, both tests profess to measure

the same concept. Coefficient alpha can be computed using equation 1:⁷⁴

$$r_{kk} = \frac{k \bar{r}_{ij}}{1 + (k-1) \bar{r}_{ij}}$$

where k = number of items in the test
 \bar{r}_{ij} = average correlation between items

(Equation 1)

For example, a 30-item test with an average correlation of 0.30 will give a reliability coefficient of 0.93. An alternative but identical equation to compute coefficient alpha is shown in equation 2:⁷⁵

$$r_{kk} = \frac{k}{k-1} \left(1 - \frac{\sum \sigma_i^2}{\sigma_y^2} \right)$$

where k = number of items in the test
 σ_i^2 = variance of item i
 σ_y^2 = variance of scores on the total test

(Equation 2)

Coefficient alpha assumes the presence of a single dimension.

✗ If the instrument is multidimensional, coefficient alpha can be used to compute the reliability of separate dimensions or factors, but it cannot be used for calculation of the total instrument reliability. Total instrument reliability can be calculated by what is known as the *Reliability of Linear Combinations*. Nunnally (1978) gives the example of total score on an achievement test for primary school pupils, comprised of

⁷⁴ This is equation (6-18) in Nunnally (1978, p.211).

⁷⁵ This is equation (6-26) in Nunnally (1978, p.214).

scores on separate test components such as spelling, word usage, and arithmetic, which are simply added together. Clearly, there are multiple domains that are sampled by the different components of the achievement test.

The equation developed by Nunnally (1978) to compute total instrument reliability is reproduced in equation 3⁷⁶, which is really an extension of the coefficient alpha relationship into multiple domain situation.

$$r_{yy} = 1 - \frac{\sum \sigma_i^2 - \sum r_{ii} \sigma_i^2}{\sigma_y^2}$$

where σ_i^2 = variance of variable *i*
 r_{ii} = reliability of variable *i*
 σ_y^2 = variance of the linear combinations

(Equation 3)

While coefficient alphas in this study were calculated using the SPSS statistical computer package, reliability of linear combinations was computed manually. The customer service quality pilot stage data (see Chapter Five, section 5.2.3.1) were used in the example below:

The test consisted of 22 items across 6 factors. The following computations were tabled prior to substituting the appropriate figures in equation 3:

⁷⁶

This is equation (7-11) in Nunnally (1978, p.248).

Table H.1: An Example of Calculating Total Scale Reliability

FACTOR	COEFFICIENT ALPHA	VARIANCE	ALPHA x VARIANCE
F1	0.8424	13.84	11.6588
F2	0.8302	46.26	38.4050
F3	0.8713	18.95	16.5110
F4	0.7710	1.77	1.3646
F5	0.6628	9.37	6.2104
F6	0.6235	1.90	1.1846
Σ		92.09	75.3344
Variance of the Linear Combinations = 331.31			

Substituting in equation 3:

$$r_{yy} = 1 - \frac{92.09 - 75.33}{331.31} = \underline{0.9494}$$

JACKKNIFING IN DISCRIMINANT ANALYSIS

The calculation of jackknifing was outlined in section 4.8.4 as part of the discussion on assessing the stability of discriminant function coefficients. In section 6.3.3, actual results of discriminant analysis were reported. In this appendix, the calculation of jackknifed coefficients and confidence intervals are illustrated in detail.

The jackknifing procedure begins with the generation of discriminant function coefficients from a subset of the design sample where one of the cases has been omitted. Next, the

first omitted case is returned to the design sample and the another case taken out before discriminant analysis is rerun, and so on. The unstandardised coefficients are then substituted into equation 1 to obtain the so-called pseudovalues, J_i (Crask and Perreault 1977; Fenwick 1979):

$$J_i = k \theta' - (k-1) \theta'_i$$

for $i = 1, 2, \dots, k$

(Equation 1)

- where k = number of subsets
- θ' = unstandardised coefficients from complete design sample.
- θ'_i = unstandardised coefficients from subsets.

The unstandardised discriminant function coefficients to emerge from discriminant analysis in section 6.3.3.1 are reproduced in Table H.2.

Table H.2: Unstandardised Discriminant Function Coefficients from Complete Design Sample

Predictors	Function 1	Function 2
FULLTIME	7.61705416E-03	1.69246298E-03
APOLOGY	-0.7482149	1.3217031
POP	1.51488250E-05	-1.97895981E-05
TELLWIN#	0.1078311	0.1301888
INCOME\$	-3.16264422E-05	1.16830909E-04
Constant	-0.4252136	-8.2894976

Pseudovalues for the two functions across the five predictors and the constant are reported in Table H.3 and Table H.4 for the first 10 subsets only (there are a total of 104 subsets for each function).

Table H.3: Pseudovalues of Unstandardised Coefficients for the First Discriminant Function

FULLTIME	APOLOGY	POP	TELLWIN#	INCOME\$	Constant
-0.0307099	-0.7742945	-0.000023	-0.9194085	0.00021015	7.6580513
0.00198284	-0.6873728	0.0000089	0.172958	0.00003896	-4.6035425
-0.0045158	-0.6271796	0.0000316	0.3177039	-0.0000665	-1.9310324
-0.0232694	-1.8407462	0.0000352	0.6394862	0.00019339	-2.8920327
-0.0009431	-0.4319843	0.0000234	0.0565474	-0.0000642	-1.6295514
-0.0085774	2.0243082	0.0000512	-0.0953467	-0.0000061	-10.208205
0.01181947	-1.2371662	0.0000499	-0.1460742	-0.0002433	3.7311763
0.01592419	-0.6109365	0.0000102	-0.0157483	-0.0000659	-3.5604924
-0.0088386	-1.4382325	-0.000190	0.4803924	0.00022333	3.1473414
0.00659893	-0.9671002	0.0000188	0.0666002	-0.0000513	-1.872858

Table H.4: Pseudovalues of Unstandardised Coefficients for the Second Discriminant Function

FULLTIME	APOLOGY	POP	TELLWIN#	INCOME\$	Constant
0.00194615	0.1546925	-0.000019	-0.1575108	0.00040841	-12.12497
0.00400615	-0.4473116	0.0000019	0.5730682	0.00020241	-9.7508204
-0.0392539	4.0639442	0.0000534	2.0682162	0.00020241	-25.18846
-0.0361639	-1.0530752	0.0000328	1.8858032	0.00071741	-22.07683
-0.0093839	3.6360925	0.0000122	0.5296022	0.00020241	-18.68813
-0.0062939	5.8406633	0.0000843	0.1581842	0.00020241	-28.3485
0.00915615	-0.7978206	-0.000008	0.4376232	0.00020241	-6.1417004
-0.0093839	1.5776993	-0.000019	0.6299242	0.00030541	-14.58564
0.01430615	-1.9799516	-0.000081	0.5961402	0.00009941	0.3328796
-0.0165939	2.3421962	0.0000946	-0.9891328	0.00061441	-22.14069

The jackknife estimator, J, for each predictor is calculated by taking the average of pseudovalues, that is:

$$J = [\sum_{i=1}^k J_i] / k$$

(Equation 2)

In the next step, standard errors of the jackknife estimators are calculated by equation 3:

$$S.E. = \frac{s}{\sqrt{n}}$$

(Equation 3)

where n = k = number of subsets
s = sample standard deviation

The final step in the calculations sets up confidence intervals for predictors using the following relationship:

$$\bar{x} \pm t \text{ critical } \times (S.E.)$$

where the t-test is two-tailed at 95 per cent confidence level and 103 degrees of freedom. Since the t-distribution merges with the z-distribution beyond 100 degrees of freedom, the t-critical value becomes 1.96. The computations leading to confidence intervals around the jackknife estimators are depicted in Table H.5 and Table H.6 below.

Table H.5: Calculation of Confidence Intervals Around Jackknife Estimators for Function 1

FULLTIME	APOLOGY	POP	TELLWIN#	INCOME\$	Constant
Jackknife Estimators					
0.00717866	-0.8357947	0.0000151	0.11241163	-0.0000292	-0.0914328
Standard Deviation					
0.01304952	3.98014598	0.0000568	0.64870325	0.0002499	15.3507197
Standard Error					
0.00127961	0.39028542	0.0000056	0.06361059	0.0000245	1.50526191
Confidence Intervals					
Upper Limits					
0.0096867	-0.0708352	0.000026	0.23708838	0.00001883	2.85888055
Lower Limits					
0.00467062	-1.6007541	0.0000041	-0.0122651	-0.0000772	-3.0417461

Table H.6: Calculation of Confidence Intervals Around Jackknife Estimators for Function 2

FULLTIME	APOLOGY	POP	TELLWIN#	INCOME\$	Constant
Jackknife Estimators					
0.0016837	1.48229594	-0.000024	0.16932207	0.00014695	-9.8182557
Standard Deviation					
0.02566502	8.15619082	0.0001177	1.38663312	0.00061044	20.3793121
Standard Error					
0.00251666	0.79978031	0.0000115	0.13597056	0.00005986	1.99835597
Confidence Intervals					
Upper Limits					
0.00661636	3.04986535	-0.000001	0.43582437	0.00026428	-5.901478
Lower Limits					
-0.003249	-0.0852734	-0.000047	-0.0971802	0.00002963	-13.735033

Examination of the confidence intervals for each predictor reveals that all the unstandardised coefficients from the complete design sample (see Table H.2) fall within the upper and lower limits, indicating stable coefficients and implying an adequate sample size.

TWO-GROUP DISCRIMINANT ANALYSIS

An alternative to the three-group discriminant analysis reported in section 6.3.3 is a two-group discriminant analysis where branches are categorised into *high performers* and *others*. Table H.7 summarises the key results from a two-group analysis.

Table H.7: Key Results to Emerge from Two-Group Analysis

PREDICTORS	UNSTANDARDISED COEFFICIENTS	STANDARDISED COEFFICIENTS
FULLTIME	7.75478358E-03	0.90045
POP	1.73059394E-05	0.53139
INCOME\$	-4.79076357E-05	-0.31306
APOLOGY	-1.0204886	-0.46397
DWELL	-0.0335421	-0.26347
Eigenvalue		1.6567
Canonical Correlation		0.7897
Correct Classification Rate		94.23%
Cross-validated Correct Classification Rate		89.42%

APPENDIX I

RANKING BRANCHES ON OVERALL POTENTIAL, OVERALL PERFORMANCE, AND UNREALISED PERFORMANCE

Two of the key research objectives in this study are to *develop measures of overall branch performance and overall branch potential*. These objectives were addressed through multiple regression analysis (see Chapter Six, section 6.3.1), resulting in the following standardised measures:

Overall Potential (POTENZ) is the sum of standardised scores on variables

FULLTIME	:	Staff numbers, full-time equivalent
APOLOGY	:	Ability of branch staff to apologise for a mistake
TELLWIN#	:	Number of teller windows
POP	:	Number of persons aged 15 years or more
INCOME\$:	Average annual family income
TOTCOMP#	:	Total number of competitor branches in the branch's catchment area outside a 200 metre radius
SBEST#	:	Number of small business establishments

MORSTAFF : Number of competitors within 200 metres
employing more staff than the branch

Overall Performance (PERFORZ) is the sum of standardised
scores on variables

- DEPOBAL\$: Total average deposit balances held
- NEWDEPO# : Total number of new deposit accounts
- LENDBAL\$: Total average lending balances outstanding
- FEEINC\$: Fee income
- INSURE : Number of new insurance policies originated
- INCREFER : Number of new investment centre referrals
- PERLOAN : Number of new personal loans
- HOMELOAN : Number of new home loans

Table I.1 and Table I.2 distinguish between branches on overall
potential and overall performance respectively (both tables are
organised in ascending order).

Table I.1: Branches Ranked on Overall Potential

BRANCH	POTENZ	BRANCH	POTENZ	BRANCH	POTENZ
214	-7.4591	52	-1.4098	27	1.0614
212	-7.4139	34	-1.3998	16	1.1601
54	-7.3197	69	-1.3519	55	1.1940
97	-6.8972	94	-1.1168	102	1.2581
80	-6.3512	210	-1.0836	37	1.2717
62	-6.1441	206	-1.0596	82	1.2823
61	-6.0541	42	-0.9906	32	1.3088
86	-5.9519	118	-0.9458	33	1.3750
64	-5.9197	26	-0.8817	2	1.5230

88	-5.8387	105	-0.8707	108	1.5636
119	-5.8324	115	-0.8407	90	1.5662
213	-5.7128	209	-0.8333	116	1.9874
208	-5.4135	75	-0.8191	85	1.9977
25	-4.8021	66	-0.7281	114	2.0295
14	-4.6675	50	-0.6561	31	2.0538
211	-4.6329	78	-0.6393	89	2.2641
205	-4.5165	76	-0.5336	10	2.3319
91	-4.2634	68	-0.5173	204	2.4884
109	-3.8060	48	-0.4242	9	2.5233
30	-3.4115	29	-0.2804	60	2.6471
113	-3.3203	39	-0.2260	19	2.8309
218	-3.2184	96	-0.2243	21	3.2535
104	-3.0240	36	-0.1001	71	3.2837
103	-2.9307	110	-0.0189	92	3.7234
95	-2.6911	63	-0.0157	70	3.9297
6	-2.4899	49	0.0176	11	4.8036
8	-2.4485	1	0.0365	15	5.1196
13	-2.3082	56	0.1242	101	5.2671
217	-2.3029	7	0.1344	28	5.3048
58	-2.2653	18	0.2281	47	6.3262
51	-2.0960	17	0.3479	72	6.7489
40	-2.0408	44	0.3535	45	6.9347
22	-2.0104	74	0.4368	202	7.1747
57	-1.8869	43	0.5587	93	7.2017
203	-1.8161	111	0.7142	67	7.4488
65	-1.7967	106	0.8758	216	8.4441
73	-1.6973	207	0.9246	201	9.3991
215	-1.5685	53	0.9392	46	10.6570
38	-1.5505	77	0.9944	24	10.7756
87	-1.4790	81	1.0426	20	14.0715

In Table I.2 below, branches are categorised into low, medium, or high performers by taking 2 standard deviations on each side of the mean overall performance. It should be recalled that overall performance is the sum of standardised scores of its constituent variables, and thus, its mean is also equal to zero.

Table I.2: Branches Grouped and Ranked on Overall Performance

BRANCH	PERFORZ	BRANCH	PERFORZ	BRANCH	PERFORZ
low performers		97	-3.7713	82	1.0313
211	-10.5762	8	-3.7173	31	1.1305
215	-9.2051	11	-3.6992	38	1.1766
212	-8.9156	13	-3.4630	85	1.3563
217	-8.3855	9	-3.2662	16	1.6356
80	-8.1573	26	-3.2481	high performers	
111	-8.0959	87	-3.0494	65	2.0567
214	-8.0835	88	-3.0154	53	2.1408
203	-8.0268	55	-3.0083	70	2.1737
66	-7.6830	209	-2.9511	19	2.4502
103	-7.3431	34	-2.9158	105	2.4638
119	-7.2001	30	-2.8451	110	2.5166
54	-6.7537	89	-2.7759	27	2.6453
86	-6.6443	96	-2.2502	115	2.6529
50	-6.6168	60	-2.1853	114	3.7594
204	-6.6081	91	-2.0308	67	4.0718
25	-6.5608	medium performers		63	4.3392
52	-6.4188	81	-2.0009	32	4.3430
57	-6.0800	73	-1.8907	29	4.4591
14	-5.7658	109	-1.8718	108	5.2866
104	-5.7317	76	-1.7932	118	5.4653
42	-5.6914	210	-1.7546	21	5.6592
51	-5.4974	58	-1.5865	95	6.7412

62	-5.2563	94	-1.0146	33	7.1435
61	-5.1869	92	-0.9058	47	7.5614
48	-5.1512	39	-0.8217	101	7.9466
18	-4.9113	2	-0.6770	28	8.4873
208	-4.8691	90	-0.6518	24	8.5109
218	-4.8535	113	-0.6174	71	10.5350
213	-4.7519	36	-0.4233	20	11.5205
7	-4.6502	74	-0.3039	102	12.9707
75	-4.6326	202	-0.1725	216	13.3110
56	-4.5737	78	-0.1523	44	13.5856
40	-4.5123	1	0.0610	201	13.6820
206	-4.3508	17	0.0973	15	14.2686
22	-4.3500	72	0.2366	116	15.3884
68	-4.1832	43	0.6992	106	19.1609
205	-4.1512	77	0.7436	10	20.9957
37	-4.1083	6	0.9210	46	22.0920
207	-4.0405	69	0.9517	45	25.9708
64	-4.0053	93	1.0146		

Unrealised performance (or, performance gap) is defined as the difference between overall branch potential and overall branch performance. For ease of interpreting scores, the numbers were taken through positive monotonic transformation.⁷⁷ Briefly, the distributions of overall potential and overall performance scores, which were characterised by negative and positive numbers, were all transformed into positive scores, maintaining the order as well as the distances between scores. The following table ranks the branches in the study on unrealised

⁷⁷ Positive monotonic transformation is defined by Varian as "...a way of transforming one set of numbers into another set of numbers in a way that preserves the order of the numbers" (Varian 1993, p.56).

performance (expressed as a proportion of overall potential in descending order):⁷⁸

Table I.3: Branches Ranked on Unrealised Performance

BRANCH	OVERALL POTENTIAL	OVERALL PERFORMANCE	UNREALISED PERFORMANCE %
111	3.91	1.87	52.11
204	4.36	2.09	52.09
11	4.94	2.51	49.26
215	3.34	1.72	48.69
66	3.55	1.93	45.58
202	5.53	3.01	45.55
72	5.43	3.07	43.40
203	3.28	1.88	42.56
93	5.54	3.18	42.54
217	3.16	1.83	41.98
50	3.57	2.09	41.57
9	4.37	2.57	41.20
211	2.58	1.52	41.04
37	4.05	2.45	39.64
89	4.30	2.64	38.68
18	3.79	2.33	38.52
60	4.40	2.72	38.09
207	3.97	2.46	38.07
92	4.67	2.91	37.73
52	3.38	2.12	37.46
7	3.77	2.37	37.14
56	3.77	2.38	36.81
48	3.63	2.30	36.70

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Theoretically, unrealised performance cannot be a negative figure, since the theoretical maximum for overall performance is the overall potential. Out of 119 branches, 22 branches were indicated with negative unrealised performance, implying these branches have exceeded their potential. Such observations are attributed to measurement errors with those branches.

42	3.49	2.22	36.35
55	4.03	2.61	35.44
20	7.26	4.69	35.38
67	5.60	3.62	35.34
103	3.00	1.98	33.95
24	6.43	4.26	33.81
57	3.26	2.16	33.68
75	3.53	2.37	32.82
68	3.61	2.44	32.44
81	4.00	2.75	31.20
206	3.47	2.41	30.49
51	3.21	2.25	30.00
70	4.72	3.35	29.04
90	4.13	2.94	28.70
2	4.12	2.94	28.60
26	3.51	2.57	26.87
96	3.68	2.71	26.24
209	3.53	2.61	25.91
40	3.22	2.39	25.91
104	2.98	2.21	25.67
22	3.23	2.41	25.37
31	4.25	3.20	24.72
19	4.44	3.39	23.76
85	4.24	3.23	23.71
76	3.60	2.78	22.84
87	3.37	2.60	22.77
34	3.39	2.62	22.65
47	5.32	4.12	22.51
74	3.85	2.99	22.15
82	4.06	3.19	21.49
77	3.98	3.14	21.11
39	3.68	2.92	20.66
17	3.82	3.05	20.19

8	3.12	2.50	19.83
36	3.71	2.98	19.79
210	3.46	2.79	19.61
13	3.16	2.54	19.57
43	3.88	3.14	19.05
16	4.03	3.27	18.74
1	3.74	3.05	18.67
201	6.09	5.00	17.87
101	5.05	4.18	17.35
25	2.53	2.10	17.30
73	3.31	2.77	16.47
94	3.46	2.89	16.34
28	5.06	4.26	15.97
53	3.97	3.34	15.78
114	4.24	3.58	15.72
78	3.58	3.02	15.68
216	5.85	4.95	15.42
21	4.55	3.85	15.40
27	4.00	3.42	14.61
14	2.57	2.21	13.94
80	2.15	1.87	13.03
119	2.28	2.00	11.96
58	3.17	2.81	11.34
32	4.06	3.66	9.92
110	3.73	3.40	8.92
30	2.88	2.63	8.78
108	4.13	3.80	8.03
86	2.25	2.08	7.23
69	3.40	3.17	6.58
212	1.88	1.76	6.51
205	2.60	2.44	6.29
38	3.35	3.21	4.23
105	3.52	3.39	3.61

115	3.53	3.42	3.05
46	6.40	6.21	3.05
63	3.73	3.66	1.93
208	2.38	2.34	1.78
109	2.78	2.77	0.52
33	4.08	4.06	0.43
71	4.56	4.55	0.19
29	3.67	3.68	-0.32
214	1.87	1.88	-0.45
15	5.02	5.09	-1.35
65	3.29	3.33	-1.41
113	2.90	2.95	-1.52
6	3.11	3.17	-1.83
213	2.31	2.35	-2.15
91	2.67	2.75	-2.90
61	2.22	2.29	-3.27
62	2.20	2.28	-3.87
54	1.90	2.07	-8.65
118	3.50	3.82	-9.22
64	2.25	2.46	-9.25
88	2.27	2.60	-14.53
102	4.05	4.90	-20.95
45	5.47	6.77	-23.64
116	4.23	5.25	-23.93
97	2.01	2.50	-24.24
44	3.82	4.99	-30.42
95	3.06	4.00	-30.80
10	4.32	6.05	-40.09
106	3.96	5.79	-46.34
218	2.93	2.34	20.13

APPENDIX J

A DESCRIPTIVE SUMMARY OF THE RELATIONSHIPS BETWEEN EACH OF THE ELEVEN PERFORMANCE VARIABLES AND THEIR CORRESPONDING POTENTIAL VARIABLES

The following is a summary of the relationships between each of the eleven performance variables with adjusted R squared values of 0.5 or above and their corresponding potential variables as per results reported in Table 6.4 (see Appendix F for descriptions of banking products):

DEPOBAL\$ (total average deposit balances held) is explained by...

FULLTIME (staff numbers, full-time equivalent): The regression coefficient of 222,409.51 indicates that adding another full-time staff to the branch can raise the average deposit balance by \$222,409.51.

POPGR (growth rate in the 15 years or more age group): Its regression coefficient points to a drop of \$347,232.70 in the average balance of deposits as population growth rate increases by 1 per cent.

POP (number of persons aged 15 years or more): Indicates a rise in the average deposit balances of \$2,024,592.01

for an additional 10,000 people joining the population of the branch's catchment area.

TOTCOMP# (number of competitor branches in the branch's catchment area outside a 200 metre radius): An additional competitor joining the catchment area can be a predictor of an increase in the deposits balance by \$1,173,168.36.

MORSTAFF (number of competitors within 200 metres employing more staff than the branch): An additional competitor within 200 metres employing more staff than the branch can point to a possible reduction of \$4,430,880.12 in the average balance of deposits.

NEWDEPO# (total number of new deposit accounts) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the number of new deposit accounts by 5.12.

INCOME\$ (average annual family income) : As average family income rises by, say \$1,000, the number of new deposit accounts drops by 13.85.

POP (number of persons aged 15 years or more): As population increases by 10,000 people, 97.8 new deposit accounts can be expected.

SBEST# (number of small business establishments): As the number of small business establishments rises by 100 in the branch's catchment area, a drop of 14.96 can be expected in the number of new deposit accounts.

LENDBAL\$ (total average lending balances outstanding) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the average lending balances by \$164,708.63.

SBEST# (number of small business establishments): An additional 100 small business establishments joining the branch catchment area has the potential to boost the average lending balance by \$377,882.65.

TELLWIN# (number of teller windows): Increasing the number of teller windows at the branch by one can lead to a rise of \$1,824,362.08 in the average lending balance.

FEEINC\$ (fee income) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the fee income by \$144.91.

TOTCOMP# (number of competitor branches in the branch's catchment area outside a 200 metre radius): An additional competitor joining the catchment area outside a 200 metre radius can be expected to indicate a rise of \$1,756.05 in the fee income.

SBEST# (number of small business establishments): An additional 100 small business establishments can lead to a rise of \$371.51 in the fee income.

INSURE (number of new home and contents insurance policies originated) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the number of new insurance policies originated by 0.1.

POP (number of persons aged 15 years or more): An additional 10,000 people joining the population of the catchment area can lead to 4.98 new home and contents insurance policies.

INCOME\$ (average annual family income): As average family income rises by \$1,000, a drop of 1.4 in the number of new insurance policies can be expected.

SBEST# (number of small business establishments): An additional 100 small business establishments joining the catchment area can lead to a reduction of 0.36 in the new insurance policies originated.

INCREFER (number of new investment centre referrals) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the number of new referrals by 0.16.

INCOME\$ (average annual family income): As average family income rises by \$1,000, the number of new referrals drops by 1.2.

TOTCOMP# (number of competitor branches in the branch's catchment area outside a 200 metre radius): An additional competitor joining the catchment area outside a 200 metre radius can be expected to indicate a rise of 1.45 in the number of new referrals.

SBEST# (number of small business establishments): An additional 100 small business establishments joining the catchment area can lead to a drop of 0.75 in the number of new referrals.

POPGR (growth rate in the 15 years or more age group): As the population growth rate increases by 1 per cent, the number of new referrals falls by 0.27.

POP (number of persons aged 15 years or more): An additional 10,000 people joining the population of the catchment area can lead to 2.5 new referrals.

PERLOAN (number of new personal loans) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the number of new personal loans by 0.18.

INCOME\$ (average annual family income): As average family income rises by \$1,000, the number of new personal loans drops by 2.4.

APOLOGY (ability of branch staff to apologise for a mistake): On a scale of 1 to 5, when the ability of branch staff to apologise improves by one point, the number of new personal loans can fall by 16.15.

DWELL (proportion of private dwellings rented): As the proportion of private dwellings rented increases by 1 per cent, the number of new personal loans can be expected to fall by 0.88.

POP (number of persons aged 15 years or more): An additional 10,000 people joining the population of the catchment area can lead to 2.3 new personal loans.

CANBI (number of new current accounts not-bearing interest) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the number of new current accounts not-bearing interest by 0.25.

TELLWIN# (number of teller windows): Increasing the number of teller windows at the branch by one can lead to a fall of 1.48 in the number of new current accounts not-bearing interest.

MC7 ([the branch manager] perseveres with an issue to its conclusion): On a scale of 0 to 4, when branch manager's perseverance improves by one point, the number of new current accounts can rise by 4.89.

TOTCOMP# (total number of competitor branches in the branch's catchment area outside a 200 metre radius): An additional competitor joining the catchment area outside a 200 metre radius can be expected to indicate a fall of 0.77 in the number of new current accounts not-bearing interest.

HOMELOAN (number of new home loans) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the number of new home loans by 0.38.

POP (number of persons aged 15 years or more): An additional 10,000 people joining the population of the catchment area can lead to 4 new home loans.

DWELL (proportion of private dwellings rented): As the proportion of private dwellings rented increases by 1 per cent, the number of new home loans can be expected to fall by 1.4.

NEATNESS (neat appearance of branch staff): On a scale of 1 to 5, when the neat appearance of branch staff improves by one point, the number of new home loans can fall by 28.54.

CARDEDTD (number of new carded term deposits) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the number of new carded term deposits by 0.75.

POP (number of persons aged 15 years or more): An additional 10,000 people joining the population of the catchment area can lead to a fall of 7.9 in the number of new carded term deposits.

STREAM (number of new streamline accounts) is explained by...

FULLTIME (staff numbers, full-time equivalent): Adding another full-time staff to the branch can raise the number of new streamline accounts by 1.15.

POP (number of persons aged 15 years or more): An additional 10,000 people joining the population of the catchment area can lead to 12.1 new streamline accounts.

INCOME\$ (average annual family income): As average family income rises by \$1,000, the number of new streamline accounts drops by 5.3.

MC7 ([the branch manager] perseveres with an issue to its conclusion): On a scale of 0 to 4, when branch manager's perseverance improves by one point, the number of new streamline accounts can rise by 36.

MC18 ([the branch manager] determines objectives with subordinate staff to develop team effort): On a scale of 0 to 4, when the branch manager improves his/her competency in developing team effort, this can lead to a fall of 24.4 in the number of new streamline accounts.

TOTCOMP# (total number of competitor branches in the branch's catchment area outside a 200 metre radius): An additional competitor joining the catchment area outside a 200 metre radius can be expected to indicate a fall of 3.03 in the number of new streamline accounts.

APPENDIX K

NORMALITY OF DATA IN MULTIPLE REGRESSION AND DISCRIMINANT ANALYSIS

Multivariate normality assumes that every variable and linear combinations of variables are normally distributed. However, multivariate normality does not lend itself to easy testing because it is not practical to test an infinite number of linear combinations (Tabachnick and Fidell 1989). The researcher often has to resort to more indirect tests to infer the presence of multivariate normality. Two common approaches are to generate measures of skewness for the individual variables, and examine a scatterplot of predicted values of the dependent variable against residuals.

Various diagnostic tests are reported for multiple regression and discriminant analysis in Chapter Six, sections 6.3.2.1 and 6.3.3. In this appendix, measures of skewness and a scatterplot are provided to facilitate a closer examination of the assumption of multivariate normality. Skewness is investigated first.

The main thrust of this study is to integrate the analysis of branch performance and potential. This is demonstrated in the multiple regression analysis reported in Chapter Six (see Table

6.6). Eight potential variables identified through stepwise regression explain 88.43 per cent of the variation in overall performance (dependent variable PERFORZ). These potential variables are FULLTIME, APOLOGY, TELLWIN#, POP, INCOME\$, TOTCOMP#, SBEST#, and MORSTAFF. The measures of skewness for these variables are reported in Table K.1 below:

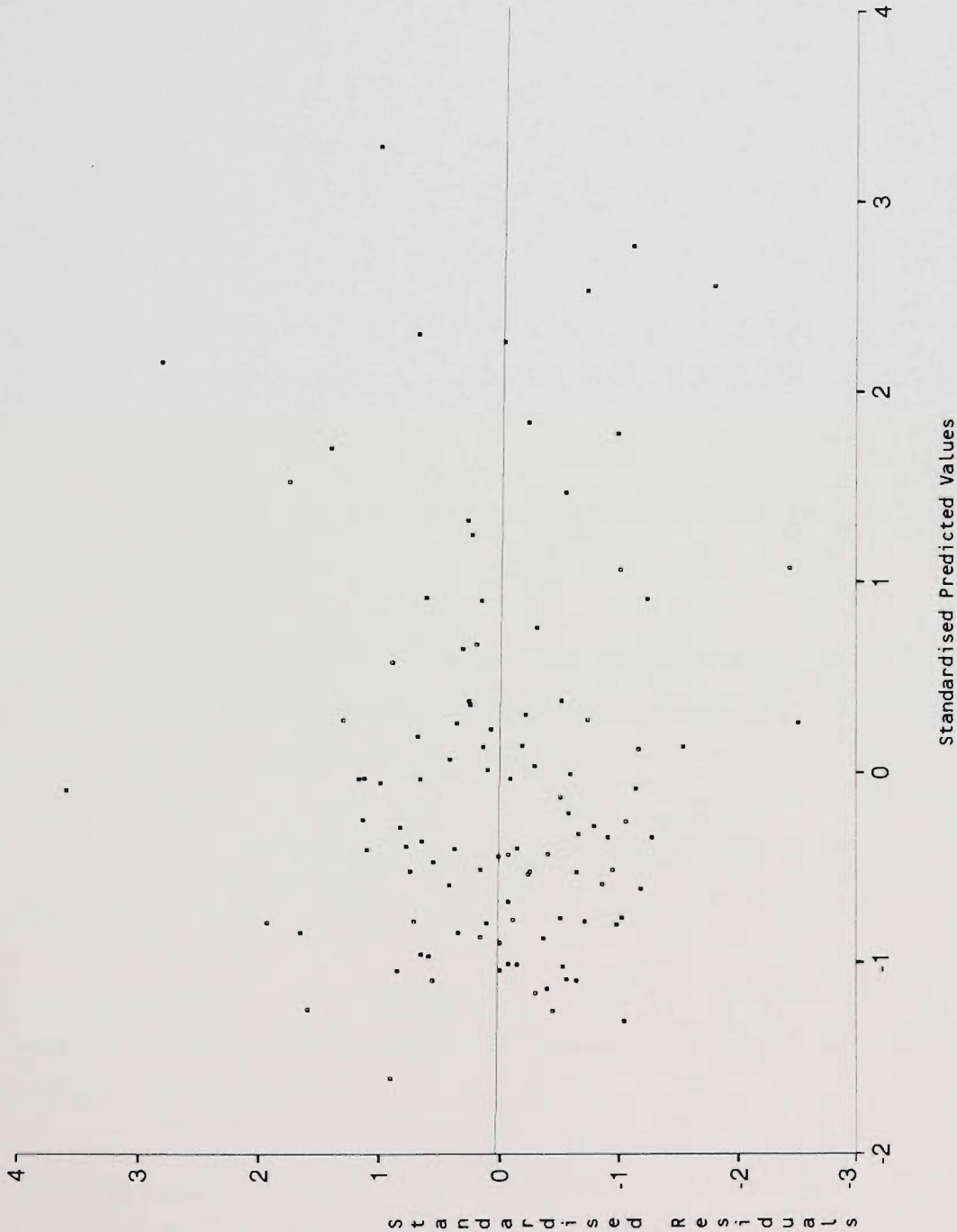
Table K.1: Measures of Skewness for Potential Variables Predicting Overall Performance

VARIABLE	SKEWNESS
FULLTIME	1.3
APOLOGY	-0.7
TELLWIN#	0.9
POP	0.9
INCOME\$	0.6
TOTCOMP#	0.2
SBEST#	1.1
MORSTAFF	0.2

A measure of skewness of 3 (plus or minus) is usually regarded as a strong deviation from normality. The above measures of skewness do not indicate any such violation of the assumption of normality.

As a further investigation of normality, a scatterplot of predicted values of the dependent variable, PERFORZ, against residuals is provided (see Figure K.1). The even distribution of residuals indicates homoscedasticity, lending support to the assumption of multivariate normality. It should be noted that presence of any heteroscedasticity can weaken the analysis but will not invalidate the results (Tabachnick and Fidell 1989).

Figure K.1: Scatterplot of Predicted Values Against Residuals



The key research objective addressed through discriminant analysis is *developing a predictive model for classifying and profiling branches*. In Chapter Six, section 6.3.3, five predictors are selected, namely, FULLTIME, APOLOGY, POP, TELLWIN#, and INCOME\$. These are the same variables already examined in Table K.1.

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