

THE EFFECTS OF RELATIVE MARKET SHARE
AND THE RATE OF MARKET GROWTH
ON THE STRATEGIC ATTRIBUTES AND FINANCIAL PERFORMANCE
OF SELECTED SOUTH AFRICAN COMPANIES
FROM 1977 TO 1981

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THE EFFECTS OF RELATIVE MARKET SHARE AND THE
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A B S T R A C T

This thesis analyses the effects of relative market share and the rate of market growth on the strategic characteristics and financial performance of selected companies quoted on the Johannesburg Stock Exchange over the period 1977 to 1981.

It is well established that business performance is partially contingent upon relative market share position and the rate of market growth. Together these variables comprise the basis of the Boston Consulting Group approach to portfolio analysis in the form of the Boston Consulting Group Growth/Share Matrix.

A methodology was designed to test the validity of this matrix in measuring and predicting corporate behaviour at the business level in South Africa. Selected companies were placed into the matrix and analysed in terms of their strategic attributes (represented by selected financial ratios) and their level of performance (represented by a wide range of financial performance measures).

The research findings show that relative market share and the rate of market growth have a significant impact on the strategic attributes and financial performance of South African businesses. Also, certain attributes are closely associated with particular types of performance. Therefore, given a specific performance target, management should ultimately be able to isolate and monitor the relevant strategic attributes in ensuring that the target is achieved.

The analysis of contingent models of strategy is still in its infancy, but this study indicates that the field is possessed of great potential.

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Thanks are also due to all my colleagues at Rhodes University, especially Philip Court, Brian Dollery and Hugh Murrell, who were prepared to make so many constructive contributions, despite the tremendous time pressures under which they themselves were working.

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CHAPTER 1

INTRODUCTION, SCOPE AND BACKGROUND

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1.1. INTRODUCTION

Strategic planning in its broadest sense has, over the past decade, been gathering considerable momentum as a distinct and essential business discipline. This focus on strategic planning has been the natural result of businesses' need to react timeously to the increasingly dynamic social, political, legal, economic and technological environments. In fact it is now, more than ever, necessary for business to be proactive rather than reactive vis a vis changes in the environment.

In order to survive in a dynamic environment any business must satisfy at least two requirements, as Hofer and Schendel explain:

"Over the long run, only those organisations survive that serve the needs of their societies effectively and efficiently, that is, that provide the benefits demanded by society at prices sufficient to cover the costs incurred in producing them". (1)

In other words, the business organisation must first and foremost provide for society a product or service which gives a sufficient degree of utility to members of that society. Furthermore, not only must utility be provided, but this must be done in such a way that the business can fulfil the efficiency criterion by, at the very least, covering its total costs. Without these two fundamental prerequisites long run survival is unattainable.

The efficiency of an organisation is related to the internal structure and operating activities of that organisation. As such, efficiency is concerned, typically, with company

methods, procedures and policies. A vast amount of executive time and talent is, of course, necessary on a day to day basis to ensure that the organisation is providing some product or service in an efficient manner. These operating and administrative considerations are, to a large degree, beyond the scope of strategic planning.

Apart from the efficiency criteria, an organisation must also ensure some minimum degree of effectiveness if it aspires to long run survival. Effectiveness refers to those business activities which are concerned with the organisations external environment.

In the words of Hofer and Schendel:

"In general, however, organisations depend much more for their long run success and survival on an improvement in their effectiveness (that is, how well they relate to their environments) than on improvements in their efficiency. Peter Drucker stated this most eloquently when he suggested that it is more important to do the right things (improve effectiveness) than to do things right (improve efficiency). Thus if an organisation is doing the right things wrong (that is, is effective but not efficient) it can outperform organisations that are doing the wrong things right (that is, are efficient but not effective)". (2)

Strategy may, therefore, be viewed as a concept which is concerned with improving or maintaining the long run effectiveness of the organisation. It is now possible to consider strategy in a more detailed manner.

1.2. STRATEGY DEFINED

The constituent elements of any concept can be clearly identified through the manner in which that concept is defined. However, strategy would appear to defy rigid definition. For example,

Haner, in terms of the following definition of strategy, believes that strategy is the primary means of reaching a specified objective:

"Military strategists differentiate between tactics to win a specific battle and strategies to win a war. In business tactics usually entail actions to cope with and/or capitalise on immediate situations. A strategy is a multi-step approach to achieve a specific objective. It is controlled by a plan, involves coordinated use of selected components and resources of the company, and covers the time frame necessary to accomplish the objective". (3)

Others maintain that objective setting itself is an integral part of strategy:

Strategy is the pattern of objectives, purposes or goals and major policies and plans for achieving these goals, stated in such a way as to define what business a company is in, or is to be in, and the kind of company it is, or is to be". (4)

"..... strategy is the pattern of decisions in a company that (i) shapes and reveals its objectives, purposes, or goals, (ii) produces the principle policies and plans for achieving these goals and (iii) defines the business the company intends to be in and the kind of economic and human organisation it intends to be". (5)

Many respected authorities, on the other hand, agree with Haner:

"..... if management has a clear picture of where it wishes to be at a given point in time it needs a guide to the activities or pattern of activities necessary to accomplish the goal. Strategy then may be defined as the guiding philosophy of the organisation in the commitment of its resources to attain or fulfil its goals. Strategy provides the constraints within which the directional-action decisions necessary to achieve the organisations goals are made". (6)

While Ansoff maintains that:

"During the past ten years the idea of strategy has received increasing recognition in management literature. Numerous papers have appeared dealing with product line strategy, marketing strategy, diversification strategy and business strategy. This interest grew out of a realisation that a firm needs a well defined scope and growth direction, that objectives alone do not meet this need, and that additional decision rules are required if the firm is to have orderly and profitable growth. Such decision rules and guidelines have been broadly defined as strategy or, sometimes as the concept of the firms business". (7)

A comparison of the major authors concepts of strategy is given in table 1.1.

TABLE 1.1 A COMPARISON OF VARIOUS AUTHORS' CONCEPTS OF STRATEGY

	Chandler	Andrews	Ansoff	Cannon	Katz	Ackoff
Breadth of Strategy Definition/Concept	broad	broad	narrow	narrow	broad	does not recognise concept
Name for Broad Concept for Strategy	strategy	strategy	X	X	corporate strategy	X
Components of Broad Concept of Strategy	goals objectives action plans resource allocations	goals policies plans	X	X	scope deployments specifications	X
Name for Goals & Objectives	goals & objectives	goals & objectives	objectives & constraints	result strategy	specifications & strategic criteria	objectives & goals
Characteristics of Objectives	none specified	none specified	attributes yardsticks goals	attributes indices targets & time tied to action strategies	none specified	none specified
Name for Narrow Concept Strategy	X	X	strategy	composite or business strategy	scope	X
Components of Narrow Concept Strategy	X	X	product-market scope growth vector competitive advantage synergy	none specified	none specified	X
Names for Functional Strategies & Policies	X	policies	policies	action strategy	functional policies	policies
Name for Implementation Plans	action plans	plans	programs	commitment strategy	deployments	programs, procedures, & courses of action
Differentiates between Goals & Objectives & Constraints	no	no	yes	no	no	yes
Differentiates between Corporate Level & Business Level Strategies	no	no	yes implicitly	yes implicitly	no	no
Differentiates between Goal Formulation Processes & Strategy Formulation Processes	no	no	yes	no	no	yes
Differentiates between Analytical & Organizational Aspects of the Strategy Formulation	does not discuss either	does not discuss organizational aspects	yes	yes	does not discuss organizational aspects	yes

SOURCE: C W HOFER & D SCENDEL Strategy Formulation: Analytical Concepts
St. Paul. West Publishing Co. 1977 Page 18

TABLE 1.1 Continued

TABLE 1.1 CONTINUED

	McNichols	Newman & Logan	Uyeterhoeven et al.	Paine & Naumes	Glueck	Steiner & Miner	Hofer & Schendel
Breadth of Strategy Definition/Concept	narrow	broad	both broad & narrow	narrow	narrow	broad	narrow
Name for Broad Concept of Strategy	X	master strategy	strategy	X	X	master strategy	grand design
Components of Broad Concept of Strategy	X	services technology synergy sequencing & timing targets	objectives strategic posture	X	X	missions purposes objectives policies	objectives strategy policies
Name for Goals & Objectives	goals & objectives	targets	goals & objectives	objectives	objectives	purposes & objectives	goals & objectives
Characteristics of Objectives	none specified	none specified	none specified	none specified	differentiates between official & operative	none specified	attributes indices targets time
Name for Narrow Concept Strategy	root strategy	X	strategic posture	overall strategy	strategy	program strategy	corporate or business strategy
Components of Narrow Concept Strategy	none specified	services technology synergy sequencing & timing	scope competitive posture self-concept	none specified	none specified	none specified	domain or scope resource deployments competitive advantage synergy
Names for Functional Strategies & Policies	operating strategy & policies	functional policies	functional strategies & policies	policies	functional policies	functional strategies & policies	functional strategies & policies
Name for Implementation Plans	master plan	programs & plans	X	programs & roles	plans & programs	programs & plans	plans of action
Differentiates between Goals & Objectives & Constraints	no	no	no	between objectives & constraints	no	no	yes
Differentiates between Corporate Level & Business Level Strategies	no	no	no, but does recognise different organizational levels	no	no	yes, in places	yes
Differentiates between Goal Formulation Processes & Strategy Formulation Processes	no	yes	no	not explicitly	yes	yes, in places	yes
Differentiates between Analytical & Organizational Aspects of the Strategy Formulation	does not discuss organizational aspects	yes	does not discuss organizational aspects	no	no	yes	yes

SOURCE:

C W HOFER & D SCHEDEL

Strategy Formulation: Analytical Concepts

St. Paul. West Publishing Co. 1977 Page 18

The issue concerning which of the approaches presented in table 1.1. is 'right' and which is 'wrong' is one which will undoubtedly be debated for some time to come. However, from a practical viewpoint, it is clear that strategies designed in the absence of a goal are as useless to management as objectives set without the formulation of strategies to achieve them. As a result it would appear that those definitions which integrate the concepts of strategy and goal formation possess the greatest potential. This wholistic view of strategy is, in the author's view, a fundamental prerequisite to long run corporate success. That is, the strategist must assign to each constituent element of strategy the relative importance it requires, regardless of title, if he is to encourage the corporate system as a whole to perform optimally.

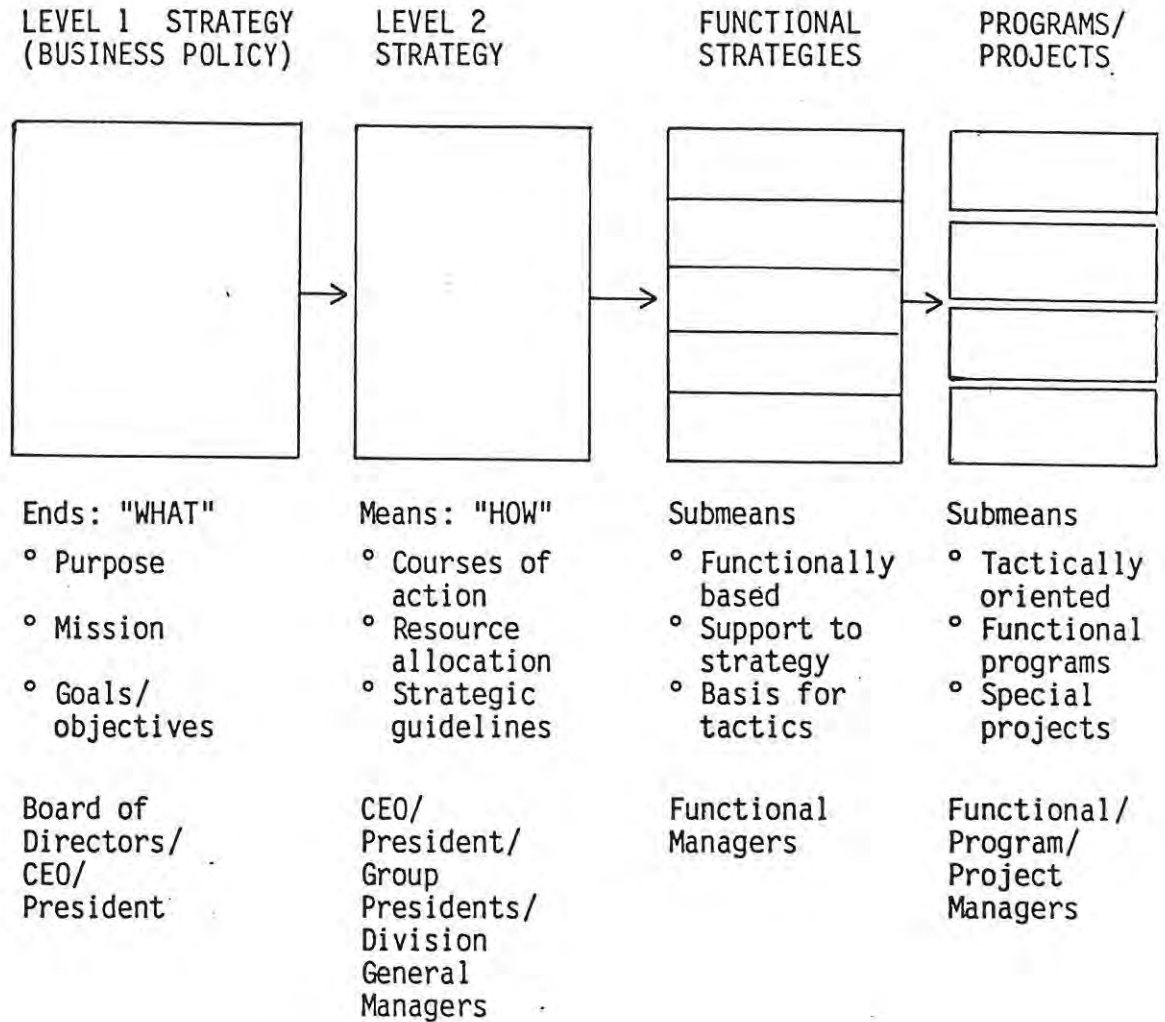
The following section is devoted to a consideration of the various constituent elements of strategy.

1.3. THE CONSTITUENT ELEMENTS OF STRATEGY

It is useful to draw up a conceptual model of strategic planning in order to illustrate the major elements of strategy as well as to give some idea of how they are related. Such a model is presented in Figure 1.1.

FIGURE 1.1

A SIMPLE CONCEPTUAL MODEL OF STRATEGIC PLANNING



Adapted from: Y N CHANG and F CAMPO-FLORES
Business Policy & Strategy. Santa Monica.
 Goodyear. 1980. Page 8. Figure 1.1

This model serves to illustrate two important points.

Firstly, the highest level of strategy, alternatively termed 'Business Policy', is that level where the organisation states its' intentions vis a vis the environment. If priorities could be assigned to each stage in the strategic planning process, this stage would undoubtedly receive the highest rating.

To be successful the entire organisational effort must be derived from an environmental stimulus.

Secondly, the full integration of strategic, operational and administrative plans is a fundamental prerequisite for long run corporate success. If well selected and devised strategic plans cannot be properly operationalized and administered the entire strategic planning system is wasted.

In essence this means that the successful organisation must:-

- continually examine its relevant environment for stimuli in the form of opportunities and threats. This information is obtained through the Strategic Information System.
(8)
- in relation to each significant stimulus it must set appropriate objectives.
- develop the appropriate strategies to achieve these objectives, by making use of all available concepts and techniques.
- build an organisational framework which will enable the strategies to be implemented.
- design management systems to support the organisations' ability to carry out the strategy.
- implement thorough evaluative and control systems to ensure the effectiveness and efficiency of the entire strategy/ operations/administrative process.

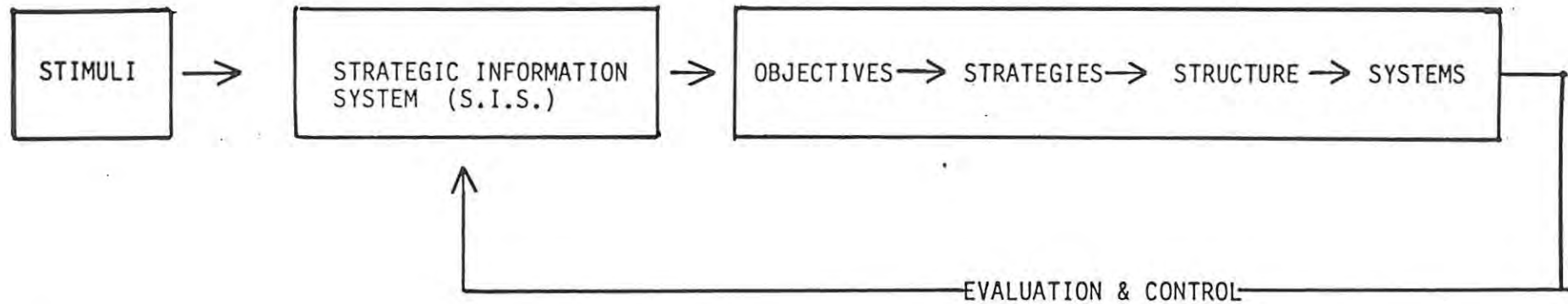
Figure 1.2 presents a model of the entire process.

FIGURE 1.2

THE TOTAL PLANNING PROCESS IN PERSPECTIVE

RELEVANT
ENVIRONMENT

BUSINESS



Although each of the components of this model constitutes a discrete subject area, it is unwise to consider any single component without regard to its position in the overall process. Hence any meaningful analysis of a specific area within the field of strategy is likely to give rise to complications due to the need to take into account these 'upstream' and 'downstream' factors which will necessarily influence such an analysis.

Having identified and commented on the constituent elements of strategic planning it is now possible to focus on the closely related concept of strategic market planning.

1.4. STRATEGIC MARKET PLANNING

The concept of strategic market planning is very closely related to that of strategy. It focuses on the integration of certain aspects of strategic planning, marketing and, to a lesser extent, the other functional areas of the firm. This attempt to integrate two or more different yet closely related disciplines is perhaps strategic market planning's greatest strength, and gives it enormous analytical potential.

Abell and Hammond (9) have identified four sets of related decisions which comprise the field of strategic market planning:-

- 1.4.1. The starting point of strategic market planning is the defining of the firms' business. This decision is, logically, of fundamental importance to the long run success of the

organisation, and is accordingly a top management decision.

As Levitt states:

"(The chief executive) himself must set the company's style, its direction, and its goals. This means he has to know precisely where he himself wants to go, and he has to make sure the whole organisation is enthusiastically aware of where that is. This is the first requisite of leadership, for unless you know where you are going, any road will take you there.

If any road is alright, the chief executive might as well pack his attaché case and go fishing. If an organisation does not know or care where it is going, it does not need to advertise this fact with a ceremonial figure-head. Everybody will notice it soon enough".
(10)

This view is propounded, somewhat less spectacularly, by Abell, who states:

"Defining the business is, above all, a general management concern. It is probably the most important strategic question that general managers confront since it provides a context within which all other strategic questions can be considered". (11)

Defining the business serves two fundamental yet vitally important purposes. Firstly, it clearly identifies the market or markets which are presently served or which should be served in the future. This enables management to focus on the customers or potential customers within that market with a view to determining precisely what their needs and aspirations are. Secondly, it gives some rudimentary guidelines as to the types of products or services the company will be producing. This will enable the identification of competing products and services, indicate the types of technologies with which the

firm will be involved and indicate the type and extent of support systems in terms of finance, labour, materials and so on, required to place the product on the market and maintain it there.

In essence, by defining its business a firm is identifying, as precisely as possible, the boundaries within which, it feels, its future appears most prosperous. The total corporate effort, as a result, will be a concerted one, focused only on products and markets falling within the defined business area. How a company defines its business and the resulting product/market posture it chooses will depend on its individual environment and the strengths and weaknesses of the company itself.

Suffice it to say that a company which has not defined its business correctly, whether implicitly or explicitly is, in effect, groping in the dark. It has no guidelines to indicate where its efforts should be channelled. It has little idea of its future management and labour requirements. It does not know which technologies to watch or develop. It is unaware of the real needs of its potential customers. There is, in short, no fit between the company and its environment and as such it cannot operate effectively by doing the 'right things'. This incompatibility with the environment must result in long run failure.

While this section has clearly identified the need for a good business definition, such a definition is frequently difficult to construct. A business may compete in many markets with an

ever increasing range of products designed to meet many diverse, continually evolving customer needs. In such a case, the ability of the company to specify its exact 'business' is clearly limited.

If it is difficult for the company itself to define its business, it is far more difficult for the independent researcher to do so. Yet without such a definition it is impossible to make comparisons between companies in the same or similar businesses.

- 1.4.2. The second decision area with which strategic market planning is concerned is that of determining the mission of the business or other unit of analysis. This involves stipulating what role each unit of analysis must play in terms of return of investment, cash-flow, market share, sales growth and so on. The role that each unit is going to play will be determined, broadly, by that unit's unique set of capabilities and weaknesses, and the environmental opportunities and threats with which it is faced.

At this stage it becomes important to confirm two things: Firstly, that each unit of analysis is operating within the limits prescribed by the business definition, and, secondly, that the mission assigned to each unit of analysis is compatible with whatever corporate objectives have been decided on at the strategic planning level.

- 1.4.3. The third strategic market planning decision area is that of strategy formulation. It is here that strategies are developed to enable the unit of analysis to accomplish its mission. At this stage the formulation of strategies can be aided

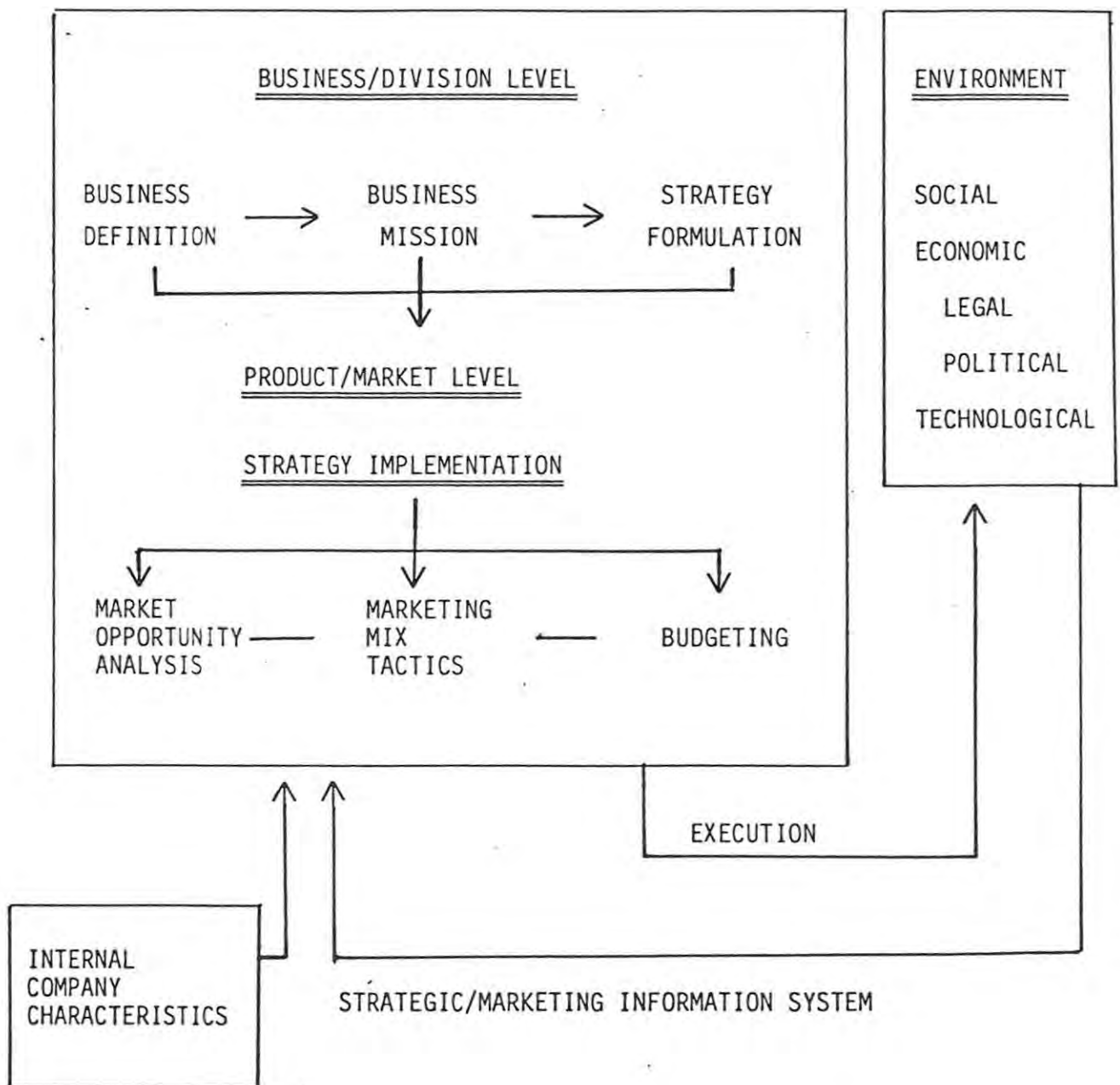
significantly by the use of a variety of concepts and analytical techniques. It is also at this level that the strategist is operating under conditions of partial ignorance in that he does not know, in the probability sense, what the outcome of the strategies he has implemented will be. However, on the basis of past experience and through the use of various concepts and analytical techniques, he should be able to express various degrees of belief that the strategies he has chosen will lead to the required mission being achieved.

- 1.4.4. The fourth, and lowest level with which this strategic market planning is concerned is budgeting. Here corporate resources are allocated amongst the various functional areas in accordance with the strategies decided on in the preceding stage.

In aggregate the strategic market plan is "a plan of all aspects of an organisations strategy in the market place".(12) It differs from the broader concept of the strategic plan in that it focuses entirely on the firms activity in the market place, ignoring such problems as objective setting and social responsibility. On the other hand it differs from the marketing plan in that the latter is largely confined to dealing with marketing mix tactics and budgeting. The entire strategic market planning process is modelled in Figure 1.3.

FIGURE 1.3

A MODEL OF THE STRATEGIC MARKET PLANNING PROCESS



SOURCE: Adapted from: KOTLER, P. Principles of marketing
 Englewood Cliffs, New Jersey, Prentice Hall, 1980.
 Figure 3 - 4, Page 73.

The formulation of strategies in order that a business may complete its mission, is obviously a vital part of strategic market planning and is discussed in the following section.

1.5. STRATEGY SELECTION AND EVALUATION

An important part of the strategic market planning process is selecting and evaluating strategies most suited to various business units, and determining the impact of such strategies over time. As a result, over the years, a number of strategic planning tools to aid in strategy selection and evaluation have been developed and refined.

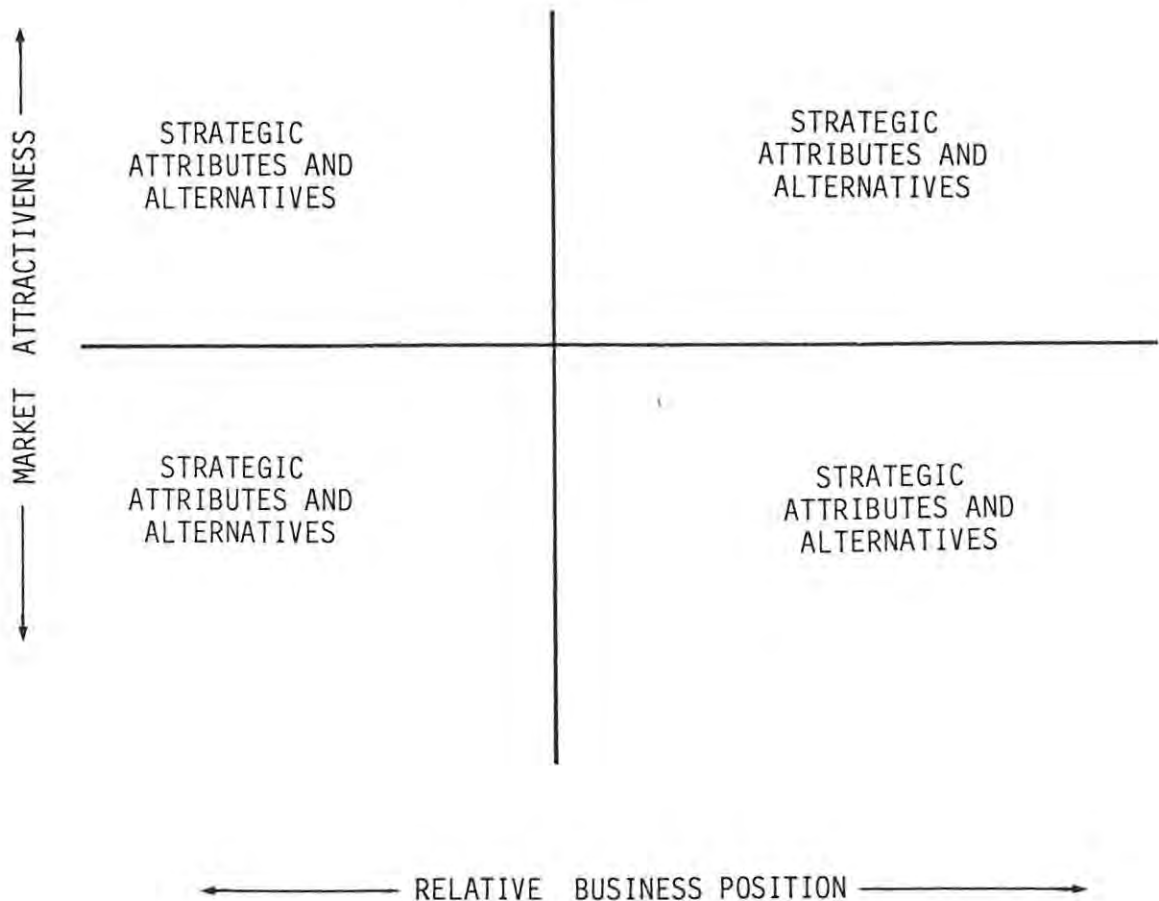
Much attention has been focused of late on strategic planning tools which are strongly technique based. This is probably the result of two unique and separate factors. Firstly, there appears to be a recognition of the need for a more rigorous, scientific approach to the discipline of business administration, although the generalist school still has numerous ardent supporters. Secondly, the rapid development of sophisticated management information systems has enabled, for the first time, the assimilation of highly complex and voluminous market related data. The combination of these two factors has probably contributed toward the significant increase in both technique and empirically based tools of strategic analysis.

The simple but realistic assumption that a firm's existence relies on the performance of given products in given markets has resulted in the development of a distinct brand of strategy

related analytical techniques. These techniques indicate the most suitable strategic posture for a given firm based on the interrelationship between product related and market related data. Although these techniques vary considerably in application they all have two things in common; they are all concerned to some extent or other with the relative position of the firm with regard to its ability to take advantage of an opportunity (or to counteract a threat) in the market, and they all have some market attractiveness dimension. These dimensions are illustrated in figure 1.4.

FIGURE 1.4

THE COMMON DIMENSIONS OF PRODUCT AND MARKET BASED TECHNIQUES
FOR THE ANALYSIS OF STRATEGY



Although there are numerous techniques using the two broad criteria illustrated in figure 1.4, the more commonly used and more widely accepted are the following, or variations of the following:

- The Directional Policy Matrix. (Shell International Matrix).
- The Boston Consulting Group. (B.C.G.) Growth/Share Matrix.
- The A.D. Little Business Profile Matrix.
- The McKinsey/General Electric Business Assessment Array.

While these various techniques vary considerably in detail, they all contain common dimensions and they are all used for the general purpose of resource allocation in respect of multiproduct, multimarket (and usually multidivisional) companies.

It is becoming increasingly evident that the allocation of scarce resources (with the objective of optimising long run performance) becomes a more difficult task as the company expands the number of products and/or markets to which these resources can be channelled.

Some of a company's products may be strong in relation to competition, others may be weak. Some may need investment to finance growth or to fight competitive battles, while others may generate greater returns than they can use. Some exist in high growth markets, others in declining markets. A vast number of investment options soon become evident and it is the strategist's unenviable task to attempt to deploy limited

company resources in a manner which will optimize total company performance.

Many companies try to overcome these complexities by dividing the organisation into decentralised profit centres, each being treated as though it were a separate business unit. Each unit prepares its own strategic plans and operates independently. This approach has various advantages. Firstly, the performance of management in each division can be easily monitored and inefficient units cannot be left undiscovered behind a perhaps acceptable overall corporate performance level. Also, there is no centralised beaurocracy giving rise to red tape, time delays and so on.

However, if a multi product, multi market company operates in a decentralised manner it is not using its single greatest advantage over undiversified companies - its ability to channel its considerable resources to the most productive divisions or products. As Hedley states:

"A multi divisional company without an overall strategy is not even as good as the sum of its parts. It is merely a portfolio of unrelated investments which has added overhead costs. Such investments properly sell at a discount from the sum of the parts". (13)

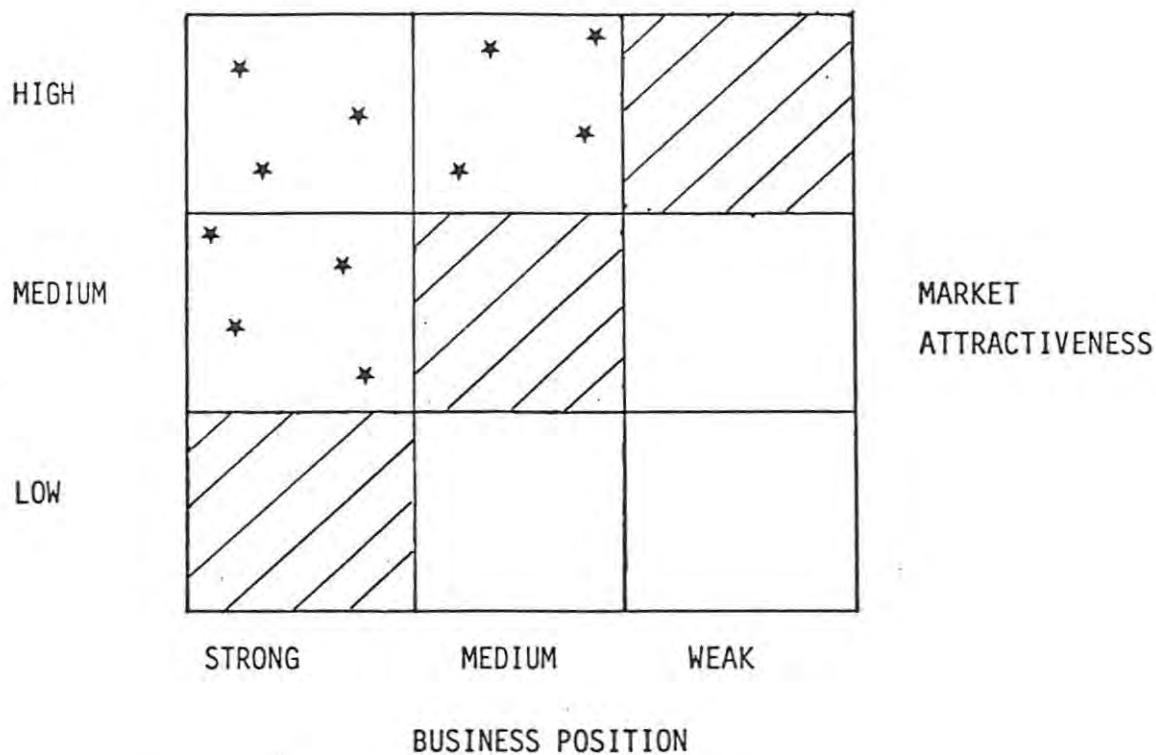
Matching resources to product or business unit needs or potentials is the central strategic planning issue and is commonly accomplished by using one of, a combination of, or variations of the four techniques referred to in this section. These techniques are briefly discussed in the following sections 1.5.1 - 1.5.4.


1.5.1. McKinsey/General Electric Business Assessment Array (14) (15)


The McKinsey/General Electric business assessment array uses product and market related criteria in the broadest possible manner in order to solve the strategy selection and evaluation problem. It does this by drawing attention to the following two factors. Firstly, the attractiveness of the market in which the product or business unit is located or wishes to be located. Secondly, the ability of the business to take advantage of opportunities or to avoid threats in the market. An analysis of the interrelationship between these two factors is accomplished through the use of a relative investment opportunity chart of the type illustrated in Figure 1.5.

FIGURE 1.5

THE MCKINSEY/GENERAL ELECTRIC BUSINESS ASSESSMENT ARRAY



 = High Overall attractiveness

 = Medium Overall attractiveness


 = Low Overall attractiveness

Table 1.1 lists some of the factors which the strategist must consider when attempting to ascertain the attractiveness of a market or the status or position of a business.

TABLE 1.2

FACTORS CONTRIBUTING TO MARKET ATTRACTIVENESS AND BUSINESS POSITION

MARKET ATTRACTIVENESS	BUSINESS POSITION
<u>MARKET FACTORS</u> <ul style="list-style-type: none"> - Size (Rand value, units or both) - Size of key segments - Growth rate - Cyclicalilty - Seasonality 	<u>MARKET FACTORS</u> <ul style="list-style-type: none"> - Market share - Share of Key segments - Annual growth rate - Influence on the market
<u>COMPETITION</u> <ul style="list-style-type: none"> - Degree of concentration - Entries and exits - Changes in share 	<u>COMPETITION</u> <ul style="list-style-type: none"> - The companies relative financial, marketing, management and production strength
<u>FINANCIAL & ECONOMIC FACTORS</u> <ul style="list-style-type: none"> - Scale and experience effects - Barriers to entry 	<u>FINANCIAL & ECONOMIC FACTORS</u> <ul style="list-style-type: none"> - The company's margins - The company's scale and experience effects
<u>TECHNOLOGICAL FACTORS</u> <ul style="list-style-type: none"> - Patents and copyrights - Maturity and volatility - Complexity 	<u>TECHNOLOGICAL FACTORS</u> <ul style="list-style-type: none"> - Depth of skills - Patent protection - Manufacturing technology
<u>SOCIO-POLITICAL FACTORS</u> <ul style="list-style-type: none"> - Social attitude and trends - Government regulations 	<u>SOCIO-POLITICAL FACTORS</u> <ul style="list-style-type: none"> - Ability to cope with change - The company's public relations

SOURCE: Adapted from D.F. Abell and J.S. Hammond Strategic Market Planning op cit. Table 1. Page 214.

The list presented in Table 1.2 is far from complete and, furthermore, different factors on the list will be of varying importance according to the type of industry or company under consideration. This highlights one of the major weaknesses of the McKinsey/General

Electric technique - the fact that it is difficult to identify which factors contribute towards market attractiveness or business position. A substantial degree of management judgement is required in determining not only which factors should be considered but also the extent to which they contribute to market attractiveness or business position.

The McKinsey/General Electric Business Assessment Array can be used in several ways. In its most simple form any business or product falling within the high overall attractiveness area is allocated an invest and grow strategy. Those with low overall attractiveness are harvested or divested, while for those with medium overall attractiveness, a holding strategy is usually employed until changing conditions make the proposition either more or less attractive. (16) On the other hand, where overall attractiveness is medium due to a poor business position, heavy investment may be indicated in order to improve business position and hence overall attractiveness. There are, in fact, numerous strategies which can be adopted depending not only on the level of overall attractiveness but also such factors as changing customer behaviour, cost changes, anticipated technological change, competitors activities and so on. (17)

Essentially, the McKinsey/General Electric Business Assessment Array can be used in three ways to assess the return on investment potential of different strategic alternatives. Firstly, it can be used to assess the present market attractiveness and business position. Secondly, it can be used to analyse the changing characteristics of a business as

market conditions change, but without any alteration in the strategies employed. Finally, it can be used to assess the effect of different strategies on changing market environments.

1.5.2. The A.D. Little Business Profile Matrix

This approach to the management of complex product and market portfolios is based on the dimensions of market position and industry maturity, as shown in figure 1.6.

FIGURE 1.6

THE A.D. LITTLE BUSINESS PROFILE MATRIX

		STAGE OF INDUSTRY MATURITY			
		EMBRYONIC	GROWTH	MATURITY	AGEING
COMPETITIVE POSITION	DOMINANT				
	STRONG				
	FAVOURABLE				
	TENTATIVE				
	WEAK				

The stage of industry maturity in the A.D. Little Matrix is broken down into four stages which are synonymous with product life cycle stages. Within each of these stages a product or business unit can occupy any one of five competitive positions ranging from dominant to weak. Resources are allocated on the basis of the

position occupied in the matrix, in a way very similar to that used in the McKinsey/G.E. matrix. In effect, resource allocation priorities decrease along the diagonal from embryonic industry/dominant competitive position to ageing industry/weak competitive position.

While the matrix would appear more intricate than the McKinsey/G.E. Matrix it is, in fact, far less flexible in that the dimensions it uses constitute only two of the many options available in the McKinsey/G.E. Matrix.

1.5.3. The Directional Policy Matrix. (Shell International Matrix)

The Directional Policy Matrix is based on the dimensions of market segment profitability and the competitive position of a business within such a segment. As such the matrix is more flexible than the A.D. Little Matrix but somewhat less flexible than the McKinsey/G.E. Matrix.

The Directional Policy Matrix is illustrated in figure 1.7.

FIGURE 1.7

THE DIRECTIONAL POLICY MATRIX (SHELL INTERNATIONAL MATRIX)

		PROSPECTS FOR SECTOR PROFITABILITY		
		Unattractive	Average	Attractive
COMPANY'S COMPETITIVE CAPABILITIES	Weak	Disinvest	Phased withdrawal Custodial	Double or quit
	Average	Phased withdrawal	Custodial Growth	Try harder
	Strong	Cash generation	Growth Leader	Leader

The Directional Policy Matrix allows management to select those factors which it considers important in determining sector profitability and the company's competitive capabilities. This approach is undoubtedly of benefit to the management of individual business units as it allows the construction of an almost customised rather than standardised matrix.

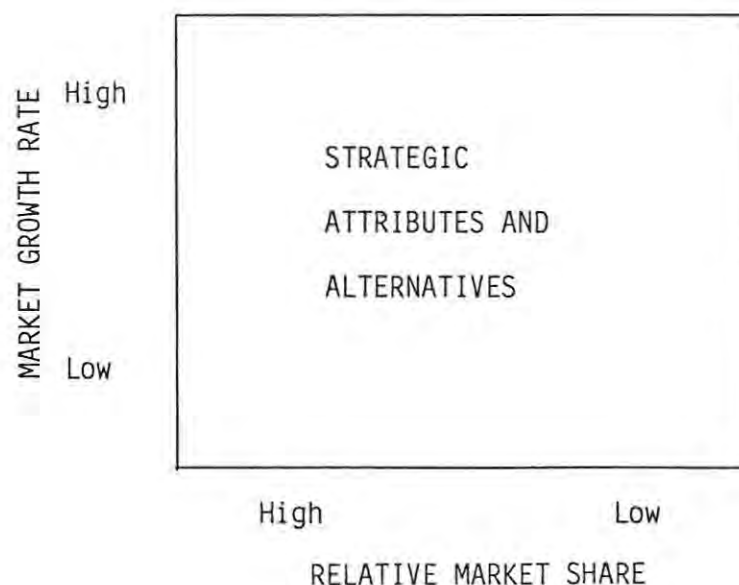
However, due to the fact that companies are likely to define their competitive capabilities and prospects for sector profitability in different ways, it becomes practically impossible to use the Directional Policy Matrix as a means of comparison between companies.

1.5.4. The Boston Consulting Group (B.C.G.) Growth/Share Matrix

This approach to the strategy selection and evaluation problem attempts to specify the optimal allocation of resources amongst various products or business units, on the basis of life cycle stage (market growth rate) and market share relative to competition. The value of this technique is that, although it has the same general dimensions as the Directional Policy Matrix, the McKinsey/G.E. Matrix and the A.D. Little Matrix, namely market attractiveness and business position, it is concerned with only two variables - one in each dimension - rather than a myriad of complex and inter-relating variables. The market attractiveness dimension is analysed in terms of the market growth rate while the business position dimension is analysed in terms of market share relative to competition. Figure 1.8 illustrates the basic structure of the B.C.G. Growth/Share Matrix.

FIGURE 1.8

THE BOSTON CONSULTING GROUP (B.C.G.) GROWTH/SHARE MATRIX



In terms of the two variables, relative market share and market growth rate, a similar analysis to that carried out with the other portfolio matrices is performed. This analysis is, however, different in one respect. The objective behind the B.C.G. approach is to identify those strategies which will maximise the performance of the portfolio of products or business units as a whole, while keeping that portfolio in cash balance.

The most outstanding advantage of the B.C.G. Matrix is that because it is concerned with a smaller number of more encompassing variables, it has a broader range of generalisability. This is very important in that the other techniques discussed in this chapter imply that so many variables must be considered that strategy selection and evaluation must be highly situational. In other words, each individual company, on the basis of its particular environmental conditions, must select those variables which it considers most relevant. These requirements preclude any meaningful conceptual analysis of strategy selection and evaluation.

On the other hand it may be argued that this very strength of the B.C.G. approach is, in fact, its greatest weakness. That is, because the matrix is concerned with only two contingent variables, the resulting analysis of alternative strategies must be highly simplified. When other variables, commonplace in the normal business environment, are introduced, its predictive ability may be severely impaired. A thorough analysis of the technique, its potential and weaknesses is made in Chapter 2.

1.6. CONCLUSIONS

It is evident that it is necessary for any firm to develop a strong orientation towards strategic planning in order to perform well in a dynamic environment. In developing this strategy orientation the firm must make use of all the concepts and techniques available to it.

In this regard it would appear that each of the strategic market planning techniques discussed in sections 1.5.1. to 1.5.4. have their own specific strengths and weaknesses. However, for the purpose of comparison between companies, the greater degree of managerial freedom allowed in interpreting the dimensions of the matrix, the less useful the matrix becomes. As a result the B.C.G. Growth/Share Matrix, which permits the least flexibility, may in fact be the most useful.

While several criticisms have been levelled at the B.C.G. Growth/Share Matrix, it nevertheless remains intuitively appealing. The PIMS programme has illustrated clearly that there is a strong correlation between market share and profitability (18) and that the requirements of an industry should be greatly influenced by the industry (market) growth rate, is logical indeed.

This study deals with a B.C.G. Growth/Share matrix analysis of strategic attributes and alternatives at the business level, using selected data from appropriate South African quoted companies over the five year period 1977 to 1981 inclusive.

This technique has been selected due to the fact that, unlike other portfolio techniques, it has a broad range of generalisability in that it does not reduce strategic market planning to a purely situational analysis. Furthermore, it utilises dimensions of proven significance in the provision and allocation of resources.

Impirical research on the B.C.G. Matrix is long overdue, especially in the context of South African business. If the concept has any predictive or analytical validity this must be determined and put to immediate use to improve strategic market planning in the increasingly volatile South African business environment.

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CHAPTER 2

PORTFOLIO ANALYSIS AND THE BOSTON
CONSULTING GROUP GROWTH/SHARE MATRIX

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2.1. INTRODUCTION

Having outlined the major alternative portfolio models in Chapter 1, this chapter makes a detailed analysis of the Boston Consulting Group (hereafter referred to as B.C.G.) model - the growth/share matrix.

The strategic planning process can be divided into two activity levels. Strategy at the corporate level is concerned primarily with the questions of 'what business should we be in and what can we hope to achieve in that business?' On the other hand, business level strategy is concerned largely with the means of competing in a given business. Portfolio models are used primarily at the business level for the purpose of assisting executive judgement in allocating scarce resources amongst various products and markets in a strategically effective manner.

In common with many contingency models, that is, models "in which the appropriateness of certain actions are deemed dependent, or 'contingent' on particular given conditions," (1) it is tempting to credit portfolio models with more than they are in fact capable. This is caused by the illusion of precision created with the use of clearly identified contingent variables. However, like all management tools portfolio models can only be considered as a means of providing partial solutions to management problems. Accordingly they will seldom perform satisfactorily when used in a limited form and in isolation from other techniques. Furthermore, many of the

strategic prescriptions derived from portfolio models in the past, have been based more on observation and intuition than on systematic research. In total, these factors tend to destroy the credibility of potentially fertile models.

2.2. GENERIC COMPETITIVE STRATEGIES AND THE B.C.G. GROWTH/SHARE MATRIX

Porter (2) suggests that there are three generic competitive strategies from which companies must choose in striving for competitive advantage.

The first of these strategies is cost leadership, where low cost in relation to competition is the company's fundamental objective. A low cost position results in above average returns which are used to perpetuate this competitive advantage.

A second generic competitive strategy is that of differentiation. This involves marketing a product or service which is accepted by the market and the industry as being unique. Differentiation creates competitive advantage through brand loyalty and a lower sensitivity to price. It may, in certain cases, preclude gaining a large market share as it relies heavily on an exclusive image.

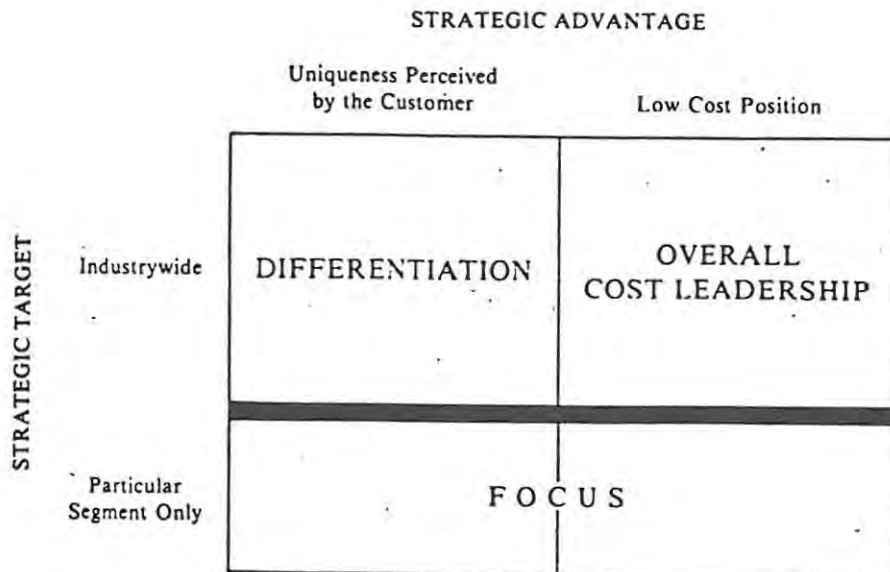
The third and final generic competitive strategy is that of focus. This involves concentrating on "a particular buyer group, segment of the product line, or geographic market". (3) As a result the company can either achieve differentiation or

cost leadership, or both, in it's area of focus.

The three basis generic competitive strategies are illustrated in Figure 2.1.

FIGURE 2.1

THREE GENERIC COMPETITIVE STRATEGIES



SOURCE: PORTER M E Competitive Strategy London.

The Free Press. 1980. Figure 2.1. Page 39.

When evaluating the B.C.G. model in terms of the three generic competitive strategies outlined above, it is clear that the model is based largely on the strategy of cost leadership.

The greater the market share gained by a company in relation to competition the more likely it is to possess a lower overall

cost structure. Furthermore, even those companies not competing on a cost basis may ultimately lose ground in terms of economic performance to the cost leader. This view is strongly favoured by Porter who states that:

".... strategic groups competing on bases other than low cost must be constantly aware of the differential between their costs and the costs of the overall low-cost strategic groups. If this differential becomes large enough then customers may be induced to switch to the lower cost groups despite a sacrifice in quality, service, technological progressiveness, or other areas". (4)

However, if the definition of the "industry" in which the company is competing is carefully controlled, the B.C.G. Matrix will also take limited account of the differentiation and focus generic strategies. For example, the manner in which the industry is defined could be adjusted to take into account those competitors striving for differentiation. In this case, given equal differentiation success, that company with the largest market share will also have a relative cost advantage.

Also, if the market is specifically defined in terms of a narrow market segment, which in many cases is quite acceptable, the B.C.G. Matrix is highly applicable to the focus strategy.

Typically those companies with the poorest overall economic performance characteristics will be those who do not pursue any single generic strategy with conviction. As Hall maintains:

"Uniformly, the successes come to those companies that achieve either the lowest cost or most differentiated position" (5)

It should be noted that high volume, low cost output is not synonymous with low quality output. It is becoming increasingly evident that quality and volume are necessary for successful cost leadership. (6)

2.3. PORTFOLIO ANALYSIS USING THE B.C.G./GROWTH SHARE MATRIX (7)

The B.C.G. portfolio approach to strategy selection and evaluation, as outlined in chapter 1, is based on the assumption that there is a positive correlation between market share and financial performance. There is a vast body of material, both conceptual and empirical in nature, debating the validity of this assumption. (8) At present the weight of fact and qualified opinion would appear to suggest that such an assumption is fully justified.

The positive relationship between market share and financial performance exists, it is held, for three reasons:

1. Due to the effects of learning and experience. (This issue is the subject of chapter 3).
2. Due to the effects of economics of scale (This issue is the subject of chapter 4).
3. Due to the effects of large corporate size, that is, economic bulk per se, on the part of the holder of a large market share. (This issue is the subject of chapter 5).

Accordingly, if the proposed relationship between market share and financial performance holds true then, as a general rule, it makes strategic sense to suggest that whatever field a firm enters, it should aim for market domination. In this way it can attempt to ensure enhanced financial performance in relation to competitors holding a lower market share.

In the light of this information, market share gaining strategies assume considerable importance, although the associated costs should always be carefully balanced against the potential benefits to be gained from market dominance. (9) Furthermore, it should be clearly understood from the outset that the existence of this market share/financial performance relationship does not imply that a company has only two strategic options; to become market leader, or to withdraw from the market. Market followers can be highly profitable and can also play a vital role in supporting the total product or business mix. This fact serves to illustrate an important consideration in the use of the product portfolio concept, namely that pragmatism is essential if one is to avoid arriving at absurd, though very logical, conclusions.

2.3.1. The Rationale Underlying the B.C.G. Approach to Portfolio Analysis

The B.C.G. portfolio technique of strategy selection and evaluation is rooted in the systems approach to strategic planning. According to this approach the need for the entire unit to perform in an optimal manner is more important than the need for a component part of that unit to perform optimally. The requirements of the part are always subservient to the requirements of the whole.

As a direct result of this philosophy the concept of portfolio analysis was developed. The real advantages of this concept, as a strategy selection and analysis tool, lie in its

relative flexibility. Not only does it allow a broader range of generalisation than other similar techniques (10), but also the unit of analysis which the concept can handle is itself flexible. The concept can as easily deal with a portfolio of businesses or divisions of a business as it can with products in the product mix (11). The relative flexibility of the concept makes it a particularly attractive strategic management tool. This research is devoted to the study of portfolio analysis, with particular reference to the B.C.G. model, at the business level. (Accordingly the business, rather than the division or product, will, hereafter, comprise the unit of analysis under investigation).

Unfortunately "empirical analysis of the B.C.G. matrix has been long overdue" (12) and as a result there is still some question regarding the predictive validity of the concept. This research aims to add to the limited general body of knowledge on the subject in the hope that ultimately the concept's predictive validity will no longer be in question.

According to the portfolio approach to strategy selection and analysis each business unit is analysed in terms of two criteria;

- the growth potential of that business unit as reflected in terms of the market growth rate,
- the market share of that business unit relative to the largest competitor.

On the basis of these criteria the cash flow potential of each business unit is estimated. Using this estimated cash flow

potential each business unit is assigned a specific role, such as; to provide investment funds to other units, to receive investment funds from other units, or to be eliminated from the portfolio of units. Subsequently the individual roles of each unit are integrated into an overall strategy for the whole portfolio of units. The overriding objective, in terms of the systems approach to strategy, is to get the best possible performance from the portfolio of units while keeping the cash flow in balance. The astute strategist would, of course, also make a careful analysis of the portfolios of significant competitors.

2.3.2. Constructing The B.C.G. Growth/Share Matrix

The analysis of business units, as outlined above, is conducted within the parameters of a specific matrix termed the 'growth/share matrix'. This matrix gives the following information for each of the units under consideration:

1. The gross sales of that unit in rands. This information may be illustrated in one of two ways;
 - by the area of a circle representing that business unit on the matrix, or,
 - by the diameter of a circle representing that business unit on the matrix.
2. The sales growth rate of the market in which the business unit is competing. This rate is usually measured in rands and should be adjusted for inflation.
3. The market share of that unit relative to its largest competitor.

The last of these items of information, relative market share, is calculated as the ratio of a business units sales (in units) to the sales of the largest competitor. For example, if company A achieves sales of 4,1 million units in a given year and company B, the largest competitor in that market, achieves sales of 10 million units, then the relative market share for company A is 0,41 and for company B, 2,44.

This example serves to illustrate that if a business unit is the largest competitor in a given market then its relative market share according to this technique, will be greater than unity. Conversely, if the opposite is true then its relative market share will be less than unity.

Two points are worth noting as regards the relative market share criterion. Firstly, relative market share is used in preference to absolute market share because the former shows the relationship between each businesses' market share and the leader's market share. This is important because competitive success is usually measured in relative terms and, accordingly, absolute measures of market share may be meaningless. It is also useful to remember, at this point, that the market leader will be achieving better financial performance than his competitors because of the assumed relationship between market share and financial performance.

Secondly, relative market share should be calculated, where possible, in terms of units produced and not in terms of sales Rands. This is due to the fact that the benefits of

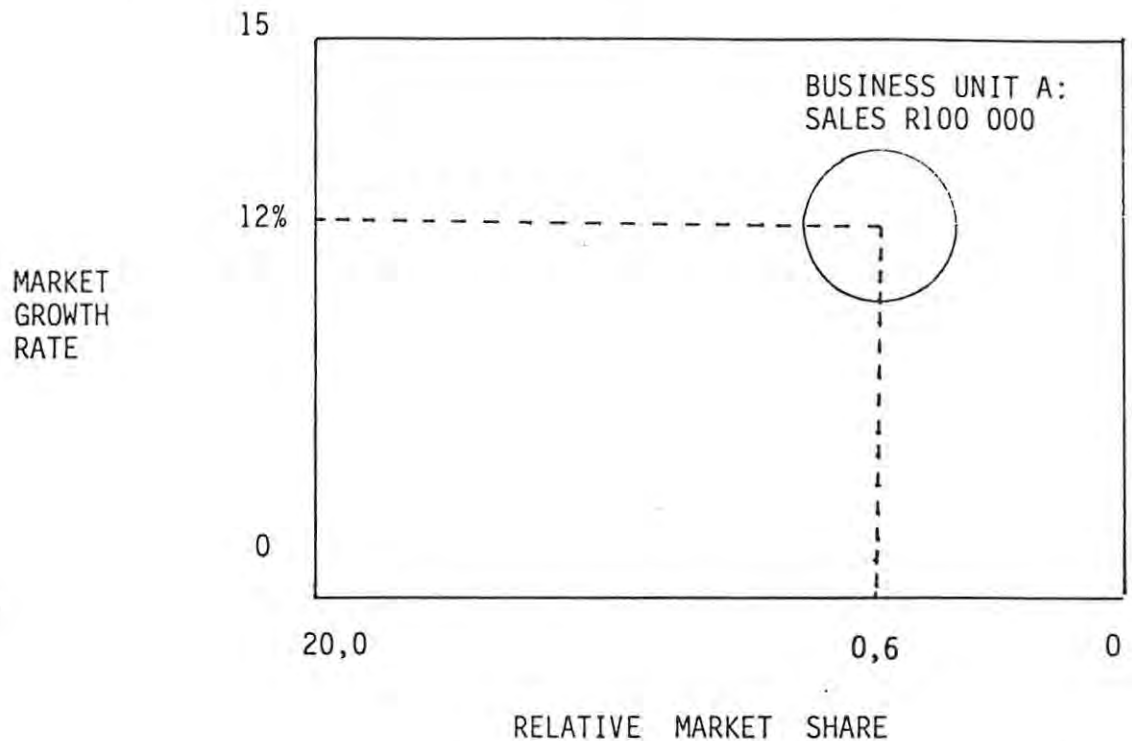
learning and experience and the benefits of economies of scale accrue in relation to the number of units produced, and presumably sold, rather than the number of Rands accumulated from goods sold. If the matrix is to be able to indicate relative financial performance, through relative market share, then strictly speaking, relative market share must be calculated on the basis of units rather than Rands. However, in practice it is often difficult, if not impossible, to accumulate information on the unit sales of various businesses and as a result the Rand sales, where available, must suffice. This practice would only be seriously deficient where the prices charged by various businesses selling similar products in the same market were significantly at variance with one another. As intuitively this can seldom be the case, there can be little valid objection to such a practice.

Relative market share is measured by the horizontal position of the circle representing gross sales, on the matrix. A log scale is used in order to accommodate the large range of relative market shares generally found within the matrix.

Figure 2.2 illustrates an hypothetical B.C.G. portfolio chart for a business unit with sales of R100 000, a relative market share of 0,6 and which competes in a market which is growing at a real (inflation adjusted) rate of 12% per annum.

FIGURE 2.2

AN HYPOTHETICAL B.C.G. PORTFOLIO MATRIX: NO. 1



For the purpose of strategic analysis the simple portfolio matrix illustrated in figure 2.2 is refined in two ways. Firstly, the market growth rate axis is usually separated, by the Boston Consulting Group, into "high" and "low" areas by an arbitrary 10% real growth line. However, in practice when dealing with a total portfolio, this refinement creates certain problems. For some business units a market growth rate of 5% may be considered "high" whilst for other units 25% may be considered "low". In effect in these cases the 10% real growth line does not divide markets of "high" and "low" growth with the result that it is often more useful to assign "high" and "low" ratings on the merit of each case. It should be understood that ignoring the 10% dividing line in no way

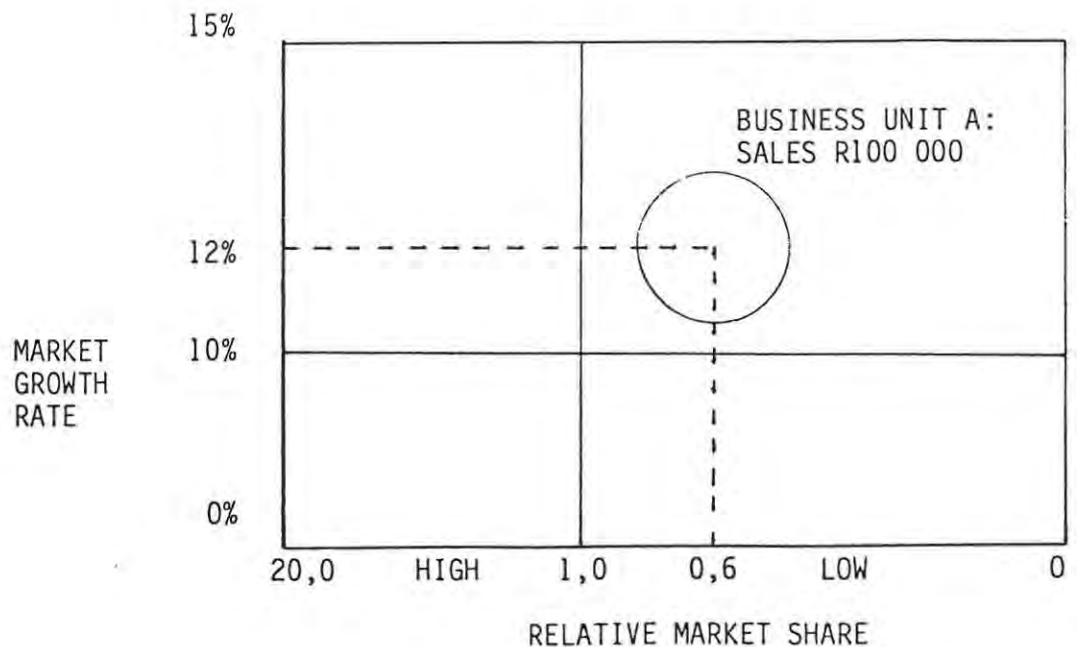
prejudices the results derived from the matrix.

The second refinement normally made to the matrix in order to facilitate strategic analysis is the division of the horizontal axis at a relative market share of 1,0. Thus "high" relative market share (greater than 1,0) signifies market leadership and "low" relative market share (less than 1,0) identifies a market follower. It should perhaps be noted at this point that a ratio of 1,5 would possibly be more suitable for claiming and exploiting, in the acceptable sense of the word, true market dominance. (13) This issue is fully discussed in Chapter 6.

As a result of these two necessary refinements it is possible to construct a more useful portfolio matrix, as illustrated in Figure 2.3., using the same statistical information as given for Figure 2.2.

FIGURE 2.3

AN HYPOTHETICAL B.C.G. PORTFOLIO MATRIX NO. 2



2.4. THE ASSUMPTIONS OF THE B.C.G. GROWTH/SHARE MATRIX

Before utilising the completed portfolio matrix developed in the previous section, for strategic analysis, it is necessary to elaborate on the central assumption regarding the relationship between market share and financial performance. It is also necessary to set up two further assumptions, both of which are eminently reasonable and thus do not impair the predictive validity of the concept.

In terms of the first assumption it is necessary to be more explicit regarding what constitutes 'financial performance'. In this case, financial performance is represented by profit margins and cash generated. Thus the first assumption states that

- due to experience, scale and size effects profit margins and cash generated increase with increases in relative market share.

This is merely a refinement and not an alteration of the original assumption and hence has no changed effect on the matrix.

The second assumption states that

- sales growth requires cash input.

This net cash input is used to finance the extra capacity required for growth and to provide for greater working capital requirements. Sales growth is not synonymous with increases in relative market share in that relative market share will fall if sales increase at a slower rate than

market growth. Thus in order to maintain market share cash requirements will vary according to the market growth rate.

The third, and final assumption states that

- increasing relative market share requires cash input to finance various share gaining tactics employed such as increased advertising expenditure, lower prices and so on. (14) Conversely a decrease in relative market share may make cash available. Cash will not be made available if, as relative market share falls, sales increase. (See assumption two).

2.5. THE FUNDAMENTAL PREDICTIONS OF THE B.C.G. GROWTH/SHARE MATRIX

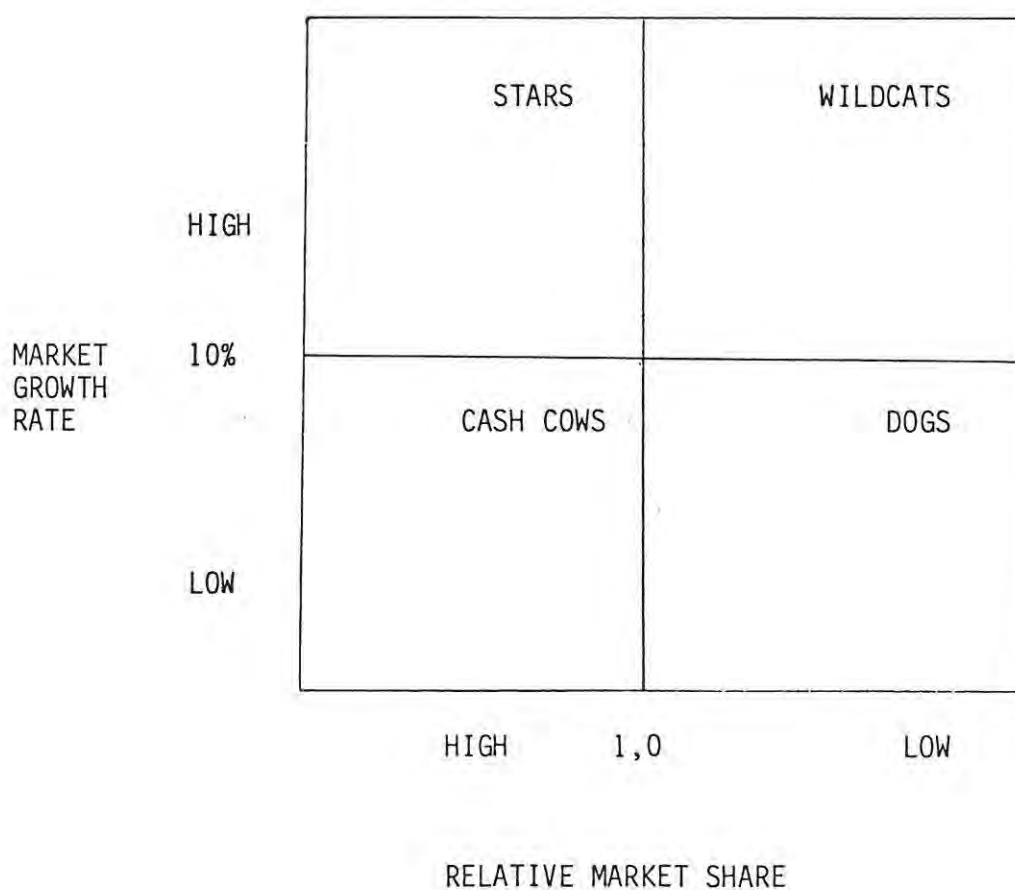
In terms of the assumptions listed above, businesses in various positions on the matrix should display certain distinct characteristics. These characteristics can be divided into four broad categories as follows:

1. Businesses to the left of the vertical dividing line (1,0 relative market share) will have positive cash flows due to their market leadership. Cash flow is defined as net profit after tax plus depreciation.
2. Businesses to the right of the vertical dividing line will have weak or negative cash flows due to their poor relative market share position.
3. Businesses below the horizontal dividing line (10% real market growth) will need little investment in order to hold relative market share because market growth rate and hence sales growth rate is low.
4. Businesses above the horizontal dividing line will require heavy investment in order to maintain relative market share due to the fact that the market growth rate, and hence the sales growth rate in order to maintain relative market share, is high.

According to these characteristics the portfolio matrix can be divided into four cells, within which businesses can be readily classified according to their cash flow and investment requirements. The four classifications are shown in Figure 2.4.

FIGURE 2.4

CLASSIFICATION OF THE FOUR CELLS OF THE PORTFOLIO MATRIX



2.5.1. Star Businesses

Businesses in the Star category are those which hold a high relative market share and compete in high growth markets. Due to their market share position they tend to possess high

gross margins and generate a strong positive cash flow. However, because they are competing in high growth markets they require substantial investment in order to maintain, or possibly improve their market position. As a result Star businesses are generally in cash balance both generating and requiring large amounts of cash.

2.5.2. Cash Cow Businesses

Businesses in the Cash Cow category are those which hold a high relative market share and compete in low growth markets. Their market share position dictates that they generate strong cash flows while, at the same time, they require relatively little investment to maintain their share position due to the low growth rate of the market. As a result Cash Cow businesses provide a strong net cash flow.

2.5.3. Dog Businesses

Businesses in the Dog category are those which hold a low relative market share and compete in low growth markets. Their poor market share position means that they generate relatively small cash flows but, on the other hand, because they compete in low growth markets their investment requirements, in order to maintain relative market share, are similarly small. As a result, unless they are mismanaged they tend to be in cash balance.

2.5.4. Wildcat Businesses (15)

Businesses in the Wildcat category are those which hold a low relative market share and compete in high growth markets. As a result they probably possess the least favourable cash flow characteristics of all the categories. The high growth rate of the market means that these businesses require considerable investment in order to maintain their market share position. However, their low relative market share gives them meagre cash flows. In aggregate, therefore, they tend to be significant net cash consumers.

Given the basic characteristics of businesses within each of the four cells of the matrix it becomes possible to perform the first level analysis of the portfolio.

2.6. THE FIRST LEVEL ANALYSIS OF THE B.C.G. GROWTH/SHARE MATRIX

Given the fact that the growth rate of any given market is, in all but a very limited number of cases, beyond the control of the individual business unit, successful portfolio strategies are essentially limited to market share strategies. As a direct result much has been written over the past decade on market share management and the means by which businesses with a given market share can perform optimally at this market share level. (16)

The first level analysis of the B.C.G. matrix is concerned, to a large extent, with implementing the correct market share strategy for a given market growth rate. Furthermore, the

first level analysis focuses entirely on balancing the cash flow over a portfolio of related investments, such as a group of companies, while obtaining optimal performance from that portfolio.

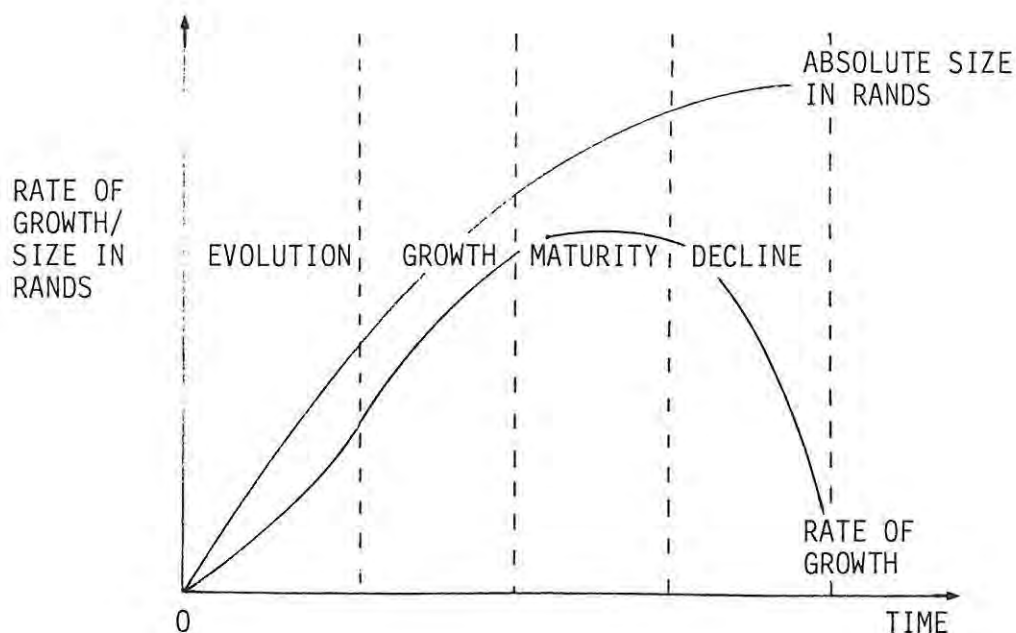
The first level analysis of the B.C.G. Matrix is based on the concept of a standard process of market evolution, or industry life cycle, which is discussed in the following section.

2.6.1. The Industry Life Cycle, Competitive Strategies and the B.C.G. Growth/Share Matrix

In much the same way as products have standard life cycle stages, markets go through a standard evolutionary process, though the length of time it takes to pass through any single stage in this process is highly variable. Figure 2.5 illustrates the process of market evolution.

FIGURE 2.5

THE INDUSTRY LIFE CYCLE



Section 2.2 of this chapter explained the relationship between the B.C.G. Growth/Share Matrix and the generic competitive strategies of cost leadership, differentiation and focus. However, the choice regarding which of these strategies to pursue may be strongly influenced by the stage of the industry in the industry life cycle. Hence, the applicability of the B.C.G. Matrix, which is strongly linked to the cost leadership strategy through the relative market share dimension, may likewise be dependent on the industry life cycle.

All industries can be said to progress at widely varying rates, through the following life cycle stages: Evolution, growth, maturity and decline.

2.6.1.1. The Industry Evolution Stage

During the evolution stage most competitors are attempting to increase market share and consequently research and development and engineering are key functions. Due to the fact that volumes are still relatively low and the product relatively unique, cost leadership does not convey significant advantages at this stage. However, the current strategic effort may be focused almost entirely on achieving future cost leadership.

Thus, during this stage, although business units may be well spread throughout the B.C.G. matrix, their position is of little significance in terms of the matrix dimensions.

2.6.1.2. The Industry Growth Stage

During the second stage of the industry life cycle, the growth stage, companies should begin to concentrate clearly on either a cost leadership, differentiation or segmentation strategy. Here, given the correct definition of the industry, the position of competing businesses in the B.C.G. Matrix is indeed significant regardless of which strategy is being pursued. However, competing in high growth industries is often anything but a simple task.

High growth markets tend to be extremely volatile in the sense that they frequently grow at unpredictable rates. As a result management is likely to encounter difficulties in forecasting market conditions. This inevitably reduces the effectiveness of activities based on plans which have been compiled in terms of the market forecast. Under such conditions it is tempting to adopt a piecemeal approach to production and marketing planning, due to the lower inherent risk in this approach. That is, less corporate resources are wasted should actual market growth fall below projected market growth. However, such an approach is seldom satisfactory as continuous small additions to capacity can seriously reduce efficiency.

On the other hand, few managers would be prepared to gamble on an unpredictable market and opt for a single capacity enlargement programme.

Similarly, the various functional areas within the organisation are unlikely to be well synchronised with market requirements. Purchase of raw materials and component parts in the required volume, at the required quality from overburdened suppliers is unlikely to be satisfactory. The internal administrative functions of the company are more easily reduced to turmoil as continuously changing requirements necessitate the updating or alteration of old systems, or the implementation of new ones. Any system sensitive to volume soon becomes defunct and the adjustment process must begin again.

With regard to the marketing of products in high growth markets, several problem areas become immediately evident. The sales-force is operating under less than desirable conditions, as they bear the brunt of dealer and consumer dissatisfaction. Marketing channels require continuous adjustment and the renegotiation of contracts as volumes surge. Pricing decisions are often less than optimal as materials, manufacturing and selling costs fluctuate violently. In short, the demand pull from the market makes itself felt down to the very roots of the business.

Although a strong growth trend in any market may result in increasing the complexity of the management task, such growth is probably the most important factor influencing industry structure over the long run. As Porter states:

"Industry growth is a key variable determining the intensity of rivalry in the industry and it sets the pace of expansion required to maintain share, thereby influencing the supply and demand balance and the inducement the industry offers to new entrants". (17)

The strong influence of market growth on industry structure is of primary relevance to the B.C.G. Growth/Share Matrix, as it determines the very nature of competition within that industry.

2.6.1.3. The Industry Maturity and Decline Stages

It is during the maturity and decline stages of the industry that the B.C.G. Matrix is particularly applicable. Here, having competitive costs and maintaining strict cost control is the key to strategic success. Those companies with relatively high market share are placed at considerable competitive advantage as clearly predicted by the horizontal dimension of the B.C.G. Matrix. This prediction is made all the more significant in view of the fact that most markets, at any given point in time, are in the maturity stage of their life cycles.

Given the preceding information regarding market growth and the industry life cycle it is possible to group the basic types of strategies which can be used in the control of market share, into three categories. (18)

2.6.2. Portfolio Strategies Used in the Control of Market Share

1. Relative market share holding strategies.

2. Relative market share building strategies.
3. Decreasing relative market share.

2.6.2.1. Relative Market Share Holding Strategy

This strategy is normally employed with Star and Cash Cow businesses and, in certain cases, with Dog businesses. The rationale underlying the application of the holding strategy for each of these types of business is briefly discussed below:

1. In the case of the Cash Cow business, the superior cash flow position which it possesses as a result of its high relative market share should be maintained by holding relative market share. Should market share be lost through underinvestment in the business, margins and cash flows will fall thus diminishing a valuable source of investment funds. On the other hand, increasing market share in low growth, mature markets often costs more than the resulting benefits justify. Ultimately cash flows from the business are once again reduced.

By holding relative market share, cash flows, as a general rule, remain optimal and can be syphoned off to other cells in the matrix where investment funds are more urgently required. Conventionally such funds would be channeled to Wildcat businesses, to any Star business in cash deficit or, alternatively, to the company's research and development function.

2. The Star business, as previously analysed, is generally in cash balance, both requiring and supplying high cash flows. According to the assumption of market evolution, however, the market growth rate must, at some stage, begin to fall, carrying the business with it into the Cash Cow category. Hence it is imperative that the market leadership position held by the Star business be maintained into and throughout the Cash Cow stage. At the same time, being the market leader, it is often pointless and ineffective for a Star business to attempt to gain still further market share, hence a holding strategy is, most often, optimal.
3. Some Dog businesses can also achieve their mission through employing a relative market share holding strategy. This strategy is normally employed with Dog businesses which are situated close to the 1,0 vertical dividing line on the matrix. Although such a business is not the market leader it should nevertheless have a viable market share and be performing some useful function in the portfolio, such as providing a positive net cash flow, supporting the product range or business mix and so on. For such a business building market share is inadvisable due to the low rate of market growth, while decreasing market share is pointless if the business is providing a utility of some sort, as outlined above.

2.6.2.2. Relative Market Share Building Strategy

As a general rule relative market share should be increased whenever the opportunities for doing so are favourable. The

cell in which these favourable conditions are most likely to exist is the Wildcat business cell.

Wildcat businesses, because of their poor net cash flow positions, are the businesses most likely to have only two strategic options; build market share, or withdraw from the market. By increasing their relative market share such businesses tend to shift toward the Star category and, if properly managed, subsequently become Cash Cows. If, on the other hand, relative market share is only maintained, such businesses will be a continuous cash drain on the portfolio. Decreasing relative market share only intensifies the problem as this will worsen the cash flow position of the company.

Fortunately the problem of increasing market share for Wildcat businesses is alleviated to a certain extent by the fact that, of all businesses, this category can gain share most easily.

In high growth markets, market share can be increased without actually reducing the gross sales of competing businesses. As a result competitors are more likely to surrender market share unwittingly either because they are satisfied with their gross sales increases or because they cannot increase capacity fast enough to keep pace with market growth.

A market share building strategy may also be undertaken on defensive grounds in certain instances. In many industries some certain minimum market share may be a prerequisite for

viability and any attempt by a business to reach this critical level may be viewed as a defensive strategy. This critical share has often been found to be 25% of the market leader's share. (19)

2.6.2.3. Decreasing Relative Market Share

This strategy involves deliberately allowing relative market share to fall by decreasing investment in the business. As a result, short run earnings and cash flows are improved.

As a strategy it is most often employed on certain categories of Dog and Wildcat businesses. A Dog business in a poor competitive position, competing in a low growth or even declining market, has limited potential and as such is a prime candidate for such a strategy.

Similarly, a Wildcat business which is so far behind competition that it would require disproportionate effort in order to make it competitive or to reach the critical market share, may be harvested and ultimately withdrawn from the portfolio.

Where one of the above strategies is clearly indicated this signal is usually robust. That is, the strategy can be confidently followed without the fear of an imprecise estimate of some important strategic variable rendering it invalid. (20) This, however, does not give management the freedom to implement strategies after only a perfunctory

analysis, but it does provide a critical cushion of safety which makes strategic decision making that much easier.

Table 2.1 summarises the basic strategies available in the control of market share and gives an outline of when they should be used according to the two central criteria of industry life cycle stage and competitive position.

TABLE 2.1

BASIC STRATEGIES APPROPRIATE FOR VARIOUS INDUSTRY LIFE CYCLE STAGES AND COMPETITIVE POSITIONS

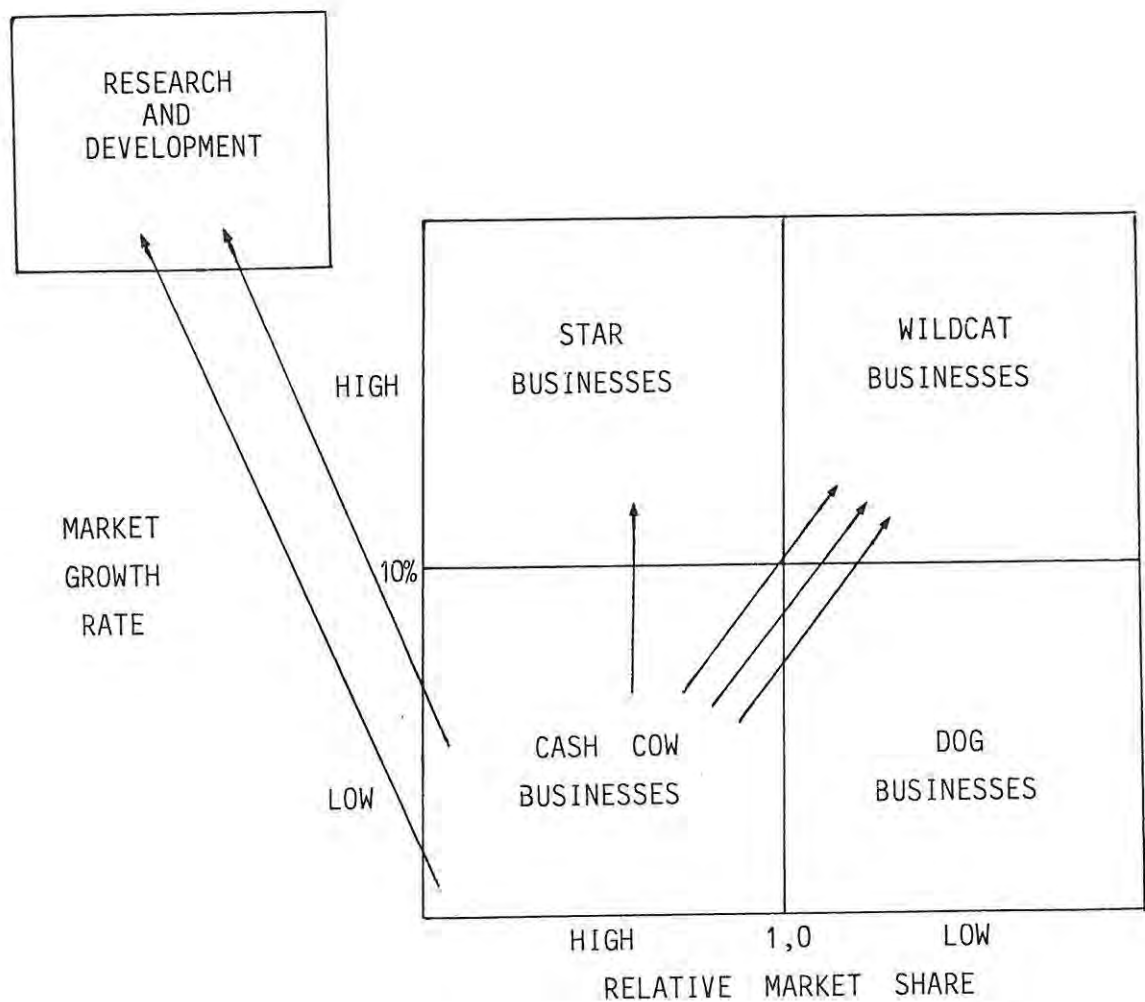
COMPETITIVE POSITION	INDUSTRY LIFE CYCLE STAGE		
	GROWTH	MATURITY	DECLINE
LEADER (HIGH SHARE)	Build share by reducing prices to discourage new competitive capacity. Utilize own capacity fully, adding in anticipation of needs	Hold share by improving quality, increasing sales effort, and advertising.	Harvest: maximise cash flow by reducing investment and advertising, research and development, etc. (market share will decline)
FOLLOWER (LOW SHARE)	Invest to increase share Concentrate on a segment which can be dominated.	Withdraw, or hold share by keeping prices and costs below the market leader's.	Withdraw from the market

SOURCE: Adapted from D. F. ABELL & J. S. HAMMOND. Strategic Market Planning. New Jersey. Prentice Hall. 1979. Page 185.

In summary, the cash flows resulting from the strategies which have been discussed in this section are illustrated in Figure 2.6.

FIGURE 2.6

THE OPTIMUM CASH FLOW SITUATION GIVEN A WELL MANAGED PORTFOLIO OF BUSINESSES



SOURCE: Adapted from G.S. DAY. "Diagnosing the Product Portfolio". Journal of Marketing. April 1977. Page 32. Exhibit 1. "The Cash Quadrant Approach to Describing the Product Portfolio".

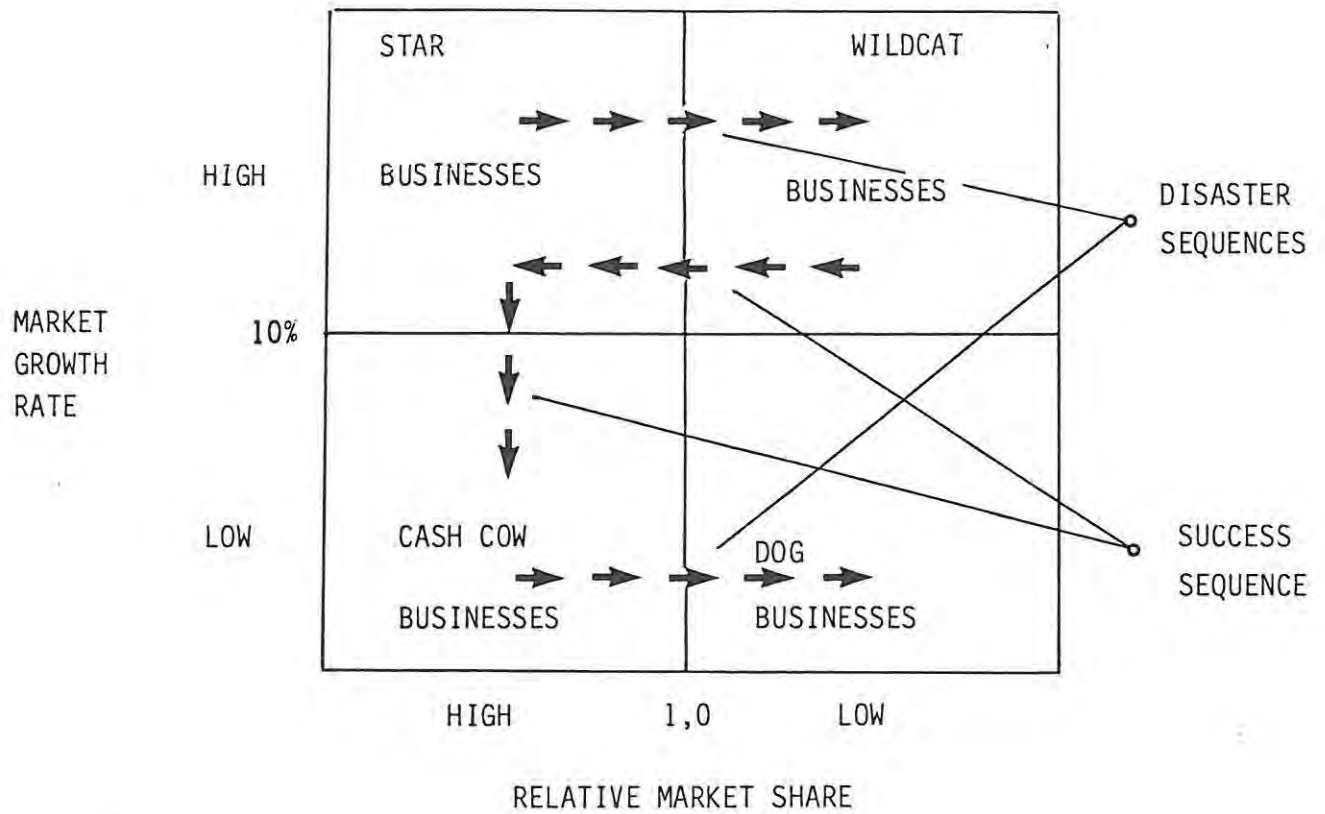
In terms of the strategies which have been outlined in this section it is evident that each category of business should be managed according to a clearly specified market share strategy. As a result of pursuing the correct market share strategies over the life cycle of the business, that business will tend to follow what the Boston Consulting Group term a "success sequence". That is, Dog businesses will remain in a relatively stable position in the matrix, Wildcat businesses will be shifted into the Star category and Star businesses will become Cash Cows as the market growth rate falls in the industry maturity and decline stages.

Conversely, should a business be managed using a fundamentally incorrect market share strategy, such a business will tend to follow a so called "disaster sequence". That is, Cash Cow businesses are allowed to lose their market share position becoming Dog businesses. Similarly Star businesses revert to Wildcat businesses and ultimately Dog businesses as the market growth rate falls.

The "success" and "disaster" sequences are illustrated in Figure 2.7.

FIGURE 2.7

THE CONSEQUENCES OF SUCCESSFUL AND UNSUCCESSFUL MANAGEMENT OF A PORTFOLIO OF BUSINESSES



SOURCE: Adapted from: The Product Portfolio. Boston.
The Boston Consulting Group. 1979. Perspectives
No. 66.

2.6.3. The First Level Analysis of the B.C.G. Growth/Share Matrix - Conclusions

As can now be appreciated, a preliminary analysis of the portfolio can be used as a powerful management tool and should highlight any glaring deficiencies in current and past strategic management. However, such an analysis does have one major weakness which derives largely from its simplistic nature. That is, it is concerned solely with the cash flow characteristics of participating business units. The inclusion of further characteristics and performance measures is clearly desirable if a more meaningful analysis is to be made of portfolio strategy. Such an analysis is examined in the following section.

2.7. THE SECOND LEVEL ANALYSIS OF THE B.C.G. GROWTH/SHARE MATRIX

The preliminary analysis of the portfolio is based largely on ensuring that business units follow the desired 'success sequence' by employing the correct market share manoeuvres. In such a way the entire portfolio performs optimally in terms of cash flow.

However, in order to make a more complete, and hence useful, analysis of business units, there are several other strategically important attributes and performance measures which can be included in the analysis. The second level analysis takes cognisance of the fact that not all businesses can be market leaders. In fact, market followers can display

highly satisfactory financial performance characteristics, whether they be in high or low growth markets, provided they possess the 'right' attributes for the Matrix cell in which they are operating. The focus thus shifts from analysing cash flows to gaining a fuller understanding of the attributes characterising different business units within the four cells and measuring their performance with a broader range of performance yardsticks. Furthermore, such an analysis should also include a temporal dimension in order to reflect the dynamic nature of performance. Finally, unlike the largely conceptual approach of the first level analysis this analysis is predominantly empirical in nature falling, in this respect, into the same category as the PIMS project where demonstrated fact gives birth to theory, as the preface to the PIMS Par Return on Investment Report points out:

"The PIMS (Profit Impact of Market Strategy) program of the Strategic Planning Institute is a multi-company activity designed to provide an improved factual base for the business planning efforts of the participants. Each member company contributes information about its experiences in several different business areas to a combined data base. The PIMS staff analyses this experience to discover the general "laws" that determine what business strategy, in what kind of competitive environment, produces what profit results". (21)

It becomes evident, at this point, that the determination of strategically meaningful attributes necessary for the secondary analysis, is of considerable importance. There are a vast multitude of attributes from which must be selected those most suitable for strategic analysis. Traditionally the analysis has been either PIMS based or alternatively based on the

McKinsey/General Electric Business Assessment Array criteria of market attractiveness and business position. Both of these approaches are highly meritorious but, unfortunately, for the independent researcher, both have serious shortfalls.

An analysis based on PIMS strategic attributes has vast potential in that it combines two individually powerful strategy analysis tools into a single effective entity. (22) However, information on the necessary strategic attributes is extremely hard to come by for the independent researcher as the PIMS data base is an elite one in that it contains much highly confidential data not available in published financial statements.

In the case of the McKinsey/General Electric Business Assessment Array there are so many contingent factors to be considered that analysing all possible combinations and permutations of these factors produces results that are almost unmanageable. As Hambrick et al state, if the researcher uses only 20 factors and allows for only 2 values per factor "the result is over one million possible configurations. The resulting sense of anomie is frustrating to both strategists and researchers". (23)

A useful approach to strategy analysis would be one which could overcome the problems associated with the PIMS and McKinsey/General Electric techniques by firstly limiting the number of contingent factors used in the analysis and secondly by using meaningful but relatively easily available information.

Regarding the number of contingent factors considered in the analysis, one of the primary strengths of B.C.G. portfolio analysis is that it uses only relative market share and market growth rates, hence allowing a broader range of strategic generalisability. That is, the dimensions used are applicable to all businesses. This is in contrast with multivariate techniques, such as those outlined in chapter 1, where many variables are not applicable to every business and hence strategic diagnosis and prescription becomes highly situational. As a result there is no real need to increase the number of contingent factors beyond those considered in the B.C.G. matrix unless one such factor can be shown to be of such influence so as to significantly alter the predictions of the model. Hence, in this respect, the basic B.C.G. matrix would appear to be admirably equipped for a more detailed application of portfolio analysis.

In the event that, for a particular business unit, a third dimension is necessary in the matrix, to take account of a third significant contingent factor, this can easily be included without detracting from the overall validity of the model. As Wind and Mahajan point out, a model can be constructed along several dimensions if necessary. (24)

This section has identified that companies within the B.C.G. growth/share matrix need to be more meaningfully analysed in terms of their levels of economic performance and in terms of their relevant strategic attributes. The following sections 2.7.1 and 2.7.2 are devoted to diagnosing those

measures of economic performance and those strategic attributes which would be most effectively included in an analysis of companies within the B.C.G. growth/share matrix.

2.7.1. Determining Performance Measures of Potential Relevance to the Analysis of Businesses within a B.C.G. Growth/Share Matrix

Regarding the issue of what strategically useful and relatively easily available information is suitable for B.C.G. portfolio analysis, there are few alternatives open to the researcher. On the positive side various performance measures, apart from cash flow, are easily calculable for businesses included in any portfolio investigation. For example, in conjunction with the PIMS data base Hambrick et al use the performance measures of return on investment, variability of return on investment and changes in relative market share. (25) The first two of these measures are universal and are, in fact, almost a prerequisite in any analysis purporting to be concerned with economic performance in its broadest sense. The results Hambrick et al obtain for their sample are given in Table 2.2.

TABLE 2.2

THE PERFORMANCE LEVEL OF BUSINESSES IN THE FOUR CELLS OF THE
PORTFOLIO MATRIX

	<u>Wildcats</u> N = 181	<u>Stars</u> N = 114	<u>Cash Cows</u> N = 315	<u>Dogs</u> N = 418
<u>Performance</u>				
<u>Measure</u>				
Return on Investment	20.55 (24.53)	29.58 (22.59)	30.00 (22.67)	18.48 (21.68)
Cash Flow on Investment	- 2.67 (18.79)	.74 (18.26)	10.01 (17.03)	3.41 (16.17)
ROI/ROI Variability (Return per Risk)	2.37 (3.53)	3.96 (5.20)	4.57 (4.15)	2.80 (4.68)
Market Share Change	.39 (1.76)	.72 (2.97)	.38 (2.30)	.14 (1.55)

() = Standard Deviations

SOURCE: HAMBRICK D C, MACMILLAN I C, DAY D. "Strategic Attributes and Performance in the Four Cells of the B.C.G. Matrix: A PIMS Based Empirical Analysis". Unpublished paper prepared at the Graduate School of Business, Columbia University. Table 1.

These results illustrate the following broad trends:

1. Businesses in different cells of the matrix tend to display different cash flow characteristics. Cash Cow businesses provide positive cash flows, Wildcat businesses require net cash investment and Star businesses are generally in cash balance.

Contrary to the predictions of the portfolio matrix, Dog businesses appear to provide positive cash flows rather than to be in cash

balance. In fact the cash flow of the average Dog business is greater than the cash requirement of the average Wildcat business. It would appear that "researchers should start dealing more positively and creatively with this category of business". (26) However, given the fact that the PIMS data base is an elite one, these findings may not be representative of a total business population. It is possible that companies contributing to the PIMS data base are more progressive than the average and hence are better able to manage the particularly difficult Dog businesses. (27)

2. Return on investment is greater for high relative market share businesses than for low relative market share businesses.

Cash Cow businesses have the greatest return on investment due to their high relative market share and because they are competing in stable markets. Star businesses follow due to their high relative market share and the fact that they are competing in unstable markets. (It would appear reasonable to propose that these changeable market conditions result in a greater frequency of less effective decisions and hence Stars do not perform as well as Cash Cows of similar relative market share).

Businesses in the Dog category have the third highest return on investment reflecting, once more, that in stable markets better performance is possible than in highly changeable markets.

Wildcat businesses reflect the lowest return on investment.

3. Market share changes are more prevalent amongst businesses in high growth markets than in low growth markets, though the difference is minimal for some categories.

Following the logic presented under "Relative Market Share Building Strategy" (section 2.6.2.2.) this result appears to be reasonable and predictable. Star Businesses reflect the highest market share change followed by Wildcat, Cash Cow and Dog businesses respectively.

4. The high return on investment earned by businesses with a high relative market share more than compensates for the variability of return on investment when compared with businesses of low relative market share. Thus gaining relative market share would appear to be desirable even where such a strategy could result in potentially high variability of return on investment.

The ratio of return on investment to return on investment variability for the sample was greatest for Cash Cow businesses followed by Star, Dog and Wildcat businesses respectively. That Wildcat businesses display the lowest ratio, even though the return on investment for such businesses is greater than that for Dog businesses, can be explained by the high variability of return on investment experienced in the turmoil of high growth markets.

5. There is no correlation between cash flow and market share gains except for Star businesses.
(28)

This finding conflicts with the theory of the matrix and with results obtained by Gale and Branch in an analysis of the same data base at a later date. (29) Gale and Branch state:

Cash flow is lowest when sales growth (in current dollars) is rapid. When growth is slow or negative, cash flow is very positive. In fact, at a moderate growth rate, all a company needs is an average R.O.I. to generate positive cash flow (before dividend or interest payments). At rapid growth rates, however, average R.O.I. no longer suffices".

This discrepancy may arise as a result of the fact that strictly speaking the two studies are not measuring the same variables, (sales growth versus market share gains). However, one would expect sales growth to be highest during a market share gaining strategy. The fact that the two analyses were performed at different points in time may also be a contributing factor to this discrepancy.

Intuitively Gale and Branch's conclusions are more convincing as the investment requirement to induce a gain in market share is likely to place a strain on the cash flow. As a result the conclusion by Hambrick et al that questions should be raised about the extent to which "general managers should be relieved of ambitious profitability or cash flow goals when they are also charged with gaining share" (30) holds little logical validity.

The analysis of market share change as a measure of performance is important in that changes in market share can have a profound influence on the other performance variables. Hence, for example, where a Star business is not in cash balance showing a heavy net cash flow deficit this can be explained by a

significant gain in relative market share by that business over the same time period. In other words, the current strategic effort, as measured by market share changes, is an important consideration. Having a high relative market share may lead to a strong positive cash flow but getting such a share leads to the opposite. (31)

The performance measures discussed thus far (return on investment, variability of return on investment, market share change and cash flow on investment) would appear to be essential to any second level analysis of businesses within the B.C.G. growth/share matrix. However, it could be argued that one further performance measure is necessary to complete such an analysis. This is briefly discussed below.

The performance measures considered up to this point give no reliable indication of the long run growth potential of the businesses under investigation. Such a measure is important, especially for Wildcat and Star businesses in that, in order to keep pace with market expansion, such businesses may be required to grow at a considerable pace for a considerable length of time. The long run growth potential of a business is indicated through a measure known as the maximum sustainable growth rate. (The construction of this measure is discussed on page 75 of this chapter).

In terms of the dimensions of the B.C.G. matrix it can be expected that businesses competing in high growth markets, where growth opportunities are abundant, should be operating

at a level nearer maximum sustainable growth than the businesses competing in low growth markets.

In summary, the complete list of performance measures necessary to accomplish a second level analysis of the growth/share matrix, is given below:

1. Return on Investment (R.O.I.)

$$\text{R.O.I.} = \frac{\text{Net Profit Before Interest and Tax (NPBIT)}}{\text{Average Total Assets (A.T.A.)}}$$

2. Variability of Return on Investment or alternatively Return per Risk (R.P.R.)

$$\text{R.P.R.} = \frac{\text{Average Return on Investment year 1 to year n}}{\text{Variability of Return on Investment year 1 to year n}}$$

Here the variability of R.O.I. is calculated as the sum of the differences between the average R.O.I. and each years R.O.I. All such differences are treated as being positive.

3. Market Share Change (M.S.C.)

M.S.C. = market share at the end of the period under analysis minus the market share at the beginning of the period.

4. Cash Flow on Investment (C.F.O.I.)

$$\text{C.F.O.I.} = \frac{\text{Net Profit After Tax (NPAT) - Changes in Net Assets}}{\text{Average Total Net Assets (ATA)}}$$

5. Maximum Sustainable Growth Rate (MSGR)

$$\text{MSGR} = \left(\frac{\text{Turnover}}{\text{Total Assets}} \right) \times \left(\frac{\text{Net Profit After Tax}}{\text{Turnover}} \right) \times \left(\frac{\text{Total Assets}}{\text{Total Debt}} \right) \\ \times \left(\frac{\text{Total Debt}}{\text{Equity}} \right) \times \left(\frac{\text{Retained Earnings}}{\text{Net Profit After Tax}} \right)$$

To conclude the analysis of performance of companies within the B.C.G. growth/share matrix it is necessary to make some comment on the potential relationship between the financial performance of companies and the growth rate of the market in which they are competing. While there may be some reason to believe that companies operating within high growth markets are faced with more opportunities for growth and profit, the market growth dimension per se does not bestow financial advantages or disadvantages on businesses. Rather, the ability of management to mould the company to the requirements of the market, whether it be high or low growth, will determine financial performance. However, if the potential for better financial performance exists in high growth markets it may be that businesses operating in such markets attract more adventurous and dynamic management personnel. If this is the case it may well be that such businesses tend to perform more favourably than those in low growth markets. Thus, while it would be premature to suggest that performance may vary by market growth rate, it is certainly an issue which demands attention in any analysis concerned with, inter alia, market growth as a strategic variable.

2.7.2. Determining Strategic Attributes of Potential Relevance to the Analysis of Businesses within the B.C.G. Growth/Share Matrix

While performance measures which can be easily integrated into the formal B.C.G. growth/share matrix structure are relatively abundant, strategic attributes suitable for the analysis of B.C.G. portfolio matrix are scarce indeed.

Hambrick et al use those attribute categories in the PIMS data base, as listed in Table 2.3. However, being an elite data base much of the information on these attributes is not available to the independent researcher who must then find other satisfactory alternatives.

TABLE 2.3.

STRATEGIC ATTRIBUTES LISTED IN THE PIMS DATA BASE

<u>RESOURCE AND RESOURCE USAGE</u>	
1.	Capacity/Market
2.	Capacity utilization
3.	Plant and equipment newness
4.	Investment/Revenue
5.	Sales/Employee
6.	Receivables/Revenue
7.	Inventories/Revenue
<u>EXPENSE STRUCTURE</u>	
1.	Manufacturing expenses/Revenue
2.	Product R and D expenses/Revenue
3.	Process R and D expenses/Revenue
4.	Sales force expenses/Revenue
5.	Advertising and Promotion expenses/Revenue
<u>DOMAIN</u>	
1.	Relative product line breadth
2.	Relative customer type breadth
3.	Relative number of customers
4.	Customer fragmentation
<u>VERTICAL INTEGRATION</u>	
1.	Value added/Revenue
2.	Relative vertical integration backward
3.	Relative vertical integration forward
<u>COMPETITIVE DEVICES</u>	
1.	Sales from new products
2.	Relative sales from new products
3.	Relative prices
4.	Relative direct costs
5.	Relative product quality
6.	Relative image
7.	Relative services
8.	Relative advertising expenses
9.	Relative sales promotion expenses
10.	Relative sales force expenses

SOURCE: Adapted from: HAMBRICK D C, MACMILLAN I C, DAY D, "Strategic Attributes and Performance in the Four Cells of the B.C.G. Matrix": A PIMS based Empirical Analysis". Unpublished Paper prepared at the Graduate School of Business, Columbia University. Table 2.

One possibility is the use of selected ratios, including those which the PIMS approach uses, to act as indicators of strategic attributes. Through multiple regression analysis it should then be possible to determine which of the attributes are significant in influencing each performance measure. Strategists, knowing what performance characteristics they can expect from businesses in each of the four cells, can then attempt to maximise the probability of achieving these performance characteristics by carefully monitoring the relevant strategic attributes.

Bearing in mind the assumptions underlying the B.C.G. matrix (as discussed in section 2.4) and the predictions of the matrix (as discussed in section 2.5) the following variables may, for the reasons given, be used as strategic characteristics, or attributes, for companies analysed in terms of the matrix (32).

2.7.2.1. Strategic Attributes Related to the Market Growth Rate Dimension

Section 2.6.1.2. of this chapter clearly identified the fact that the different environments created by high and low growth markets will place vastly different strategic, operational and administrative requirements on management. The reason why this occurs is because the fundamental characteristics of the business itself are altered as that business adapts to a changing market. Therefore, it becomes important to determine exactly which business

characteristics alter and the extent to which they alter. Only once this has been done can strategic management monitor such characteristics meaningfully.

It is possible to anticipate several changes in the characteristics of a company as it responds to changes in the rate of market growth. These characteristics are classified as strategic attributes and can be analysed in the manner presented below. (33)

2.7.2.1.1. Attributes Related to the Asset Structure

- 2.7.2.1.1.1. Companies operating in high growth markets can be expected to have a higher proportion of fixed assets in their total asset structure. Due to the more favourable future prospects in high growth markets companies should show little reluctance to implement capital projects. In low growth markets where future prospects are less favourable a build up of fixed costs must be carefully controlled.
- 2.7.2.1.1.2. In high growth markets companies may be expected to turn over stock more rapidly and hence the value of stock as a proportion of total assets can be expected to decrease. Conversely, there is the very real possibility that companies operating in low growth markets will allow their stock holdings to accumulate thus increasing the value of stock in the total asset structure.

2.7.2.1.1.3. In high growth markets the need to keep pace with market growth should absorb all available funds in the company. As a result there will be less tendency for such companies to advance loans either to corporate officers or to other companies. Therefore, both long term and short term loans advanced will be comparatively small in relation to total assets. This also means that operating assets (defined as total assets less investment funds) will constitute a larger proportion of total assets in high growth markets than in low growth markets.

2.7.2.1.2. Attributes Related to Current Assets

2.7.2.1.2.1. The composition of current assets may be expected to vary according to market growth rate. For example, the strong demand experienced for the companies products in high growth markets should result in a higher stock turnover and a relative decrease in stock as a proportion of current assets.

Conversely, the increased rate at which stock is converted into debtors, given a constant average collection period, should result in an increase in the debtors portion of current assets.

2.7.2.1.2.2. Also, businesses operating in high growth markets may tend to "buy" market share by relaxing credit control requirements. Should this be the case the turnover of debtors will decrease with increases in market share.

2.7.2.1.3. Attributes Related to Borrowed Funds

2.7.2.1.3.1. Businesses operating in high growth markets will require relatively larger investment funds and hence they can be expected to expand their borrowings. These investment funds will be used largely to finance fixed asset growth and hence should be predominantly long term in nature. There is no immediately apparent reason why short term borrowings as a proportion of total borrowed funds should vary between high and low growth markets.

2.7.2.1.3.2. High relative market share businesses can be expected to exploit, to some degree, their dominant position in the market. One principal area where exploitation could occur is in the payment of creditors. As a result it may be expected that high relative share businesses will tend to stretch their creditors and thus the proportion of creditors in total current liabilities will be greater for such businesses than for businesses with low relative market shares.

1.7.2.1.4. Attributes Related to Asset Growth

2.7.2.1.4.1. Due to the nature of high growth markets (as outlined in section 2.6.1.2.) companies competing in such markets should possess a higher rate of growth of both fixed and current assets than companies in lower growth markets.

2.7.2.1.5. Attributes Related to Capital Utilisation

2.7.2.1.5.1. In low growth markets businesses may be forced to reduce asset build up in accordance with the lower rate of activity in these markets and hence it is possible that capital (both in terms of fixed and current assets) will be turned over more rapidly.

2.7.2.1.5.2. In high growth markets businesses should be experiencing cash flow difficulties hence they may be expected to stretch their creditors thus decreasing the creditors turnover ratio. Similarly, the turnover of short term borrowings and bank overdraft should decrease as businesses increase their liabilities in order to finance growth.

Having attempted to anticipate the characteristics of businesses according to variations in the rate of market growth, the following section performs the same analysis on the basis of variations in relative market share levels.

2.7.2.2. Strategic Attributes Related to the Relative Market Share Dimension

The relative market share dimension of the B.C.G. Matrix is, by definition, a performance related dimension. As a result any company characteristics used as strategic attributes will, of necessity, bear some performance component if that company is analysed in terms of relative market share. However, these characteristics are differentiated from the performance measures discussed in section 2.7.1. by the fact that they are not designed

to reflect overall performance as such but rather to illustrate specific aspects of performance such as the performance of fixed assets, current assets, operating assets and so on.

2.7.2.2.1. Attributes Related to the Asset Structure

- 2.7.2.2.1.1. Companies operating at low relative market share levels can be expected to reduce their overheads as much as possible in order to lower their fixed expenses and the break even volume. Conversely, high relative market share businesses, given their greater liquidity can be expected to focus less on fixed charges and break even volumes. Such businesses may, in fact, attempt to increase operating leverage by increasing fixed assets in the total asset structure. As a result the proportion of fixed assets to total assets can be expected to rise for high relative market share businesses.
- 2.7.2.2.1.2. High relative market share businesses should, according to the predictions of the B.C.G. matrix, be financially stronger than their low relative market share counterparts. Therefore, it follows that such businesses will be in a better position to grant loans. As a result the amount of both long and short term loans advanced in relation to total assets, should be higher for high relative market share businesses.
- 2.7.2.2.1.3. Given that the logic presented in section 2.7.2.2.1.2. above is correct, it can be expected that operating

assets (which are defined as total assets less all investments) will constitute a smaller proportion of total assets for high relative market share businesses.

2.7.2.2.2. Attributes Related to Funds Structure

2.7.2.2.2.1. Due to the assumed better financial position of high relative market share companies it can be expected that such companies will have a lower level of borrowings, both long and short term, than their low relative market share competitors.

2.7.2.2.3. Attributes Related to Current Assets

2.7.2.2.3.1. The superior financial position of high relative market share businesses should reflect itself in improved liquidity. As a result one can expect the current and acid test ratios to be more favourable in high relative market share companies.

2.7.2.2.4. Attributes Related to Capital Utilisation

2.7.2.2.4.1. According to the predictions of the B.C.G. matrix high relative market share businesses are by definition, more cost efficient than their smaller counterparts. That is, at the current market price such businesses receive

higher gross margins due to experience, scale and size effects. As a result all capital utilisation ratios should be higher for high relative market share companies. The most common capital utilisation ratios relate turnover to such items as fixed assets, current asset items, current liability items and total assets.

2.7.2.2.5. Attributes Reflected on the Income Statement

In that the income statement carries several useful performance related items such as turnover, incomes received from non-operating sources and the general expenses incurred by the business, it represents an important fount of company characteristics suitable for use as strategic attributes.

- 2.7.2.2.5.1. Due to experience, scale and size effects, high relative market share businesses should be characterised by higher gross profit and trading profit margins than their low relative share counterparts. (34)
- 2.7.2.2.5.2. Based on the recommendations of the Boston Consulting Group it can be expected that the only categories of businesses within the growth/share matrix which should be pursuing growth strategies are Wildcat businesses and, if the situation is favourable, Star businesses. It is, therefore, likely that the increase in turnover associated with such businesses will be greater than that of Cash Cow and Dog businesses.

Sections 2.7.2.1. and 2.7.2.2. have attempted to identify the changing characteristics of businesses according to variations in the rate of market growth and the level of relative market share. The following section deals with the probable characteristics of businesses according to each cell of the B.C.G. growth/share matrix.

2.7.2.3. Strategic Attributes Related to the Four Cells of the B.C.G. Growth/Share Matrix

Apart from the general performance measures discussed in section 2.7.1. it is difficult to assess how the combined effect of relative market share and market growth will alter the attributes of businesses within the cells of the B.C.G. matrix. However, by definition any attribute which displays changed values according to different rates of market growth or levels of relative market share should also vary amongst at least some of the four cells of the B.C.G. growth/share matrix. Furthermore, where an attribute varies by both relative market share and market growth it should be possible to determine how that attribute varies between each cell of the matrix. Where an attribute varies by either relative market share or market growth rate this, of course is not possible.

The following attributes are those which in the preceding sections 2.7.2.1. and 2.7.2.2. were anticipated to vary by both dimensions of the growth/share matrix.

Attributes Related to the Asset Structure

- The ratio of fixed assets to total assets (refer to sections 2.7.2.1.1.1. and 2.7.2.2.1.1.)
- The ratio of short and long term loans advanced to total assets (refer to sections 2.7.2.1.1.3 and 2.7.2.2.1.2.)
- The ratio of operating assets to total assets (refer to sections 2.7.2.1.1.3. and 2.7.2.2.1.3.)

Attributes Related to Capital Utilisation

- The turnover of fixed and current assets (refer to sections 2.7.2.1.5.1. and 2.7.2.2.4.1.)
- The turnover of current liabilities (refer to sections 2.7.2.1.5.2. and 2.7.2.2.4.1.)

The manner in which these attributes are likely to vary between the cells of the B.C.G. growth/share matrix is discussed below.

2.7.2.3.1. Attributes Related to the Asset Structure

- 2.7.2.3.1.1. According to the arguments presented in sections 2.7.2.1.1.1. and 2.7.2.2.1.1. it can be expected that the proportion of fixed assets to total assets will vary between each cell of the B.C.G. growth/share matrix. Star businesses will possess the highest proportion, followed by either Cash Cow or Wildcat businesses. Dog businesses will possess the lowest proportion of fixed assets to total assets.

- 2.7.2.3.1.2. Sections 2.7.2.1.1.3 and 2.7.2.2.1.2. have indicated that the ratio of both short and long term loans advanced to total assets may vary according to each cell of the growth/share matrix. In both cases Cash Cow businesses may be expected to have the highest ratio followed by either Dog or Star businesses. Wildcat businesses will have the lowest ratio.
- 2.7.2.3.1.3. Given that operating assets are defined as total assets less investments and with reference to the arguments presented in sections 2.7.2.1.1.3. and 2.7.2.2.1.3. it follows that the ratio of operating assets to total assets should be highest for Wildcat businesses followed by either Star or Dog businesses. Cash Cow businesses will have the lowest ratio.
- 2.7.2.3.2. Attributes Related to Capital Utilisation
- 2.7.2.3.2.1. Due to the arguments presented in sections 2.7.2.1.5.1. and 2.7.2.2.4.1. the turnover of both fixed and current assets should vary between the cells of the growth/share matrix. The turnover of fixed and current assets should be highest for Cash Cow businesses followed by Star or Dog businesses. Wildcat businesses should possess the lowest ratio.
- 2.7.2.3.2.2. The arguments presented in sections 2.7.2.1.5.2. and 2.7.2.2.4.1. indicate that the turnover of current liabilities should vary amongst the cells of the B.C.G. matrix in the following manner: Cash Cow businesses

will have the highest turnover followed by Dog or Star businesses and finally Wildcat businesses.

The second level analysis of the B.C.G. growth/share matrix has thus far analysed the probable relationships between the following variables:

1. Relative market share and financial performance (refer to section 2.7.1.1.)
2. Market growth and financial performance (refer section 2.7.1.2.)
3. The four cells of the B.C.G. Matrix and financial performance (refer section 2.7.1.1.)
4. Market growth and strategic attributes (refer section 2.7.2.1.)
5. Relative market share and strategic attributes (refer section 2.7.2.2.)
6. The four cells of the B.C.G. matrix and strategic attributes (refer section 2.7.2.3.)

In this section the impact of relative market share and the impact of the market growth rate (or product life cycle stage) on the strategic attributes and the financial performance of businesses have been analysed both in isolation from each other and in terms of their joint and simultaneous effect. This approach has been adopted for two reasons: Firstly, each variable on its own has the ability to affect business performance significantly

and thus deserves individual attention. Secondly, by analysing each variable independently it is possible to gain some indication of the relative contribution of each to the attributes and performance of businesses within the growth/share matrix.

In order to complete the second level analysis it is necessary to investigate the relationship between financial performance and strategic attributes for the various categories of businesses within the B.C.G. matrix. The following section analyses this relationship.

2.7.3. The Relationship Between Strategic Attributes and the Performance of Businesses in the B.C.G. Growth/Share Matrix

The final stage of the second level analysis of the B.C.G. matrix involves identifying the relationship, if any, between the performance and the strategic attributes of businesses according to the four cells of the growth/share matrix. Only once the significant attributes have been explicitly related to financial performance does the analysis become useful as a strategic management tool. That is, once having set an objective in terms of a specific financial performance measure, management can then monitor the salient

attributes in attempting to ensure that such an objective is achieved.

2.7.4. The Second Level Analysis of the B.C.G. Growth/Share Matrix - Conclusions

The second level analysis of the B.C.G. growth/share matrix, as outlined in section 2.7 above, is designed to result in a more useful study of companies by progressing beyond the limited cash flow performance criterion of the first level analysis. If it can be shown that the attributes and performance characteristics analysed in this chapter do in fact apply to businesses categorised according to the two dimensions of the B.C.G. growth/share matrix, this will be a strong indication that the contingent variables used by this model are relevant and applicable to the strategic planning process at the business level. If they do not apply, then the concept of portfolio management according to the Boston Consulting Group must be categorised as a logically consistent theoretical framework for portfolio analysis with limited practical potential.

This section (section 2.7.) has clearly identified the strategic attributes and performance measures which should be

included in a second level analysis of the B.C.G. growth/share matrix. However, these attributes and performance measures will only vary from cell to cell if the participating businesses have been correctly positioned within the matrix. In order to achieve such positioning, the definition of the market within which each company is competing assumes considerable importance. This issue is discussed in the following section.

2.8. THE IMPORTANCE OF THE DEFINED MARKET

The preceding analysis of strategies applicable to various categories of business in the matrix is based on the premise that all business units are in fact correctly situated in that matrix. The mission allocated to each business is based almost entirely on the position of the business in the matrix. It is, therefore, imperative that this position be realistic.

Due to the fact that most markets can be defined in several ways it is possible to significantly alter the position of any single business unit in the matrix. Most often the issue regarding market definition revolves around the choice between using the served market (for example; the small economy motor vehicle market) and the total market (for example; all motor vehicles). Unfortunately there is no simple manner in which this conflict can be resolved. On the one hand a major objective of portfolio analysis is to indicate relative costs (shown through the relative market share position) and hence,

according to this criterion, it is necessary to use the broader definition of the total market. On the other hand, however, the definition of the market should separate markets which are essentially different, that is, have different growth rates, different identifiable competitors and so on. To this end it is often necessary to use the narrower definition of the served market. Where no satisfactory compromise to this dichotomy exists it is often necessary to perform a dual analysis and adjust the recommended strategies accordingly.

A unique situation arises in that instance when a researcher is analysing an aggregate of businesses from a formal data source and has, therefore, limited access to information regarding the served and total markets of each of these separate units. In order to avoid unacceptable value judgments regarding the 'true' market of each of these units some other, more objective, solution must be determined. It would appear that the Standard Industrial Classification system presents such a solution. That is, the three, four or five digit Standard Industrial Class for each participating business can be used to identify the industry or market within which that business is competing.

One evident weakness of this system is that the Standard Industrial Classification can be rather arbitrary, especially in the case of highly diversified companies. However, the system is at least consistent and in the absence of any other

technique such a system would appear most acceptable.

2.9. THE LIMITATIONS OF THE B.C.G. GROWTH/SHARE MATRIX

Although portfolio analysis, as described in this chapter, would appear to have prodigious analytical and prescriptive powers, its potential is limited somewhat by a number of latent weaknesses. These weaknesses in no way invalidate the concept as a whole, however, and are noted here merely for the sake of completeness.

1. It is possible that the cash flows derived from Cash Cow businesses are not really significant. Cash Cows are normally in the maturity stage of their life cycle where price competition can depress margins and hence adversely affect cash flow. However, it must be added that, in this case, if the Cash Cow business is suffering from poor cash flows its competitors in the same market should find themselves in an even less favourable situation.
2. Where experience, scale and size effects are small it is unlikely that cash flow differences for businesses with different relative market shares will be significant enough to warrant the use of this technique. However, the likelihood of small experience, scale and size effects are in most cases remote as reflected in the analyses presented in Chapters 3, 4 and 5.

3. Where capacity utilization rates differ amongst various businesses in the same Standard Industrial Class, relative market share may not be a good indicator of relative costs.
4. Where one competitor is operating under preferential business conditions the assumptions of portfolio analysis may not apply. For example, one competitor may be sited in a region of exceptionally harmonious labour relations thus reducing his unit costs in a manner unrelated to relative market share. The same situation would logically apply to a business which enjoys a unique low cost source of materials supply.
5. Strategic factors other than relative market share can have a profound impact on the performance of businesses in each of the four cells of the matrix. However, in order to overcome this weakness it is possible to conduct a more detailed analysis of the portfolio taking specific account of these other strategic factors. In this way it should be possible to identify a whole range of characteristics which separate the good, mediocre and poor performers in each of the four cells of the matrix.
6. Perhaps the most serious criticism of portfolio analysis, though one which has little empirical or theoretical support at present, is that it is possibly concerned with the analysis of irrelevant contingent factors. (35) Wensely maintains that for any model

to be valid, it must satisfy three requirements:

- " - an internal consistency in the implied economic process.
- must be based on established empirical regularities.
- must focus the search (for economic profits or rents) along critical dimensions rather than trivial ones, even if it is claimed that a particular approach is to help managers think rather than give them answers". (36)

While Wensley concedes that portfolio analysis is internally consistent and is based on established empirical regularities, he maintains that, as a resource allocation device, the model focuses on trivial dimensions. Firstly, the manipulation of business units in order to achieve cash balance in a given portfolio ignores the importance of the capital market in project financing. While at the most elementary useage level this may constitute a valid criticism, the model is more generally, and fruitfully, used to indicate the actual degree of external financing necessary to allow a changing portfolio of business units to operate optimally. Thus, at the more pragmatic level, the model does not advocate the elimination of certain business units should the cash flow for the portfolio not balance. Such a recommendation would only be considered, if, at the same time, external financing in the way of equity or loan capital could not be raised at an acceptable cost.

Similarly, should a portfolio of business units provide an overall positive cash flow this should only be invested in new

projects/business ventures if such an action will create more value for the owners of the business, at acceptable risk, than the issue of increased dividends.

Secondly, Wensley maintains there is no sound empirical evidence to support preferential investment in high market growth businesses. That is, market growth is a trivial criterion for investment. This criticism is based almost entirely on Kijewski's work using the Pims data base. (37) A single piece of research on an elite data base, however, hardly constitutes a valid case for refuting a practice based overwhelmingly on common sense.

Finally, Wensley holds that...

"the market share/growth matrix approach fails to reflect the considerably greater degree of risk attached to major and substantial diversification moves, which has been widely recognised in more traditional work on corporate strategy since Ansoff's famous four boxes". (38)

One could consider, however, that it is not necessary for the portfolio model to 'reflect' risk, as defined above, when Ansoff's product/market matrix (39) is by no means precluded from being used alongside a portfolio analysis.

A further criticism of standardised portfolio models of the B.C.G. type has been put forward by Yoram Wind et al. (40) Using PIMS data for fifteen business units of a single Fortune 500 firm Wind concludes that ...

"using any single model can lead to classification of businesses into questionable categories since a minor change in definition, weights of dimensions or the model used, could result in a different classification of the businesses involved (and hence in the strategic guidelines for that business)". (41)

Not only must this conclusion be carefully questioned, but once again the methodology used leaves much to be desired. In the first instance, the selection of the sample is such that no claim could possibly be made, as has been made, regarding the universal validity of the results obtained. Not only are the business units drawn from a single company but also that company is drawn from an elite, and therefore, unrepresentative data base. Furthermore, it is hardly surprising that different techniques and variations of models produce different results; to expect otherwise is somewhat naive. No single model purports to represent the final word in effective strategic management, it is merely another addition to the growing pool of techniques placed at the disposal of management. In fact, the ability of a manager to select the correct technique for his unique set of circumstances is probably of equal importance to his ability to implement and interpret the results derived through that technique.

While serious cognisance should be taken of the main contentions of Wensley and Wind et al, it would appear that, to date, the broader concept of portfolio analysis has escaped relatively

unscathed from the attentions of academics and practicing strategists. It should be noted, however, that there is likely to be an abundance of criticisms of this technique for the single reason that it recognises only two contingent factors on strategy and hence is a highly generalised technique. However, as discussed earlier, this fact has many positive ramifications when the concept is used as the focus for strategy analysis and selection.

2.10. CONCLUSIONS

The concept of portfolio analysis using the B.C.G. matrix is an important one as regards strategic market planning for the reason that it embodies a small number of more encompassing variables and hence allows a broader range of generalisability. Other strategy analysis and selection techniques use a greater number of contingent variables but as a result often make strategic analysis highly situational. Use of the Directional Policy Matrix involves so many variables that analysis becomes cumbersome and is often meaningless. While the PIMS approach has much to recommend it the data base from which its analyses are derived is an elite one which casts severe doubt on the universality of the results obtained. Furthermore, the type of information used in the PIMS approach is highly confidential and extremely difficult to prise from any but the participating companies. For all practical purposes a duplication of the PIMS research is, as a result, impossible.

Portfolio analysis according to the B.C.G. matrix is based largely on the assumption that the financial performance of business units is linked closely to relative market share. While intuitively this would appear logical there has been much debate regarding the degree of benefit, if any, actually derived from experience, economies of scale and large corporate size, factors which are of primary importance when analysing relative market share. As a result the following chapters, chapters 3, 4 and 5, are devoted to analysing each of these factors in turn in order to validate the assumption that an increase in any of them will in fact lead to improved corporate performance through an enhanced relative cost position.

Finally, portfolio analysis is essentially a medium term to long term strategic planning technique. Any analysis making use of this technique should, where possible, be more than a mere cross sectional analysis. However, the inclusion of an acceptable temporal dimension is severely limited once again by data availability.

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33. It should be noted that the anticipated variation in these attributes between high and low growth markets makes use of the ceteris paribus assumption. That is, only one attribute is allowed to vary in a single analysis. If this assumption is dropped the number of possible effects on the variable under consideration becomes unmanageable with the result that no specific hypotheses can be formulated of course, when an hypothesis is ultimately tested the validity of the ceteris paribus assumption is immediately revealed.
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CHAPTER 3

MARKET SHARE AND ECONOMIC PERFORMANCE:

LEARNING AND EXPERIENCE EFFECTS

C O N T E N T S

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3.1. INTRODUCTION

The purpose of this chapter is to attempt to justify the previously assumed relationship between relative market share and financial performance. This relationship forms the basis of the B.C.G. growth/share portfolio matrix which was the subject of investigation in chapter 2.

Learning and experience curves are the subject of much interest to strategists because these curves both reflect and predict unit cost structures within whole industries and industry segments. As such they are particularly important planning devices for those companies primarily pursuing cost leadership competitive strategies. While learning and experience are not found in all industries, nor are they the natural result of quantity achievements, they would appear to be fairly widespread.

3.2. THE NATURE OF LEARNING AND EXPERIENCE CURVES

Improvements in efficiency as a result of task repetition is a commonly accepted operations principle as Hirschman explains:

"Practice makes perfect. A thing can always be done better not only the second time but each succeeding time by trying. This everybody knows". (1)

This common principle of learning, that is, the improvement of performance through experience, has been both observed and measured in a large number of industries over a long period of time. (2) The pattern of improvement in performance is, in fact, regular enough to enable management to use this principle

as a predictive tool. In other words, as cumulative output increases, so unit cost falls by a measurable and predictable amount.

Originally this phenomenon was thought to apply only to the labour portion of total manufacturing costs and as such was first used as a quantitative planning tool called the Learning Curve (3) This curve is an expression of the relationship between cumulative output and the unit cost of that output. It is usually expressed in terms of the percentage cost reduction resulting from the doubling of cumulative output. For example, analysis of aircraft assembly shows the operation of an 80% learning curve. That is, as output (aircraft assembly) doubles so the cost of assembly is reduced to 80% of the original cost per unit.

It is now known that the learning curve, or progress ratio as it is alternatively termed, is applicable to a far broader range of activities than manufacturing alone. These activities include areas such as general administration, marketing, sales, purchasing and so on. This broader relationship between costs and learning is commonly termed the experience effect and is illustrated by means of the experience curve. (4) A typical experience curve of 80% plotted on arithmetic scales is shown in Figure 3.1. Plotted on log-log scales the experience curve is a straight line, as shown in Figure 3.2.

FIGURE 3.1

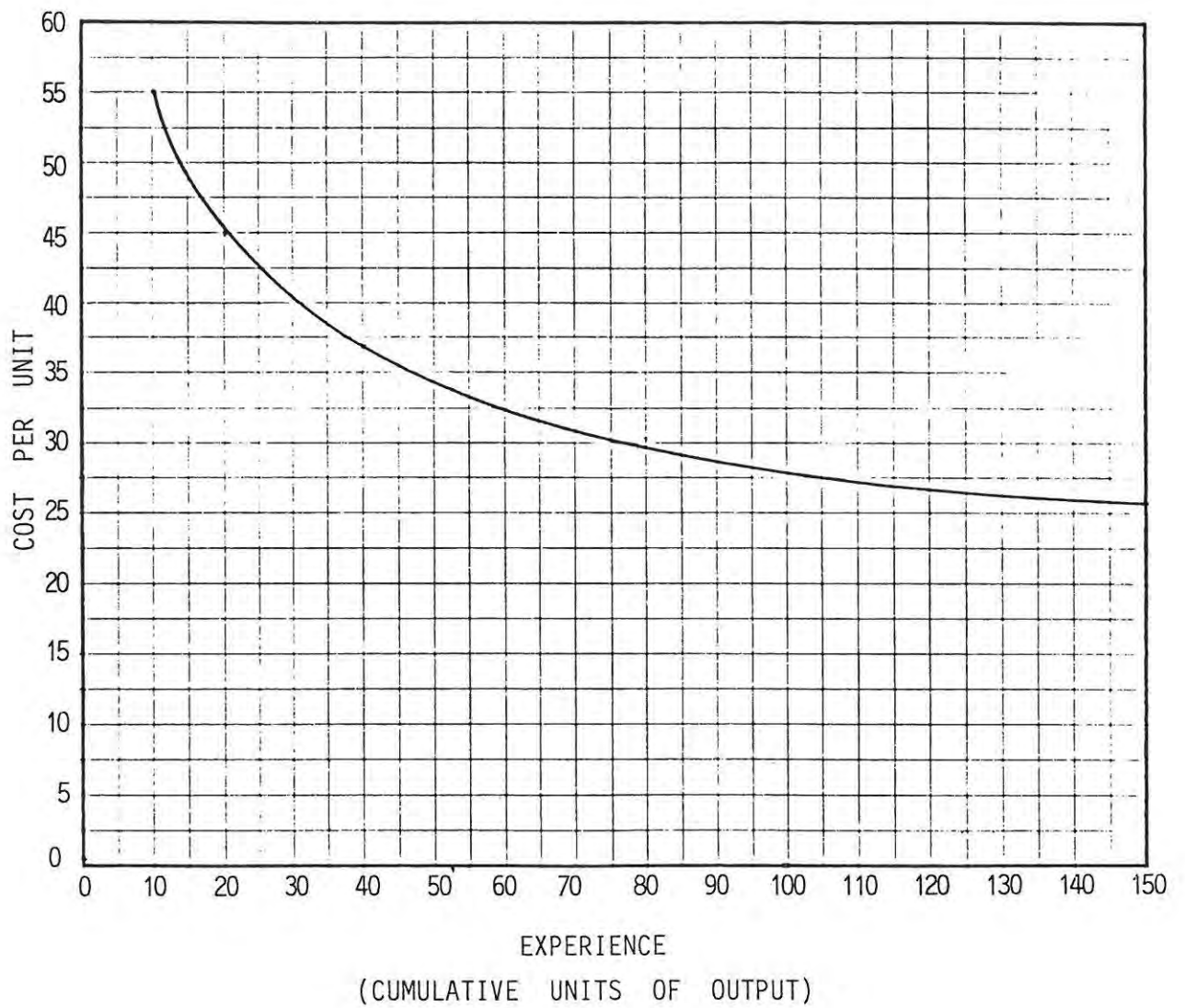
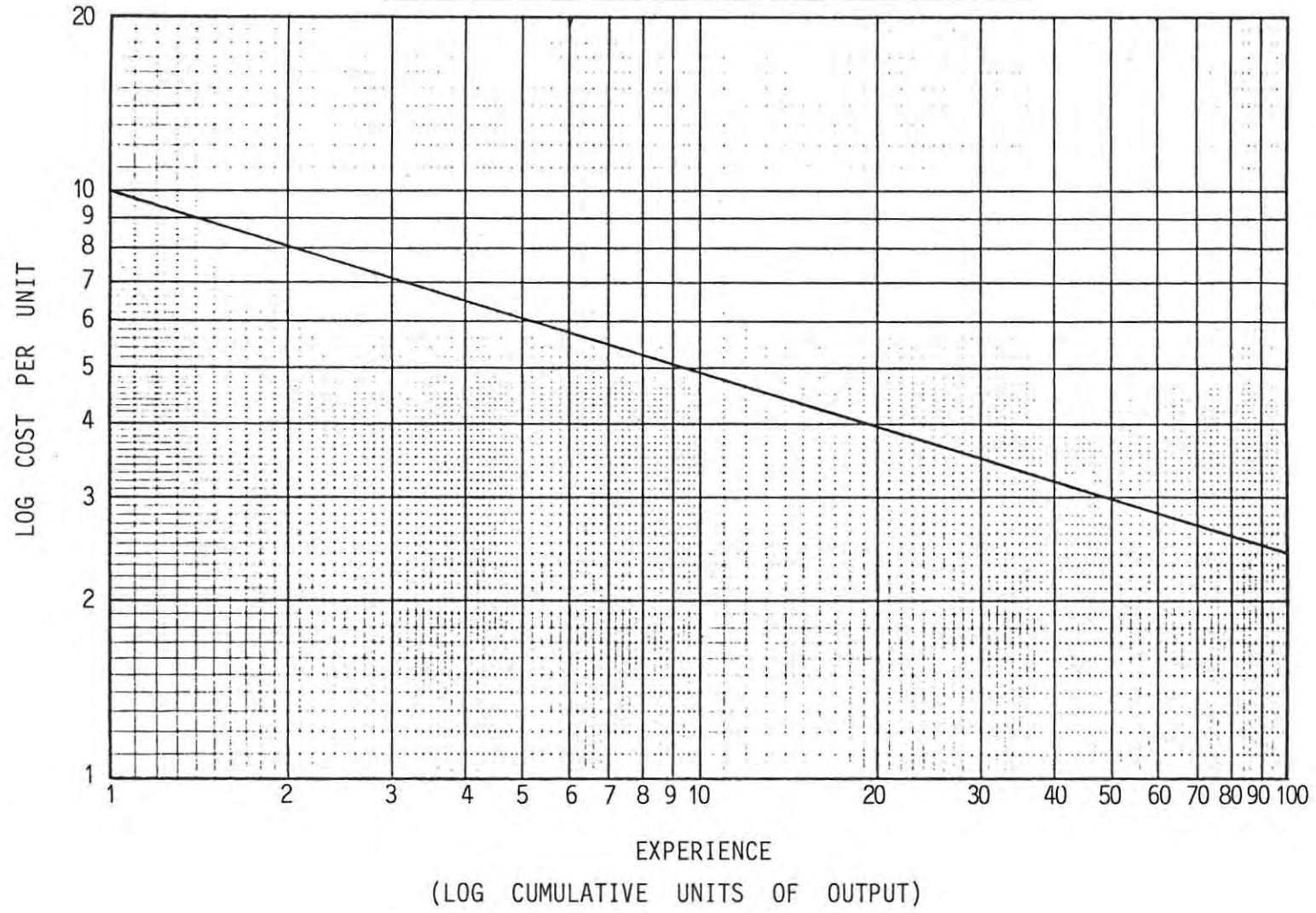
AN 80% EXPERIENCE CURVE ON ARITHMETIC SCALES

FIGURE 3.2

AN 80% EXPERIENCE CURVE ON LOG-LOG SCALES



The formula for the experience curve is

$$C_q = C_n (q/n)^{-b}$$

Where

q = the experience in terms of cumulative production to date;

n = the experience in terms of cumulative production at an earlier date;

C_q = the inflation adjusted cost of unit q;

C_n = the inflation adjusted cost of unit n;

b = a constant exponent which depends on the rate of learning (See Table 3.1). The value of b is obtained using the following formula:

$$b = \frac{\log \text{ Experience Curve}/100}{\log 2}$$

TABLE 3.1

EXPONENTIAL VALUES FOR VARIOUS EXPERIENCE CURVES

Experience Curve	Exponential Value	Experience Curve	Exponential Value
100%	0,000	74	0,434
99	0,015	73	0,454
98	0,029	72	0,474
97	0,044	71	0,494
96	0,059	70	0,515
95	0,074	69	0,535
94	0,089	68	0,556
93	0,105	67	0,578
92	0,120	66	0,599
91	0,136	65	0,621
90	0,152	64	0,644
89	0,168	63	0,667
88	0,184	62	0,690
87	0,201	61	0,713
86	0,218	60	0,737
85	0,234	59	0,761
84	0,252	58	0,786
83	0,269	57	0,811
82	0,286	56	0,837
81	0,304	55	0,862
80	0,322	54	0,889
79	0,340	53	0,916
78	0,358	52	0,943
77	0,377	51	0,971
76	0,396	50	1,000
75	0,415		

3.3. VARIATIONS IN THE SHAPE OF EXPERIENCE CURVES

While the general form of the experience curve is clearly illustrated in Figures 3.1 and 3.2, under certain conditions the shape of the curve can vary considerably. There are a number of possible causes for these variations.

- 3.3.1. In the first instance, if learning takes place through repetition of essentially the identical task or problem, then it is subject to significant diminishing returns as Arrow points out:

"There is an equilibrium response pattern for any given stimulus, towards which the behaviour of the learner tends with repetition. To have steadily increasing performance, then, implies that the stimulus situation must themselves be steadily evolving rather than merely repeating".
(5)

The implications of this relationship are that in those situations where learning occurs through repetition of identical functions or activities, while the initial learning rate may be high, the experience curve as a whole will tend to be flatter than when more stimulating conditions occur. For this reason some authorities (6) prefer to use cumulative gross investment as an index of experience rather than cumulative output. The rationale for using the former measure is that the addition of capital stock changes the environment within which learning takes place, so that the learner is continually presented with new stimuli. As a result learning does not gradually approach equilibrium behaviour but rather there is a steady rate of growth of productivity.

- 3.3.2. A second cause of variation from the standard experience curve shape is differences in the proportion of labour in various activities. Only labour can learn, therefore, the greater the proportion of labour in any activity the steeper the learning curve will be. By the same token, those activities which are machine paced leave no opportunity for learning to occur. One would expect, in the light of this fact, that economies characterised by labour intensive industries would stand to benefit more from the experience effect than where capital intensive production prevails. (7) This possibility must, of course, be balanced against the fact that the quality of labour, as opposed to mere quantity, is certain to be of importance. Where the workforce is largely traditional, steeped in ancient cultural customs or generally uneducated, learning should logically occur at a correspondingly slower rate.
- 3.3.3. A third influencing factor on the shape of the experience curve is the structure of the work being performed. Generally speaking work can be divided into three distinct categories according to structure as shown in Table 3.2.

TABLE 3.2

THE STRUCTURE OF WORK

Discrete Projects: This type of work is characterised by a definite and clear beginning, some form of intermediate activity, and a definite end.

EXAMPLES: New plant start-up; contracting with a supplier for major office purchases; installing a computerised management information system; entering a diversification program by acquiring another company; launching a new product where no formulae can be applied.

Recurring Activity Cycles: Cycles of activity are repeated without major change in structure, yet each cycle has a new beginning, intermediate phases and an end, and each is patterned after the previous one.

EXAMPLES: Developing an annual budget; using a formularised approach to advertising program development; the compilation of weekly, quarterly, annual reports; filing tax returns.

Continuous Flow: This type of work has no beginning and no end. It involves more or less steady and repetitive performance - a quasi stationary equilibrium.

EXAMPLES: Assembly line production systems; filing systems, packaging and despatch of goods.

SOURCE: Adapted from R R BLAKE and J S MOUTON

Making Experience Work . New York, McGraw Hill,
1978. Page 6.

Within each of these categories exists a different potential for learning, hence it is important to determine which category best fits the type of work being analysed.

Discrete project type work can be considered as a complete package. It is a unit with a definite beginning and end. No two packages are the same although they may possess similar characteristics. Due to the fact that each project has a character of its own, the handling of one project cannot be used as a guide on how to handle another in the future. As a result a very limited potential for learning exists with this type of work.

Recurring activity cycles consist of a sequence of work which repeats its main features. The work may often appear to be a continuous flow when there is little or no break to mark the end of one cycle and the beginning of the next. The amount of learning which can take place with this type of work is closely related to the rapidity with which the cycles reoccur; the more frequent the reoccurrence the greater the potential for learning.

Work of a continuous flow nature is characterised by repetition of the same tasks at a similar rate over any given time period. By nature, this type of work contains the greatest potential for learning to occur.

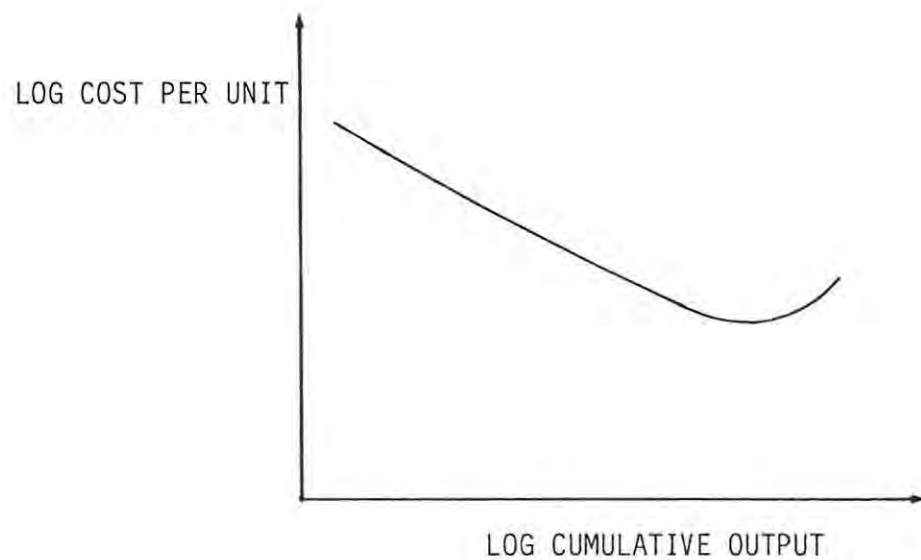
Sections 3.3.1 to 3.3.3 above have outlined some important factors which influence the shape of the experience curve. Further to these factors Hirschman has isolated three situations which will give rise to experience curves of a specific shape (8). These are discussed below (9).

3.3.4. The "Toe up" curve

This is associated solely with the labour component of a manufacturing operation and occurs at the end of a production run. The closing out operations occurring at this time are invariably far less efficient than those in the middle of the run and hence unit costs increase. (See Figure 3.3)

FIGURE 3.3

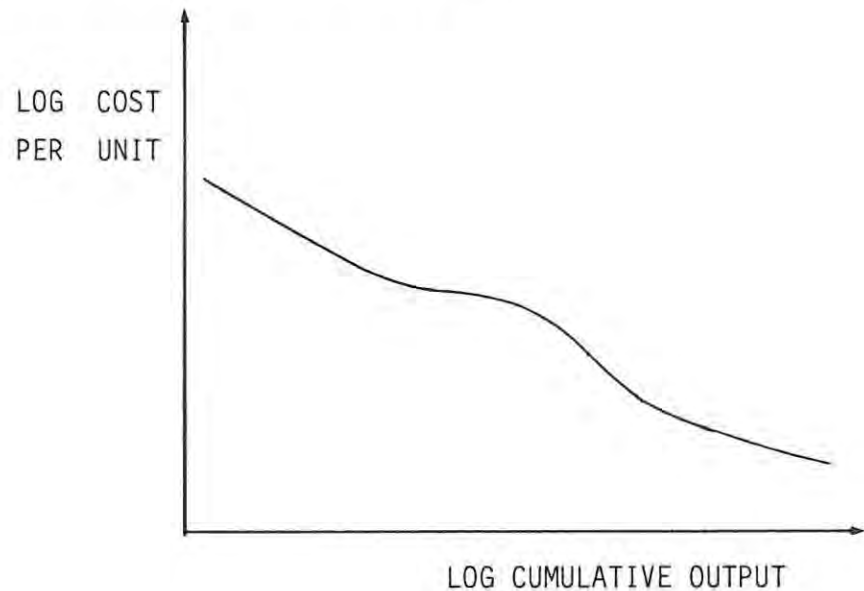
THE "TOE UP" EXPERIENCE CURVE



3.3.5. The Scalloped Curve

This curve is characterised by a substantial increase in cost per unit somewhere between the initial and closing out operations (See Figure 3.4).

FIGURE 3.4

THE SCALLOPED EXPERIENCE CURVE

Such a situation may arise where an increase in capacity is necessary and can only be accomplished by the purchase and installation of extensive new plant and equipment. Due to possible indivisibility of factor inputs the new plant may not be able to run at full capacity, hence the increase in unit cost. To add to this there will logically be a costly adjustment period during which any new capital investment addition is being fully integrated with the rest of the system.

On the other hand, whenever there is a lengthy delay in operations, such as a Christmas shutdown for example, disruptions and forgetting occurs, which give rise to higher unit costs after resumption of operations. In this case it

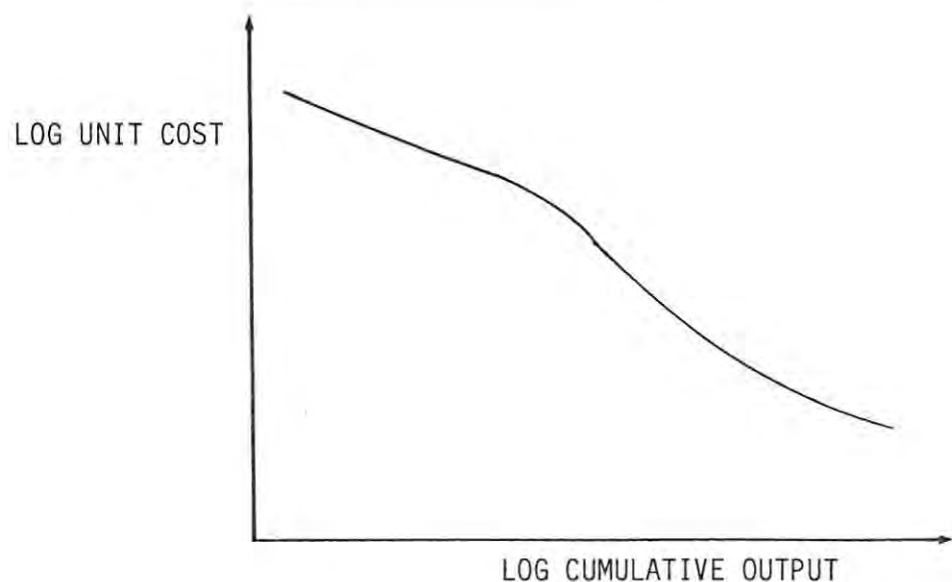
may, however, be argued that, in fact, a new experience curve is operative - one which cannot be considered as an extension of the previous curve.

3.3.6. The Kinked Curve

A kinked experience curve could conceivably arise where labour productivity is partially dependent on capital equipment. If improved equipment is introduced into the operation, learning and productivity must increase. An effective training campaign would logically have the same effect. (See Figure 3.5)

FIGURE 3.5

THE KINKED EXPERIENCE CURVE



Having analysed the nature of experience curves it is now possible to study those situations or activities within the business which give rise to its occurrence. This is done in the following section.

3.4. SOURCES OF THE EXPERIENCE EFFECT

If the experience curve is to be put to use in strategic planning it is necessary to isolate those activities or situations which give rise to its occurrence. Abell and Hammond (10) have determined seven sources of the experience effect. Each of these is discussed below.

3.4.1. Labour Efficiency

The contribution of labour to the experience effect is made through the learning curve as Abell and Hammond explain:

"As workers repeat a particular production task they become more dextrous and learn improvements and short cuts which increase their collective efficiency. The greater the number of worker paced operations, the greater the amount of learning which can accrue with experience. (11)

The important point here is not whether the activity itself is labour or capital intensive but rather whether labour or capital controls the pace of production. If production is totally paced by machinery, which need not necessarily imply capital intensiveness, then learning cannot occur because the efficiency of labour is dictated by capital.

The learning effect is composed of two parts. Firstly, there is an improvement in the efficiency of labour, and this improvement is self initiated. Secondly, there is the increased efficiency of the labour unit due to improvements in the performance of other units related to the task. This improvement initiated by others would consist of functions

such as maintenance, administration, sales, marketing and supervision.

3.4.2. Work Specialization and Methods Improvements

Specialization leads to greater proficiency at a given task as the worker becomes more au fait with his part of the task than he could be with the entire task. Improvements in work methods will also lead to greater efficiency.

3.4.3. New Production Processes

Innovating existing processes can lead to a substantial decrease in costs, especially in capital intensive industries.

3.4.4. Getting Better Performance from Production Equipment

When production equipment is first installed its output capacity is often underestimated. Experience may reveal innovative ways of increasing output thus reducing unit costs further.

3.4.5. Changes in the Resource Mix

With experience an entrepreneur can often use less costly resources to achieve exactly the same output. By using less skilled workers, negotiating more favourable contracts with suppliers and so on, the unit cost of production can be significantly decreased.

3.4.6. Product Standardisation

Standardising the product reduces the number of tasks which

have to be performed, thus increasing task repetition and encouraging learning. Standardisation must, however, be balanced against the marketing considerations of offering an attractive product range. Modularisation can often help to overcome this problem. For example, by combining different modules in different ways a large variety of moderately differentiated products can be assembled.

3.4.7. Product Redesign

Experience with a product will give both the producer and consumer a better idea of what is ideally required of that product in terms of appearance and performance. This will enable the manufacturer to save on materials, or use less costly ones, while at the same time matching the product more closely to the consumers needs.

With respect to these sources of the experience effect it is necessary to ensure that, in all cases, real and not nominal cost is analysed and hence careful attention must be paid both to general inflation levels and to cost increases within the activities required to create and market a product or service. In addition to this it is important to bear in mind the fact that the experience effect is not only concerned with real cost reductions as cumulative output increases as Abell and Hammond explain:

"The experience effect can be thought of as making an equivalent product for less cost, a product of greater value for the same cost, or a combination of the two". (12)

It is in this broader cost/benefit/value sense that the experience effect is most usefully analysed.

It should also be stressed that cost reductions due to experience do not arise as a matter of course. Rather "... they are the result of substantial concerted effort to lower costs. Left unmanaged, costs rise". (13) In general, there are five exogenous factors which can have a profound impact on the experience effect through its cost dimension.

3.4.8. The Quality of Management

Obviously, poor quality management will lead to a lessening of the experience effect. Often the quality of management is strongly influenced by the nature of competition in the industry concerned. By necessity, the stronger the competition the better management quality tends to be.

3.4.9. The Quality of Labour

In the same way as poor quality management can be detrimental to the experience effect, poor quality labour can lead to a flattening of the experience curve.

3.4.10. The Stability of the Workforce

Where there is a high labour turnover, learning is hampered as disruptions occur during the orientation period of new workers, regardless of the level at which they are employed. The reason for this is provided by Rosen who states that:

"The phenomena of learning by experience suggests that production knowledge is at least partially acquired through the production process itself, (and that thought is pursued here). Individuals responsible for decision making within firms can be thought of as self producers of their knowledge, which is specific to themselves and not freely transferrable to others". (14)

The individual nature of experience thus dictates that during any employee orientation period it is unlikely that cost reductions will be forthcoming, regardless of the nature of the work involved.

3.4.11. Compensation and Employee Relations

Where either compensation or employee relations is perceived as being poor by employees or management, there is little incentive for efficiency or improvement, making cost reductions unlikely.

3.4.12. The Company's choice of Environment

Each organisation's total environment is composed of many interrelated elements such as suppliers, distributors, competitors, government, social pressure groups, inventors and innovators, trade unions, and so on. Varying levels of interaction will take place between the company and each element of the environment. The company's total experience will be strongly influenced by both the quality and quantity of interactions with environmental elements. Norman clarifies this as follows:

"..... a company's ability to learn should increase to the extent it is able to augment its pool of available variety, in other words as far as it can increase, for example, the set of impulses, demands and ideas to which it is exposed". (15)

In this respect it is also important that the company's organisation structure be such that it enables effective interaction and response between the company and the desired elements in the environment.

3.5. THE STRATEGIC IMPLICATIONS OF THE EXPERIENCE EFFECT

The acknowledgement of the existence of the experience effect in any particular industry gives rise to a number of strategic options which the individual organisation within that industry can pursue in order to improve its competitive position. Obviously the extent to which any of these strategies is considered desirable will depend on the degree of experience effect operative in the particular industry concerned.

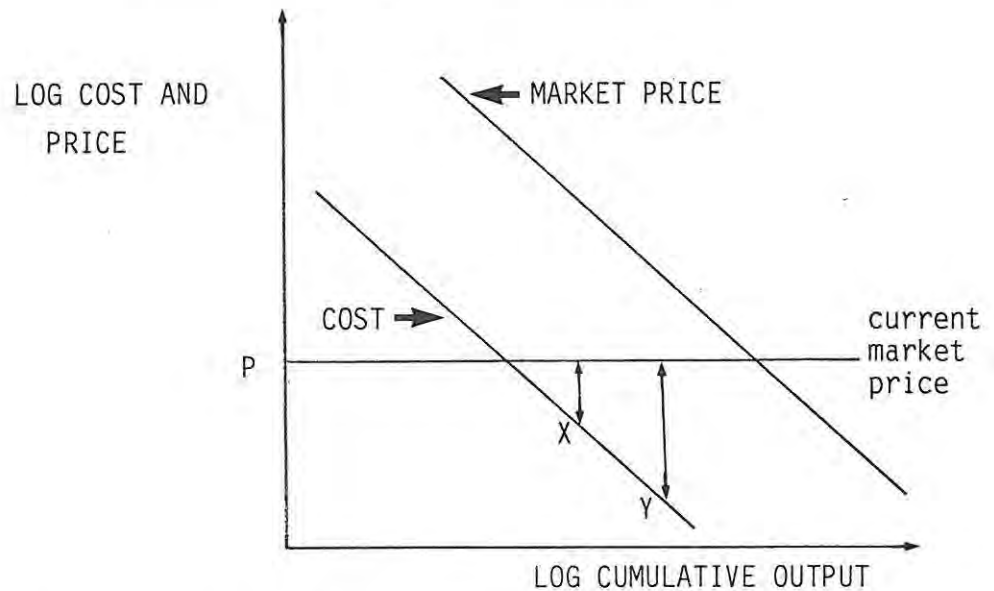
Where the experience effect is significant the company should follow a vigorous market share building strategy. Such a strategy would give rise to a greater cumulative output than competition which would in turn result in lower unit cost. With this cost advantage the firm can take one of two courses of action to further improve its competitive position, namely sell at the current market price or sell below the current market price. These options are discussed below. (16)

3.5.1. Sell at the Current Market Price

By selling the product at the current market price, the gross profit earned per unit sold will be greater than that earned by competitors. (See Figure 3.6) This can be used for a number of purposes such as the further improvement of the marketing mix resulting in greater cumulative output, or for new product development to ensure future earnings.

FIGURE 3.6

PRICING AT THE CURRENT MARKET LEVEL



SOURCE: Adapted from Abell and Hammond. op cit.

Figure 6. "Profitability advantages of Greater Experience". Page 117.

Figure 3.6 illustrates the case where Y has greater experience than X and hence has a lower unit cost of output. By pricing

at the current market price, P , Y has a gross profit margin of YP , considerably larger than that of competitor X whose gross profit margin is XP .

3.5.2. Sell below the Current Market Price

While there are undoubtedly substantial benefits to be derived from selling the product at the current market price, it may, in certain circumstances, be more advisable to sell below this price thus actually reducing gross profit margins. By undercutting the market price it may be possible to eliminate marginal producers from the market thus reinforcing ones own long run market position. Also, selling at the current market price may earn competitors enough gross profit per unit to launch a counter offensive which cannot be matched quickly enough to prevent damage to ones own competitive position.

There are, however, certain factors which should be taken into account before a price cutting strategy is followed.

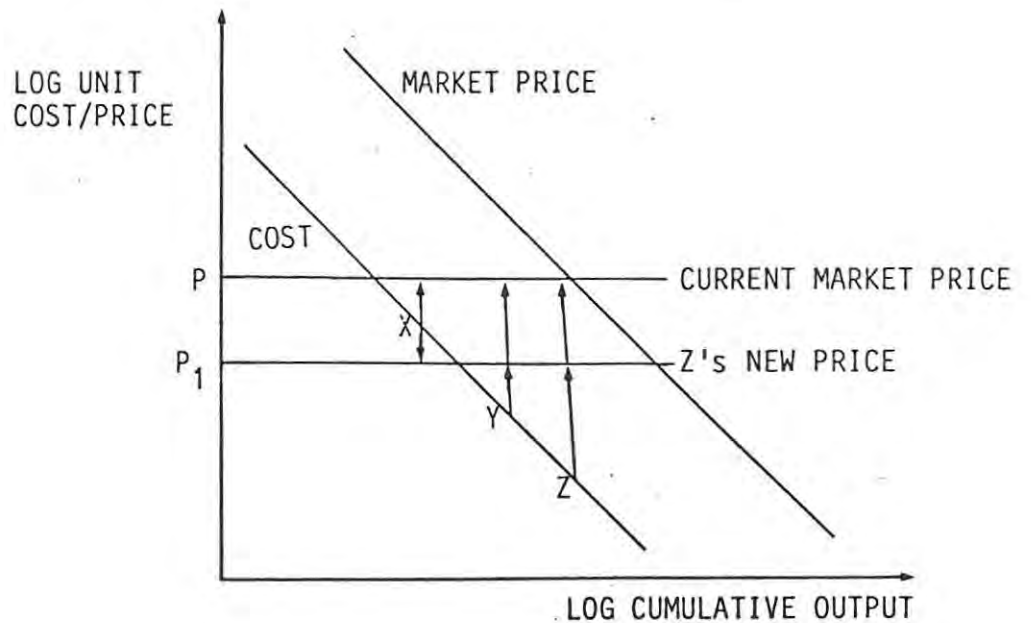
- 3.5.2.1. A higher gross profit margin - achieved by selling at the market price - may be necessary to enable the support of a new product introduction or some existing product with a favourable long run potential. If some positive cash flow is not forthcoming to support such products they may have to be dropped from the portfolio, to the long run detriment of the company.

- 3.5.2.2. Where there are a few large competitors oligopolistic pricing conditions may occur. In this case should any one company reduce its price below the market level, competition will follow suit with the result that none of them benefit to any significant degree. (17) Conversely, should any one competitor raise his price above the market level, no competition will follow suit, with the result that demand for his product falls drastically and his new position becomes even less acceptable than the previous one.

Figure 3.7 illustrates the effect of the most experienced competitor selling his product at below the market price.

FIGURE 3.7

PRICING BELOW THE CURRENT MARKET LEVEL



Before any price changes are instituted all three products make some gross profit per unit. (XP , YP and ZP respectively). Producer Z , being the most experienced and, therefore, a price leader, reduces his price from P to P_1 . Producer X now makes a loss of XP_1 per unit and in the long run will be forced out of the market. Producer Y 's gross profit per unit is cut from YP to YP_1 and he becomes a marginal member of the industry. Producer Z has, through his actions, reduced his gross profit per unit (ZP to ZP_1) but has effectively enhanced his position in the market by eliminating one competitor X and reducing another's (Y) gross profit per unit by a substantially greater proportion than his own.

This example serves to illustrate the importance of the market leader in determining the character of competition within the industry as the following emphasises:

"The dominant producer can greatly influence industry profitability. The rate of decline of competitors costs must at least keep pace with the leader if they are to maintain profitability. If their costs decrease more slowly, either because they are pursuing cost reductions less aggressively or are growing more slowly than the leader, then their profits will eventually disappear, thus eliminating them from the market". (18)

Not only is it important to be the dominant producer, but market leadership should be attained as early as possible. A perfunctory analysis of the nature of the relationship between cumulative output and unit cost (see Figure 3.1) shows the importance of the early units of output in the overall decrease of unit costs.

Both the pricing options discussed above presuppose that the company is striving for cost leadership through greater market share. While market share building strategies make sound economic sense in most cases, it would be wise only to follow such a strategy with discretion as Fruhan points out:

"Since profit can jump impressively in many industries as a company's position in the market share pecking order advances, market share battles are often waged with energy; but unfortunately, in spite of the tremendous stakes involved, companies tend to launch their campaigns for building market share without much foresight.

Specifically they tend to ignore three basic questions:

Question 1: Does the company have the financial resources necessary to win - and then support - the level of sales implied by its market share target; or, if it does not have these resources, can it acquire them at an acceptable cost?

Question 2: Will the company find itself in a viable position if its drive for an expanded market share should be thwarted - by antitrust action, say - before it has reached its market share target?

Question 3: Will regulatory authorities permit the company to achieve its objective with the strategy it has chosen to follow?" (19)

It is, therefore, incumbent upon the strategist to make a thorough analysis of the company's resources, its strengths and weaknesses and its sociopolitical, competitive, legal and technological environments, both now and anticipated, before any such market share building strategy is pursued. Also, because a company cannot be market leader with all its products the strategist must decide which will be most profitable as leaders and which can play some useful role as followers.

Hirschmann (20) points out some further practical applications of the experience effect.

Firstly, if the nature of the environment remains the same and experience has been occurring, there is good reason to believe that it will continue occurring in the future. If this is the case then it would be prudent for management to make provision for such when preparing plans, forecasts or budgets for any future time period.

Secondly, management must take serious cognisance of the experience effect when deciding on the allocation of resources between replacing or modernising existing plant and equipment. Existing plant and equipment may have reached the limit of its capacity to contribute to the experience effect. Bottlenecks have been cleared and systems and procedures are running at near optimum efficiency. In this case the decision to replace plant and equipment may be wise as this would promote new learning.

Finally, management should attempt to refine all systems and procedures in order to improve operating efficiency. By analysing past performance reasonable goals can be set, making allowance for learning, which "can constitute a real challenge to a group's capacity to meet them". (21) In this respect, however, it must be remembered, as stressed in chapter 1, that efficiency must not constitute the major endeavour of the company. It is far more important, in terms of long run survival and profitability, to be

strategically effective than operationally efficient.

3.6. CONCLUSIONS

It would appear that the relationship between cumulative output and decreasing unit costs is, with necessary qualifications, an indisputable one. Not only does the relationship exist, but it is reliable, quantifiable and applies over a wide range of corporate activities.

The nature of the relationship between unit costs and cumulative output is such that the initial units of output are of vital importance. Competitive advantage is gained more easily immediately after the inception of the curve where the cost/volume relationship is most favourable. As a company progresses down the experience curve the output required to bring about significant cost reductions increases exponentially. This observation is borne out by Buzzel who comments in an analysis of the PIMS data base that:

"Cost differentials among competitors tend to diminish as a market matures, presumably because smaller competitors are able to imitate market leaders' processes and equipment". (23)

In other words, as cumulative industry output increases (markets mature) the advantages accruing to the market leader, in terms of experience, are reduced.

Ultimately a stage will be reached where the benefits of further cost reduction must be weighted against other marketing considerations such as product quality, innovation,

product performance and the benefits of broadening the product range. At this point any effort to pursue cost reduction at the expense of other marketing considerations is illogical and will lead to "reduced flexibility, a loss of innovative capability and higher overhead". (24) In fact, any attempt to focus solely on cost reducing strategies must be explicitly countered by the company's flexibility objective which should be designed to ensure both the maintenance of liquidity in the company and a reasonably diversified pattern of product market investments. (25)

The learning and experience effects do not automatically give rise to unit cost reductions. Left unmanaged, costs rise. Hence the role played by effective management in the process of reducing costs must not be underestimated.

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1. HIRSCHMANN, W.B. "Profit From the Learning Curve". Harvard Business Review, January - February 1964. Page 116.
2. See, for example: ABELL, D.F. & HAMMOND, J.S. Strategic Market Planning, Englewood Cliffs, New Jersey, Prentice Hall, 1979. Page 106.
3. ibid., Page 106 - 107.
4. For convenience the term "experience curve" will be used henceforth to cover all expressions of the relationship between unit cost and cumulative output including those which normally represent the learning curve. However, the term "learning" which represents an important process in the gaining of experience will be used where necessary.
5. ARROW, K.J. "The Economic Implications of Learning By Doing". Review of Economic Studies, Vol. 29, 1961. Page 155 - 156.
6. ibid., Page 157.
7. This does not mean that the unit cost of items manufactured in labour intensive economies will be less than similar items manufactured with capital intensive facilities. It only implies that unit cost will fall at a slower rate in the latter case, while in absolute terms the unit cost itself may be significantly lower.
8. HIRSCHMANN, W.B. op cit., Page 116 - 119
9. Although these conditions are referred to by Hirschmann as 'learning curves', they are, of course, also experience curves.
10. ABELL, D.F. & HAMMOND, J.S. op cit., Page 112 - 113.
11. ibid., Page 112.
12. ibid., Page 113.
13. ibid., Page 113.

14. ROSEN, S. "Learning By Experience as Joint Production". Quarterly Journal of Economics, Vol. 86, August 1972. Page 366.
15. NORMANN, R. Management for Growth, New York, John Wiley & Sons, 1977. Page 83.
16. While these pricing options are somewhat simplistic they are tailor made for present purposes in that they clearly illustrate the strategic significance of the experience effect. For information on alternative pricing strategies see: DOLAN, R.J. & JEULAND, A.P. "Experience Curves & Dynamic Demand Models: Implications for Optimal Pricing Strategies". Journal of Marketing, Vol. 45, 1981. Page 52 - 62.
17. This situation presupposes that no single company has any significant cost advantage over the others.
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CHAPTER 4

MARKET SHARE AND ECONOMIC PERFORMANCE:

ECONOMIES OF SCALE

C O N T E N T S

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4.1. INTRODUCTION

The subject of scale economies and minimum optimal scale has been both a substantial and integral part of economic theory and research for many decades. There are, undoubtedly, many thousands of volumes devoted to the discussion of the subject, a thorough analysis of which would present a formidable, if not impossible task. For the purposes of this research it is necessary to survey the major authors in this field and briefly discuss the nature and cause of economies of scale in order to draw some conclusions concerning the conditions required for their existence. While on the fringes of the subject, there are many continuing disputes, at the core there is general agreement on a vast number of issues. It is these issues which are important here.

Economies of scale can, and have, been studied from many different viewpoints but always the central issue has been that they allow "relatively large producers to manufacture and market their products at lower average cost per unit than relatively small producers" (1) in a particular industry. In his pioneering work on the subject first published in 1931, Robinson (2) points out that economies of scale arise from a number of sources and that they are not only limited to the production process itself. In addition to this, these economies can be divided into three categories.

1. Product specific economies. These are economies associated with the output of a single product.
2. Plant specific economies. These are economies associated with the total volume of output, calculated by taking into account all products produced at a single plant.
3. Multi-plant economies. These are economies associated with the operation of more than one plant by a single firm.

These issues will be the subject of the rest of this chapter.

4.2. PRODUCT SPECIFIC ECONOMIES OF SCALE

In analysing product specific economies Scherer uses the highly illustrative example of the manufacture of ball bearings.

"If only a few bearings are to be custom made the ring machining will be done on general purpose lathes by a skilled operator who hand positions the stock and tools and makes measurements for each cut. With this method, machining a single ring requires from five minutes to more than an hour, depending upon the parts size and complexity and the operators skill. If a sizeable batch is to be produced, a more specialised automatic screw machine will be used instead. Once it is loaded with a steel tube it automatically feeds the tube, sets the tools and adjusts its speed to make the necessary cuts, and spits out the machined parts into a hopper at a rate of from 80 to 140 parts per hour. A substantial saving of machine running and operator attendance time per unit is achieved, but setting up the screw machine to perform these operations takes about eight hours.

If only a hundred bearing rings are to be made, set up time greatly exceeds total running time, and it may be cheaper to do the job on an ordinary lathe. As the number of parts made increases, set up time per unit of running time falls - e.g. to 88 percent of running time with 1 000 rings and 9 percent with 10 000 rings. The larger the batch the lower the average cost (i.e. set up plus running time per unit) will be. Analogous savings come with higher volume at other stages of the bearing making process - e.g. in grinding, groove honing, cage stamping, and assembly. If very large quantities (i.e. a million per year) of a single bearing design can be sold, a still different production approach is likely to be chosen. Even more specialized, higher speed machines are used, and parts are transferred automatically to the next processing stage in a continuous straight-line flow. Computer guided devices then match completed inner and outer rings with balls to attain the desired tolerances; and the parts are assembled, greased and packaged without any human intervention. With such an automated, straight line bearing production approach unit costs may be 30 to 50 percent lower than with medium volume batch methods. But in order to realise these savings the production line must be kept running without change-over two shifts per day, and this requires a large and continuous volume." (3)

This example clearly illustrates how economies of scale can be achieved at the single product level and further serves to identify the level of demand for that product as the most important factor influencing the viability of high volume, highly automated production processes. The benefits accruing from economies of scale at the single product level often encourage the limiting of product lines. While this may result in a lower cost per unit of output it may also lead to heavy penalties being placed on the producer by customers who are unsatisfied with the restricted market offering. Achieving some balance between economies of scale and product range (4) is in fact an important strategic issue.

Management cannot always seek the lowest total cost solution, because this solution "leaves out the dimensions of time and customer satisfaction, which must usually be considered".

(5)

Therefore, in attempting to determine if economies of scale are achievable at the product specific level it is a prerequisite that some fairly accurate estimate can be made of demand for the product concerned. Where demand can be forecasted it is a relatively simple matter to calculate the optimum production run (in units) using the following formula:-

$$Q = \sqrt{\frac{2 D F}{h C}}$$

Where:-

Q = the optimum production run in units;

D = the quantity demanded per unit of time;

F = the fixed cost associated with setting up a production run;

C = the variable cost of production per unit (assumed to be constant)

h = inventory holding costs, per unit of time.

(6)

This equation serves to highlight an important relationship. The size of the optimal production run varies less than proportionately with demand, that is, with the square root of demand. This means that relatively large variations in demand may not, in fact, have a significant impact on the optimal production run. Also, the optimal production run decreases with increases

in the cost of holding finished inventory.

Of course, this does not mean that demand plays a relatively unimportant role in the achievement of economies of scale at the product specific level, as Scherer et al explains:

"The problem of achieving good sized production runs are especially acute in small nations like Sweden and Canada, where firms appear to be not much more specialized than their large nation counterparts and where characteristically higher seller concentration, and hence larger leading-firm shares of a products total demand, is not sufficient to compensate for the small overall quantity of demand. Thus, Canadian textile makers claimed that their unit costs on style-sensitive dress goods and decorative fabrics were 20 to 30 percent higher than the costs of comparable U S manufacturers, primarily because of the tenfold difference in market size and the attenuated but still substantial differences in lot size. Paint manufacturers operating in both national markets reported that average batch sizes in Canada were one-fifth to one-half those experienced in the United States. Similar average run length differences were cited by Canadian glass bottle manufacturers". (7)

These findings will be of obvious significance when analysing potential economies of scale at the product specific level in South Africa. It may be apt, however, at this stage, to point out that, in strategic terms (at the strategic level of a single company) economies of scale are only important in the relative sense. Thus, while it may be true to say that South African manufacturers achieve lower product specific economies of scale than their counterparts operating under more favourable demand conditions, this does not negate the validity of a single South African manufacturer attempting to gain greater economies of scale than his local

competitors in order to achieve some local cost advantage. In strategic terms this manufacturer, by achieving greater economies of scale than his relevant competition, gains a relative advantage in three distinct ways.

Firstly, because his production runs are longer and more standardised than his competitors he may be able to employ a completely different production technique, as in the manufacture of ball bearings, and as a result gain substantial unit cost savings.

Secondly, due to the fact that under these conditions cumulative output must be increasing at a more rapid rate than competitors, this manufacturer should, ceteris paribus, further decrease his unit cost of production through 'dynamic' economies of scale - the effects of learning and experience. (8)

Thirdly, if long production runs can be set up "managers and engineers can justify spending much more time and effort developing superior production layouts and methods than they can for short-run products". (9) As a result the smallest details of the production process can receive attention and the final output is highly standardised at near perfection.

It is clear that these product specific scale economies are important in a strategic sense because they help determine the competitiveness of the individual producer in the market. Even so, there is evidence to suggest that they may be the least significant of the three categories of economies of scale.

4.3. PLANT SPECIFIC ECONOMIES OF SCALE

If a plant is considered as an individual processing unit, then the most significant economies of scale occurring at the plant specific level result from expanding the size of this unit, as Levin illustrates with the following example:

"It is well known that for many items of capital equipment the costs of construction and operation increase less rapidly than capacity. In tanks, vessels and furnaces, if the thickness or quality of the materials is not affected, costs vary with respect to the surface area while capacity is a function of volume. Costs thus increase as the two-thirds power of capacity". (10)

While there are limits to this phenomenon, increases in production inputs usually result in a more than proportionate increase in output (in terms of cost per unit).

While many economies of scale are derived in the area of capital investment, such as that described above, there are other areas where the potential for plant specific economies exists.

Firstly, labour costs per unit of output often fall appreciably as output increases. This is largely due to the fact that the labour required to operate and maintain a relatively large unit of plant or machinery is often the same as, or only marginally larger than that required for a unit of smaller capacity.

Another area of plant specific scale economies arises at the level of plant overhead functions. A large plant can make

use of specialised staff in the form of accountants, inventory controllers, security guards and the like. A small plant is often forced to double up on such functions resulting in a relatively poor overall performance. At the management level, every plant must have a manager and his salary can be spread over a larger number of units of output as the plant size increases. Alternatively, at the larger plant better remuneration can be offered resulting in a higher calibre of management. In both cases the unit cost of output should fall.

Bain succinctly summarises the benefits of large scale plants as follows:

"As plants become larger the firms are able to exploit mass production techniques involving the specialization of labour to specific narrow tasks; the use of specialized machinery and other capital equipment which are available only in very large minimum sizes; and the specialization of management and supervisory personnel to narrow and detailed tasks. Exploitation of these opportunities as the plant becomes bigger will result in lower unit costs". (11)

However, these cost reductions only occur up to a point; unit costs do not continually decrease as the size of the plant continuously increases. There is some finite limit beyond which the economies of specialised equipment, labour and management cease to exist and unit cost decreases stop. There are several reasons why such a situation arises, and these can be broadly categorised as follows:

4.3.1. The Limits of Economies of Scale

4.3.1.1. The Limits of Economies of Scale due to Technical Forces

As the size of individual units of plant increases, there is a concomitant increase in stress, strain and friction in the equipment concerned. For example, in the case of turbines where very large units are built "the ends of the blades travel at a speed near to that of sound. At this speed the strains and stresses increase more than proportionately with the capacity of the turbines". (12)

It is usually technically possible to overcome the problems associated with stress, strain and friction in equipment, but this can often only be done at a tremendous cost both in terms of materials and the expertise required. For this reason it is often far more practical to duplicate the plant already in existence rather than build bigger plant.

Another problem arises where, in a single plant, different large scale processes have different optimal output capacities. As a result there is a poor dovetailing of operations and some processes are compelled to run at below (or above) optimum output, hence increasing the unit cost of production.

Also, as plant size increases the flow of materials, and the associated information flows, becomes longer, more complex, and more difficult to control. This ultimately discourages the continual expansion of a specific plant.

4.3.1.2. The Limited of Economies of Scale due to Limited Management Capabilities

The elementary fact that, ceteris paribus, it is more difficult to manage a large plant than a small one has important implications for economies of scale, especially in areas where there is a shortage of suitably competent persons to fill managerial positions. Once a plant has reached the size demanded by equipment and a suitable degree of worker specialisation has been achieved, many companies avoid further expansion of the plant purely on the grounds of managerial limitations. (13)

As plants expand there is a commensurate growth in both the volume and complexity of the decisions top management must make. When this is taken with the fact that such management becomes increasingly divorced from the operations of the company per se, it is logical to assume that sooner or later diminishing returns must set in, as the quality of decisions falls.

"The problem is aggravated when the firm operates in a rapidly changing and uncertain environment, for it is the non-routine decisions associated with change that press most heavily on top managers' capacities".
(14)

Given a changing environment, as plant size increases, the cost of organising and co-ordinating production may also rise more than proportionately. There is a consequent proliferation of middle management which has become the trade mark of bureaucrasies. As the chain of management is extended management becomes less

effective and organisational response slows down, adding to corporate inefficiency.

Scale may also affect the motivation of managers. Companies with a small plant are often faced with the choice of improving efficiency to become competitive or leaving the market. In large plants where economies of scale exist, management does not need to strive for profit maximisation for survival and hence other objectives may increase in priority. Ultimately the result is a higher cost of output.

The extent to which these managerial diseconomies of scale actually come into effect is hotly debated. Modern business systems provide information in its most useful form and complex techniques have been developed and proven to prevent, as far as possible, a poor decision from being made and implemented.

Another factor mitigating in favour of managerial efficiency is the development of the decentralised organisation structure. While this is a separate field of study on its own, suffice it to say for present purposes that the decentralising of responsibility and authority goes a long way towards alleviating the problems associated with bureaucratic, centralised corporate structures. In fact scaling up a plant without making the necessary structural adjustments is courting disaster, as Chandler points out:

"..... growth without structural adjustment can lead only to economic inefficiency. Unless new structures are developed to meet new administrative needs which result from an expansion of a firms activities into new areas, functions, or product lines, the technological, financial and personnel economies of growth and size cannot be realized. Nor can the enlarged resources be employed as profitably as they otherwise might be. Without administrative offices and structure, the individual units within the enterprise (the field units, the departments and the divisions) could undoubtedly operate as efficiently or even more so (in terms of cost per unit and volume of output per worker) as independent units than if they were part of a larger enterprise. Whenever the executives responsible for the firm fail to create the offices and structure necessary to bring together effectively the several administrative offices into a unified whole, they fail to carry out one of their basic economic roles". (15)

4.3.1.3. The Limits of Economies of Scale due to Labour Dissatisfaction

There are a number of labour related factors which could, logically, add to scale diseconomies in the large plant.

As plant size increases so does the number of specialised and repetitive tasks. As a result labour tends to express a decreasing degree of job satisfaction in the large plant, especially as concerns job challenge. Scherer(16)

illustrates this point with a 1972-1973 survey of blue collar workers in the U.S.A. The results of the research are presented in Table 4.1.

TABLE 4.1

JOB SATISFACTION AMONGST BLUE COLLAR WORKS IN THE U.S.A.

ESTABLISHMENT SIZE	INDEX ^X OF WORKER SATISFACTION WITH		
	(1) JOB CHALLENGE	(2) ADEQUACY OF RESOURCES	(3) FINANCIAL REWARDS
LESS THAN 10 EMPLOYEES	3,21	3,39	2,78
10 - 49 EMPLOYEES	3,17	3,43	2,91
50 - 499 EMPLOYEES	2,95	3,28	3,05
500 OR MORE EMPLOYEES	2,79	3,21	3,24

^XThe higher the index value the greater the worker satisfaction

SOURCE: F M SCHERER. "Industrial Structure, Scale Economies and Worker Alienation" in R T Masson and P D Qualls Essays on Industrial Organisation in Honour of Joe S Bain . Cambridge Mass. Bellinger. 1976. Page 109

Scherer interprets his findings in the following way:

"Workers in the largest establishments were less satisfied on the average with the challenge afforded by their jobs and with the adequacy of the physical, informational and managerial resources supporting their work, but they were most satisfied with the pay, fringe benefits and security associated with their jobs". (17)

It would appear, therefore, that in order to compensate for poor perceived job conditions large firms have to offer a wage premium to blue collar workers. As plant size grows, job satisfaction decreases and the wage premium increases ultimately leading to decreasing returns to scale as the positive aspects of scale, with respect to labour, are negated.

A further contributory factor to scale diseconomies is labour relations. The larger the plant becomes the longer the chain of command grows, effectively divorcing management from labour. As the possibility of not understanding or appreciating each others needs increases, so does the likelihood of some unfavourable unilateral action on the part of labour. It is also far easier to incite ill feeling and to gain worker participation in subsequent restrictive practices in a large organisation than in a small one.

The evidence concerning labour related diseconomies of scale is however, by no means conclusive. As Miller indicates:

"In the vast majority of American industries the largest firms have better labour productivity than the remainder of their industry". (18)

Due to the fact that evidence supporting this view is limited while, on the other hand, there is ample support for labour related diseconomies of scale, it would appear, on balance, that the latter view both predominates and is more logically conclusive.

The unique labour conditions existing in South Africa make it difficult to estimate what effect, if any, the above factors will have on economies of scale. It is clear, however, that some modification to the predictions of the theory will be necessary in order to accommodate the South African situation.

4.3.1.4. The Limits of Economies of Scale Due to Selling and Distribution Activities

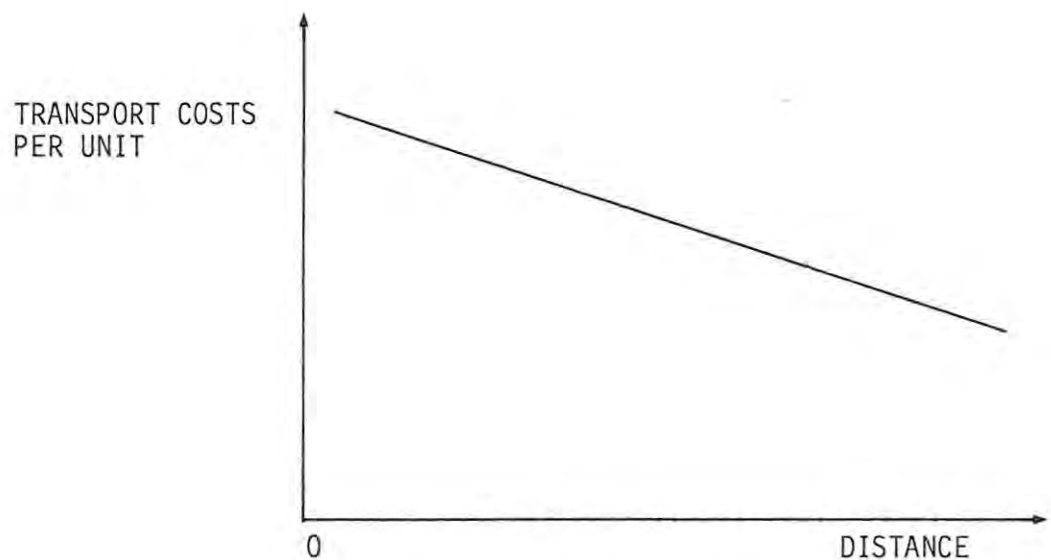
At the plant specific level selling and distribution costs can, under certain circumstances, lead to significant diseconomies of scale. In order to meet its growth objectives a company must, inevitably, begin expanding its sales areas further and further from its plant. The spread of business operations from serving local markets to national and finally international markets is a natural one. However, when this occurs, and production remains at a single plant, or closely set cluster of plants, there is a strong possibility of unit distribution costs in the form of transport and packaging requirements, increasing substantially.

There are a number of factors which will influence the size of this increase in unit costs. Firstly, the existing relative market share of the company may be important. If this is small the company may be able to increase sales largely within existing geographic markets hence transport costs will not rise significantly. Secondly, an increase in unit cost is, in itself, not important unless that cost cannot be offset in the form of higher prices. Where the producer can pass cost increases on to the buyer there will still be significant economies of scale as output grows. The ability to pass on cost increases is most often limited by competitors of a comparable size who are more advantageously placed in relation to the market.

A further variable to consider is the structure of transport costs. Where transport costs per unit decrease with distance, as Figure 4.1 shows, as is usual, less of a constraint is placed upon plant size.

FIGURE 4.1

THE NORMAL RELATIONSHIP BETWEEN TRANSPORT COSTS PER UNIT AND
DISTANCE TRANSPORTED



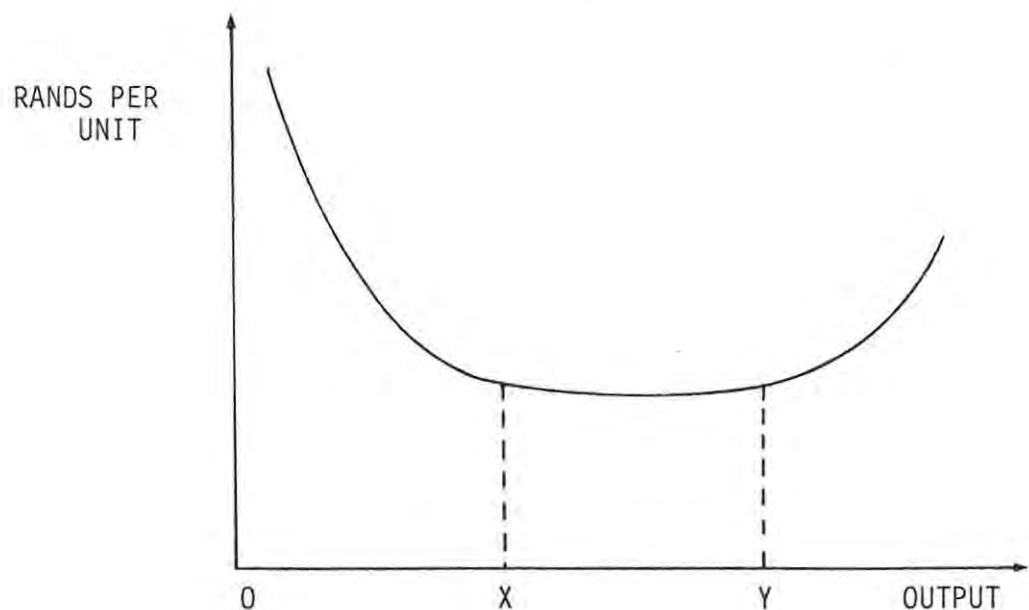
Finally, the commodity's value in relation to its bulk is important. For a high bulk, low value good the unit cost of transport can be significant and hence imposes stringent limits on the size of the plant. Conversely, low bulk, high value items can better absorb transport costs and hence can be more easily sold in diverse geographic markets. This consideration is somewhat offset by the fact that transport tariff structures normally take account of the value of an item and the transport cost per unit is raised accordingly.

Thus, selling and distribution expenses are important in limiting economies of scale though exactly how this occurs is dependent on a number of variables. Not only must account be taken of the physical dispersion of the served markets, but also the nature of demand, the products mass/value ratio and the transport tariff structure in operation.

From the analysis thus far of plant specific economies of scale it has been shown that it is reasonable to conclude that such economies do exist, and can indeed be significant, but that beyond certain output limits diseconomies set in with the result that unit costs of production tend to rise. These conclusions give rise to the classical "U" shaped long run cost function as shown in Figure 4.2.

FIGURE 4.2

THE CLASSICAL LONG RUN UNIT COST FUNCTION



Up to the output OX the firm encounters economies of scale and hence unit costs fall. Between outputs OX and OY these economies of specialised equipment, labour and management level off and a constant unit cost is maintained. Beyond output OY diseconomies of scale set in as the firm grows too large and unit costs begin to increase.

When analysing Figure 4.2 the importance of achieving output OX is clearly evident. At any point before OX there are still substantial benefits to be derived from increasing output, whereas the firm has to grow substantially beyond OX before diseconomies of scale occur. Output OX is thus known as the minimum optimal scale and represents the smallest level of output that a firm hoping to take advantage of economies of scale, should achieve.

4.3.2. Minimum Optimal Scale

There are several ways of expressing what constitutes an optimal plant, the most common being a measure which related the plants output to total industry output. That is, 'what proportion of industry output will a single plant of minimum optimal scale supply?' In this case the size of an optimal plant will depend on two things.

- 4.3.2.1. Firstly, the economies of scale that exist in the industry. The larger the economies of scale the greater the proportion of a given market an optimal plant will supply.
- 4.3.2.2. Secondly, the size of the market the industry serves. The larger the market the smaller the plant has to be (in terms of

the proportion of that market it supplies) in order to be of optimal size.

Given this information it is obvious that minimum optimal scale will represent vastly different plant sizes in different industries.

From this analysis, one very pertinent factor becomes evident. The larger the proportion of the market a minimum optimal scale plant supplies, the less the number of optimal plants that industry can hold. For example, if minimum optimal scale in industry Y is 10% of that industry's output, then that industry can accommodate ten efficient plants. On the other hand, if in industry Z the minimum optimal scale is 2% of industry output, one would expect to find a much lower concentration ratio as that industry can hold fifty efficient plants. This does not mean, of course, that the maximum number of minimum optimal scale plants will exist in any industry as plants can be greater than minimum optimal scale and still be efficient. Hence the number of efficient plants in any industry will normally be less than the maximum possible, as Bain indicates:

"The proportion of industry output supplied by such efficient plants ranged, over the twenty (American) industries, from about 70 percent at the minimum to 90 percent at the maximum, the inefficient fringe among industries (between 10 and 30 percent of industry output) did show some tendency to be larger in industries with strong product differentiation". (19)

The importance of minimum optimal scale, from a strategic viewpoint, lies in the extent to which plants of less than optimal size incur higher unit costs. In other words, the attainment

of minimum optimal scale is of little consequence if the unit cost at this output is not significantly lower than that in plants of less than minimum optimal scale. Where no useable relative advantage can be gained over competitors by increasing plant size, the concept of minimum optimal scale has no strategic importance.

While it is logical to conclude that the attainment of minimum optimal scale could be of considerable significance to a single plant, the methods available to estimate the volume at which minimum optimal scale is achieved are at best unsatisfactory. Minimum optimal scale exists only at a highly conceptual level and, as yet, the tools necessary to make use of this concept, in a rigorous scientific manner, simply do not exist.

One popular method (popular because it uses data which are reasonably abundant) is to analyse the relationship between plant/firm size and profitability. This approach, however, has two serious disadvantages. Firstly, there is not necessarily any simple relationship between profitability and economies of scale. Large firms may not be more profitable because they are more efficient but because they have more monopoly power than small firms in the same industry. Secondly, profit figures are often relatively poor indicators of economic performance because they are so open to manipulation through varying, yet apparently acceptable, accounting procedures.

4.3.3.3. Another approach to determining minimum optimal scale is through what is known as the "survivor technique". (20) This technique works on the principle that "those sizes of plants which have minimum average costs will be sizes of plants which will survive best in the market place". (21) Therefore, those plants that supply an increasing percentage of an industries total output must be within the range of optimum size. If a plant supplies a declining proportion of industry output it is either too large or too small.

"The survivor technique simply involves the comparison of the distribution of plants - in a specific industry - at two or more points in time. The systematic changes in the distribution will indicate the optimum size, on the assumption that existing plants and new plants will tend toward that size which has minimum average cost. Moreover, the failure of nonoptimal plants will further accentuate this relative growth of the optimal sizes of plant". (22)

Again the problem arises when using this technique that there is always uncertainty as to whether it is economies of scale or some other combination of success criteria that cause a plant/firm to succeed under the survivor criterion.

4.3.3.4. Finally, the least scientific approach to estimating optimum plant size is the questionnaire method. This involves asking businessmen which they consider to be the optimum size plant in their industry. The problems associated with this technique are that there is no guarantee that the information given is accurate and also

such information is only of short term validity in that the perceived optimum plant size is bound to vary rather rapidly with changes in social, economic and political trends.

In conclusion, it should be noted that the inability to measure minimum optimal scale to any acceptable degree does not invalidate the concept altogether for strategic planning. Although the corporate strategist may never know exactly where a plant is operating on the long run average cost curve he should, with a thorough knowledge of economies of scale and by using a combination of the available techniques, be able to ascertain, with a reasonable degree of certainty, whether the plant is operating below, at or beyond the optimal scale.

4.3.4. The Product Mix, Managerial Costs and Plant Specific Economies of Scale

One final plant specific related issue that deserves mention is that of the effect of the product range on economies of scale and, more specifically, on minimum optimal scale.

A common fault with much of the theory on economies of scale is that it ignores, or, at best, pays only scant attention to, demand. The fact that markets today are made up of increasingly sophisticated consumers with increasing real disposable income means that companies must concentrate more heavily on the nature of their

market offerings than on the nature of the production process. As a result this has led to a proliferation of different, though perhaps closely related, products being produced at the same plant in order to supply one market. (23) This has a significant effect on the traditional analysis of economies of scale.

There seems little doubt that as the number of products produced at a single plant increases, so do the difficulties associated with running that plant. This means that managing the plant becomes a more complex task and hence management costs, in the form of planning, organising and controlling, can be expected to rise. Hence management costs should rise at an increasing rate per unit with the number of products manufactured at the plant. Figure 4.3 illustrates:

FIGURE 4.3

THE PRODUCT RANGE, MANAGERIAL COSTS AND ECONOMIES OF SCALE

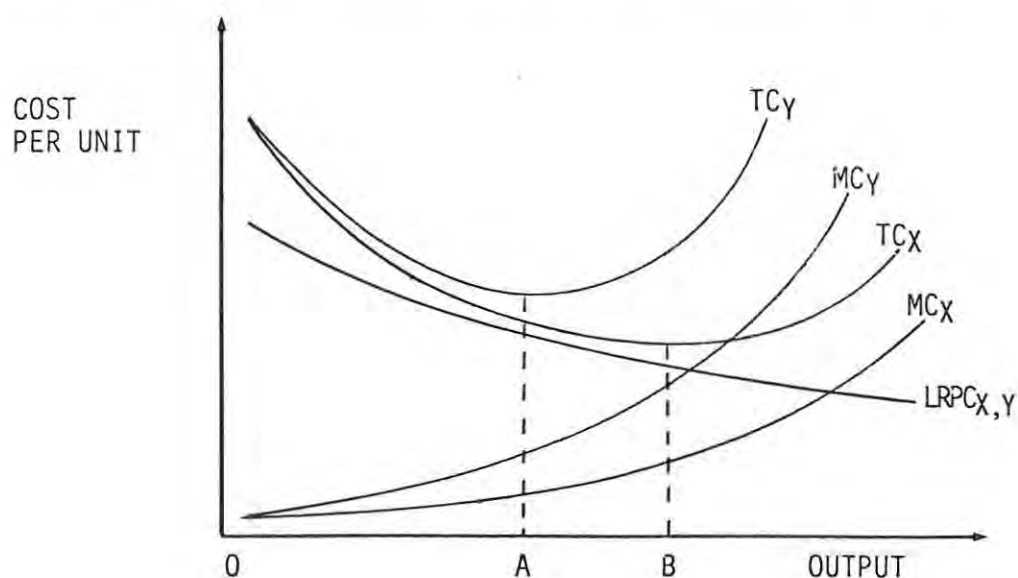


Figure 4.3 considers the unit costs of two plants X and Y where plant Y is producing a greater number of product types. The long run production costs at both plants, excluding managerial costs, is the same at LRPC. That is, excluding managerial costs, both plants experience the same economies of scale at similar levels of output. However, because plant Y makes a greater range of products the managerial costs associated with running this plant are greater than those of plant X. Hence MC_y is greater than MC_x at any given level of output. The result is that diseconomies of scale are encountered earlier in plant Y than in plant X which in turn effects the minimum optimum scale for both plants. For plant Y the minimum optimum scale is OA while for plant X it is the greater volume OB.

In accordance with this analysis it can be concluded, therefore, that in those industries where a wide product range is necessary for successful marketing effort, the size of efficient plants is likely to be reduced. Such a situation is likely to be found in markets where competition is strong and where, accordingly, a comprehensive product range is necessary to gain competitive advantage. Also where brand switching behaviour on the part of consumers occurs frequently, any single manufacturer is encouraged to place as many slightly differentiated brands on the market as possible in order to create a "closed set" of brands and capture as great a proportion of those brand switchers as possible.

As a general rule, therefore, it would appear logical to deduce that the greater the number of products manufactured at a single plant the lower will be the minimum optimum scale.

4.3.5. Plant Specific Economies of Scale: Conclusions

There seems little doubt that economies of scale at the plant specific level give rise to potentially significant unit cost reductions. However, any effort to consciously make use of economies of scale is complicated by the problems involved in estimating optimal plant size. While these problems do not invalidate the concept of minimum optimum scale they do retard the possibility of implementing a course of action with the specific intent of achieving minimum optimal scale. Moreover, the concept of minimum optimal scale pays no attention to the social cost of large scale plants. Although such costs are of no concern in the present analysis, it must be noted that social criteria are receiving increasing attention in the study of modern business administration and cannot be totally ignored in any analysis of the 'lowest unit cost of output'. (24)

4.4. MULTI-PLANT ECONOMIES OF SCALE

The fact that most leading companies in most industries in South Africa operate a number of plants, each supplying similar products, (25) tends to indicate that a multi-plant firm gains economies of scale over and above those found at a single plant of minimum optimum scale. Such economies,

should they exist, could be classified as being directly related to the overall size of the firm. Due to the fact that increasing company size has been a dominant feature of business during the past century and because size is still so actively sought after by corporate empire builders, the size/economic performance relationship becomes a central issue in scale analysis. For this reason it is dealt with as a separate item in the following chapter. Suffice it to say, at this point, that the benefits of increasing company size beyond that required to achieve minimum optimal scale at the single plant level, remain one of the most hotly debated issues in the field of economies of scale.

4.5. CONCLUSIONS

According to the overwhelming majority of opinion, economies of scale are to be found at a significant level in the production of single products, in the output of single plants and, possibly, in the size of firms with multiple plants.

In general these economies of scale result from an improvement in the efficiency of production and distribution.

This efficiency appears to be influenced by inter alia,

- The total output of a particular product in a given period of time.
 - The length of production runs for each product, that is, the batch size.
 - The degree of standardisation of products.
 - The capacity of the plant.
-

- The extent of bottlenecks.
- The geographic concentration of the firm's customers.
- The size of consignments to the firm's customers.
- The size of the firm.

Most of the body of literature on the subject is unanimous in suggesting that economies of scale do not continue to arise as output increases. After a certain volume of output, evidence indicates that unit costs tend to remain constant and at greater levels of output costs may actually increase as diseconomies of scale set in. However, the range of output over which economies are attainable is itself flexible and can be increased by technical changes. (26)

Finally, it should be noted that economies of scale tend to be attributed with far more significance in theory than in terms of empirical evidence, as Bannock explains:

"The absence of quantitative information on the economies of scale is very striking in relation to the volume of qualitative comment and to the tremendous weight placed upon scale economies in justifying industrial concentration". (27)

However, perhaps it would be pertinent to point out that the issue is not that economies of scale don't exist - the theory is too convincing for this - but rather that effective means of measuring economies of scale have not yet been developed.

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6. This formula is derived as follows:
 Assume the unit time period being used is one week.
 Then a production run of Q units will supply demand D for Q/D weeks. Also if the finished goods inventory is Q at time t, it will decline to zero at time t + Q/D weeks. (Assume this inventory is replenished immediately it reaches zero.) Therefore, the average inventory in any given cycle is 1/2 (Q/D) = Q/2D. The cost of carrying this inventory is hC per unit per week. Therefore the average inventory cost must be hCQ/2D.

The set up cost per unit is F/Q.

The average total cost (A T C) is the sum of the average set up cost, the variable cost and the inventory costs per unit.

$$A T C = \frac{F}{Q} + C + \frac{hCQ}{2D}$$

To obtain the minimum average total cost, which will occur with the optimal production run, the equation must be differentiated with respect to Q setting the derivative equal to zero.

$$Q = \sqrt{\frac{2 D F}{h C}}$$

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23. Some problems regarding what constitutes "one market" may be encountered here. This issue has been dealt with in Chapter 2, Section 2.8.
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CHAPTER 5

MARKET SHARE AND ECONOMIC PERFORMANCE:

COMPANY SIZE

C O N T E N T S

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5.1. INTRODUCTION

As concluded in the previous chapter, large firm size is not synonymous with the existence and exploitation of economies of scale. As a result, the effects of size on the conduct and performance of firms in their markets are not the same as the effects of scale on corporate conduct and performance. Both, however, are of considerable importance as Baumol stresses:

"Economists who have spent time observing the operations of business enterprises come away impressed with the extent of managements occupation with growth. Expansions is a theme which (with some variations) is dinned into the ears of stockholders, is constantly reported in the financial pages and in the journals devoted to business affairs. Indeed, in talking to business executives one may easily come to believe that the growth of the firm is the main preoccupation of top management. (1)

The creation of businesses of large size is a major feature of modern management practice. Exactly why this preoccupation with size is so important to management is, to say the least, difficult to fathom. While economic theory provides many logical foundations which support the existence of large organisations, it also recognises that size can, in fact, be a hindrance to economic performance. Empirical evidence on the subject appears to be just as confusing, if not more so.

Given the contradictory nature of the subject it is difficult to find some satisfactory means of presenting and

analysing past research efforts in the field. The approach adopted here will be to focus on each area where some performance related effect could possibly occur as a result of increasing company size.

5.2. ANALYSIS OF COMPANY SIZE

5.2.1. Problems of Analysis

It is convenient to measure the size of a company on a single dimension. The choice of this dimension is, however, no easy task as there exist several indices of size. As Table 5.1 indicates each is useful for analysing a different aspect of size and each possesses some type of limitation. (2)

TABLE 5.1

VARIOUS INDEXES OF SIZE - THEIR USES AND LIMITATIONS

INDEX	CONTEXT: WHAT THE INDEX SHOWS	LIMITATIONS
1. <u>Financial</u>		
a. Real investment	Staying power; ability to apply financial resources	Book or replacement value? Also assets differ in liquidity and flexibility
	(1) Total assets (2) Shareholders' equity	
b. Portfolio assets	Banking assets; ability to select among paper assets	
c. Profits	Ability to gain profits and reward investors	Measurement is often tricky and obscure.
2. <u>Economic Activity</u>		
a. Sales	Extent of the firm's role in market transactions	Inflation can dilute "real" meaning of revenues
b. Value-added	Scope of economic activity and total production	Not given for many firms
3. <u>Power over Jobs and Votes</u>		
a. Employment	Dependence of public on the firm for jobs and security	Jobs vary in types and value
b. Geographic extent	Power and involvement in local and national affairs	Degree of permeation into locales is difficult to measure
c. Number of stockholders	Breadth of public dependence on the firms for investment success	Distribution among big and little shareholdings is often unclear

Table 5.1 adapted from The Economics of Industrial Organisation
W.G. Shepherd, Englewood Cliffs, Prentice Hall. 1979. Page 353
Table 18-1

Depending on the reason why size is being evaluated, a choice must be made from among the options outlined in Table 5.1 concerning which index would be most applicable. While in practice sales and assets are the most commonly used measures of size, for many purposes they are ineffective measures. It should also be noted at this juncture that differences in firm size, no matter how size is measured, only become meaningful when they are significant. Drawing conclusions from marginal differences in size is unwise. The major reason for this is that there are many causes of varying economic performance between companies. Thus the size difference between two otherwise similar companies must be significant before it can be justly concluded that size was, in fact, the cause of any noted variation in economic performance. However, multiple regression techniques have somewhat reduced the size differences at which inter firm comparisons can legitimately be made.

5.2.2. The Concept of Relative Size

A further difficulty with analysing the effects of corporate size concerns the concept of relative size. For the purposes of analysis it is often imperative to distinguish between absolute size - economic bulk per se - and relative size.

A comparison of companies on the basis of absolute size is often unsatisfactory as it involves comparisons across industries. The results of such an analysis can hardly be considered as satisfactory when such companies are subjected

to a myriad of different influences by virtue of the fact that they operate in potentially vastly different environments.

The comparison of firms, on the basis of size, within a particular industry, or within acceptably similar industries, is far more meaningful, as such firms are subjected to similar social, economic and political forces. In such a case it is reasonable that size be taken as a partial indicator of the ability of a company to influence economic results. Therefore, the greater that size the greater is the potential of a company to influence such results. Hence, in this case, size is important in a relative and not absolute sense because the benefits (or disadvantages) that accrue through size accrue in relation to companies not possessing that size.

An analysis of relative size cannot, therefore, be successfully conducted across industries but only within industries.

5.3. THE ADVANTAGES OF LARGE CORPORATE SIZE

Corporate size is only of strategic significance if it can be shown that such size results in corporate conduct and/or performance which differs significantly from the conduct and/or performance of firms of a smaller size.

In general terms, a firms conduct and performance is determined entirely by four categories of decisions made within the context of dynamic environmental conditions. (3) The first decision category concerns inputs. That is, what input levels are required in each functional area to ensure the

efficient operation of the company? Of importance here are such considerations as selecting the least cost factor input combinations and determining the optimal distribution of limited investment funds among alternative projects. The second decision category concerns outputs. This decision involves determining the output, sales or price level for any given period. Thirdly, financial decisions must be made involving the distribution of profits between dividends and retained earnings and finding the best means of raising new capital. Finally, and of greatest import here, is the investment decision. That is how much should be spent on expanding the size of the firm? While these four decision categories are, in many instances, closely related, when analysing corporate conduct and performance, they are most beneficially viewed as being separate and distinct.

There are two reasons as to why management may tend to focus on the investment decision category and subsequently increase company size. One argument is that size plays an important role in determining managerial status and prestige. Also salaries are positively related to the size of the firm, in fact, more so than is profitability. As George and Joll point out:

"Managers in large corporations enjoy far greater prestige in the business community. Furthermore, a growing firm offers the prospect of more rapid promotion up the managerial ladder, especially, as is frequently the case, when appointment to more senior positions is made from among existing staff. These factors have been given particular emphasis in explaining the interest in growth shown by those companies where there

is a divorce between the shareholders who own the company and the managers who control it." (4)

A second reason for focus on corporate size is applicable to firms under all forms of control. Once again according to George and Joll:

"In a market that is generally expanding, growth is part of the competitive process. Under such conditions to stand still is to fall behind. The faster growing firms will be in a position to benefit from a number of advantages compared to their slower-growing competitors. Faster growth will mean a higher level of gross investment. This in turn will allow the quicker realisation of economies of scale and the speedier adoption of technological improvements so that a larger proportion of the firms capital stock will embody up to date techniques. Furthermore expanding firms are likely to attract better quality management". (5)

These advantages, it must be emphasised accrue to companies achieving size through growth and thus should not prevail in stagnant companies of considerable size.

Company size sought after for the purpose of achieving the benefits noted above, must be distinguished from operations which, per se, require large size. Bannock states:

"Some activities do, by their very nature, require large amounts of capital, or people: Aerospace manufacture, oil exploration, development and distribution are two examples. There is probably no way in which these activities can be organised on a small scale if they are to be carried out at all. Practically everything else, if we are to speak broadly, can be and is conducted on both a small and a large scale". (6)

Bannock further points out that "Modern technology required large scale and thus inevitably meant fewer and larger firms".

(7) Thus much of the reason for finding large firms in the economy is based on the nature of the production process. Where factor inputs are indivisible if production is to take place at all it must often be on a large scale. Townsend explains:

"Two half pencils are as good as one whole one, but two half typewriters are no good at all. The fact that machinery usually has a minimum efficient size lies behind many economies of scale". (8)

In more specific terms the most frequently quoted areas of advantage and disadvantage for large firms are as follows:

1. Large, multi-plant firms have the ability to use superior production techniques and more effective control and coordinating devices than can small firms. On the other hand although large corporations have high potential efficiency they often become inflexible and conservative bureaucrasies whose actual performance is very poor.
2. Large firms are often able to take advantage of managerial economies by centralising many management functions. On the other hand centralisation creates rigidity and removes initiative which in turn reduces performance.
3. The large firm is better able to counter risk by diversifying its assets. Often, however, the end

result is eggs in so many different baskets that nothing really significant is hatched from any of them. In this case performance falls as the firm spreads itself too thin in too many markets and is unable to react timeously to the signals emanating from each.

4. Large firms can better afford to innovate through developing effective research and development facilities. In this case small firms are forced to play the role of followers.
5. Large firms enjoy significant economies of promotion and advertising. However, many promotional efforts may "do no more than shift about market share among large firms and thus constitute a waste of resources".
(9)
6. The large multi-plant firm enjoys distribution advantages in that it has plants closer to scattered markets than the small single plant firm.
7. The large firm enjoys financial economies of scale in that it has easier access to capital markets than its smaller counterpart, and it has greater bargaining power with suppliers. As a result it has lower investment and input costs than the small firm.

Each of these items is fully discussed in the following sections 5.3.1. to 5.3.7.

5.3.1. Technical Economies of Size

As a company grows in size it is likely to benefit from certain technical economies in the manufacture of its products (10). These economies arise from a number of sources the most common of which is the specialisation of labour, which enables unit cost savings in three areas. Firstly, the dexterity of every employee is increased as he repeats the same specialised task. Secondly, the adjustment period involved in moving from one type of task to another is avoided. Finally, as tasks become more specific, more specialised and more efficient machinery can be incorporated into the production process itself.

There are, however, practical limits to the degree to which labour can specialise in the manufacturing environment. Once these limits have been reached it is noticeable that firms still continue to grow by increasing the repetitions of each specialised task. That is, they employ further capital equipment and staff to perform the same specialised functions as the present equipment and staff. This would tend to indicate that labour specialisation is not the only factor influencing the optimum technical size of the firm and, in fact, in many cases the benefits of division of labour may be exhausted even in a relatively small firm.

A further technical benefit of size Robinson refers to as the 'integration of processes'. He maintains that:

"the large firm often differs from the small firm in having fewer rather than more processes of manufacture. The process of the division of labour is being reversed; one large machine can be designed to take over what has hitherto been done by a series of manual or less completely mechanical operations". (11)

Only the large firm can afford to keep this type of machinery running at full capacity and thus it enjoys substantial advantage over its smaller competitor.

Closely related to the integration of processes, where several different jobs are combined into one operation, is the benefit of the large machine. In the large firm a number of parallel tasks may be taken over by a single piece of machinery. Only once production has reached the level where many parallel tasks have to be performed in order to cope with current throughput will the purchase and installation of such machinery be possible. Hence, again, the large firm can, in this respect, benefit from lower unit costs of output.

In this regard Miller has found a strong empirical relationship between size of firm and size of plant in American manufacturing industries.

"In all industries the plants of the leading firms are of above average size, and in all industries those of the smallest firms are of below average size. In most cases the plants of the leading four firms were larger than those of the next four, and the greater the advantage of the top four firms in size of firm, the greater their advantage in average size of plant. Plant size and firm size appear empirically to be closely related". (12)

It would appear, therefore, that large firms enjoy considerable advantages over their smaller counterparts in respect of economies of the large machine and process integration.

The optimum technical size of the firm is by no means a static quantity. Rather, this optimum size will vary according to two factors. Firstly, the rate of innovation, or new technique introduction, will play an important role in determining optimum technical size. New techniques will have the net effect of either reducing the unit cost of current output, or enabling a greater output at the same unit cost, or a greater output at a reduced unit cost. In all but the first case the natural effect on the firm will be an increase in size.

The second factor influencing the optimum technical size of the firm is the capital to labour cost ratio. The higher this ratio the less will be the incentive to integrate processes and install large cost saving plant and machinery. As a result, the higher the said ratio the smaller the optimum technical size of the firm will be.

It should be noted that both the rate of innovation and the capital/labour cost ratio are highly dynamic factors, with the result that it is unlikely that any production unit will be of optimum size for long. Hence continual modification to both plant and production technique are likely to be necessary in order to achieve optimum size in this respect.

Firms attempting to reduce unit costs through integrated processes and the use of large plant and machinery will encounter one further problem of importance. The various units of machinery and the various processes in use will normally have different capacity outputs. This will lead inevitably to bottlenecks in some areas, while in others plant will be operating below capacity. Careful production scheduling, maintenance and shut-down procedures can, however, minimise the negative effects arising here.

A further technical benefit accruing to the large multi-plant firm is one which Robinson refers to 'economies of massed reserves'. (13) The large firm, it is reasoned, is far better able to cater for fluctuations in the demand for its products. For example, where demand for a product increases unexpectedly, production shortfalls can be made up by help from others of the firm's plants, either by increasing production at such plants or by borrowing from each plant's stocks, or both. Should the small firm wish to provide for such eventualities it would require proportionately large spare plant capacity and/or finished goods inventory. Both of these alternatives must inevitably lead to increased unit costs of production. Koch, however, provides a counter to the argument concerning economies of massed reserves when he states:

"This argument, however, rests on the crucial assumption that the fluctuations in demand cannot be foreseen. If they can be foreseen then all firms, large or small, can prepare for such fluctuations and the size of the firm

need not be a liability. Since no firm large or small has perfect foresight, the question devolves to one of which can forecast most accurately, large firm or small firm; and further, which type of firm handles most efficiently the inevitable deviations from expected conditions". (14)

The large, multi-plant firm also possesses a degree of production flexibility which is unattainable at the small firm level. For example, it is unusual that firm size merely reflects having more plants producing the same products in different territories. More often the large firm makes use of its multi-plant facilities by practising specialisation at selected individual plants. (15) This enables certain component parts of the final product to be produced at the lowest unit cost and is especially important in the production of low volume items. Furthermore multi-plant companies are usually vertically integrated, to varying degrees, and can thus exercise greater control over product specifications and order patterns. Finally, it may be necessary to acknowledge the rather unlikely assertion that large multi-plant companies can "manage their demand" thereby enforcing product standardisation and reaping the resulting benefits. (16) (17)

The benefits of large, multi-plant operations would, therefore, seem to be greatest where the marketing consideration of a broad product range is important and where unit costs fall substantially with increases in output. They would appear to be lowest where strong competition forces specialisation

and where transportation costs curb opportunities for geographically specialised plants.

That technical economies of corporate size exist is largely undisputed, although "confident statements about the frequency of their incidence are hard to make". (18) There is also some doubt regarding the ability of the large firm to meet constantly changing consumer needs if it is purposefully pursuing technical economies. It is also accepted that technical economies of size do not continue indefinitely. Like all economies of scale there is a point beyond which the incorporation of further processes or the purchase of larger machinery is uneconomical.

Generally optimum technical units will be large where either the product or production plant and equipment are large, for example shipbuilding, or where the final product is highly complex, for example motor vehicles. Conversely, optimum technical units will be small where the product is small and simple and hence there is no technical advantage to size. (19)

The extent to which large firms actually make use of the potential technical advantages at their disposal may also be debated ad nauseum. In fact, it is argued that in many cases big firms, rather than concentrate on technical progress in their field, should diversify "because in this way they can often avoid the decline in the rate of profit which they are

likely to experience when trying methods of capital intensification while their profit margin is high". (20)

However, little meaningful generalisation on this subject is possible and hence it must be left largely unexplored.

5.3.2. Managerial Economies of Size

In the same way as labour specialisation is a major technical benefit of firm size, so specialisation with regard to management plays an important role in corporate conduct and performance.

In simple terms the manager of the small firm is a general manager; an archetypal jack of all trades. The large firm, on the other hand, can be split into several specific functional areas where specialised managers can perfect their individual tasks. This elaborate division of labour confers two separate benefits on the large firm. Firstly, it enables corporate specialists to make full use of their abilities with, theoretically, every specialist spending all his time immersed in his specific field of competence. In smaller firms, specialists, where they are employed, are often compelled to use up "spare" time by performing functions outside their field of specialisation. (21)

Secondly, the staff specialist, by focusing all his attention on one particular field, becomes even more of an expert in that field, especially in relation to its application to the firm's particular problems. Furthermore, the greater volume of output over which the talents of management specialists can

be applied in a large firm, enables the firm to offer a far higher salary for this job and thereby attract superior talent. (22)

Further economies of large management arise through the fact that certain managerial activities require a relatively fixed number of persons over a fairly wide range of output levels. Certain personnel functions, market research and forecasting, and legal advice departments are possible examples here. If the need for a specialist managerial service fluctuates over time, the large firm might also possess economies of massed reserves in this respect.(23)

Apart from direct increases in the efficiency of management itself in the large firm, it is plausible that such management may be more effective in increasing the productivity of workers under their control. Due to the fact that the large firm may be able to attract superior managerial talent and can also afford to train them more fully there should be an increase in the effective performance of the standard managerial functions of controlling, planning, organising and directing in large corporations. It should also be appreciated that even if managerial costs per unit are greater in large firms than in small ones, this can be more than compensated for by the increased efficiency created lower down the echelon (as a result of better planning, organising and so on) in large firms.

There is reason to believe, however, as was the case with technical economies of size, that unit cost reductions based on the various managerial related factors do not continue indefinitely as output increases. A point is reached beyond which further specialisation by management gives rise to no further economies. Again this limit may be reached long before the size of some large modern corporations is reached, whereafter it is the positive influence of other economies of size which encourage further corporate growth.

One of the major limiting factors on managerial economies of size exists in the form of coordination difficulties. The more specialisation occurring in a firm the greater the number of separate work units created and, accordingly, the more complex and difficult the task of coordinating these units. Robinson explains:

"If the management of a large firm is to be more efficient than that of a small firm, the increase of efficiency due to the division of labour and the employment of specialists must be sufficient to outweigh the cost of the necessary coordination, or, as more often happens, the loss of efficiency and flexibility due to the impossibility of perfect coordination". (24)

Furthermore, as the firm grows and specialisation occurs, a profusion of separate decision making units arises. Complex authority/responsibility relationships develop in an elaborate hierarchy and decisions are removed further from the locus at which they will be executed. According to Williamson:

".... A quality/quantity trade off necessarily exists in every decision to expand. It arises for two reasons, both of which are related to the distance of the top executive from the locus of productive activity. First, expansion of the organisation (adding an additional hierarchical level) removes the superior further from the basic data that effect operating conditions; information regarding those conditions must now be transmitted across an additional hierarchical level which exposes the data to an additional serial reproduction operation with its attendant losses. Furthermore, the top executive, or peak coordinator cannot have all the information that he had before the expansion plus the information now generated by the new parts (assuming that he was fully employed initially). Thus he can acquire additional information only by sacrificing some of the detail provided to him previously. Put differently he trades off breadth for depth in undertaking the expansion; he has more resources under his control but the quality (serial reproduction loss) and the quantity (bonded capacity constraint) of his information are both less with respect to the deployment of each resource unit. In a similar way, being further removed from the operating situation and having more subordinates means that his instructions to each are less detailed and are passed across an additional hierarchical level". (25)

The result is more frequent delays and increasing operative and administrative mistakes. If decisions have to be made often and quickly, such organisations frequently cannot cope adequately. To add to this the quality of an individual's work, notwithstanding organisational problems, can be reduced with increases in corporate size. "The bureaucratic tendencies are toward impersonal, narrow jobs, with orders flowing down from above. Large firms tend to separate the workers from both the managers and the customers", (26) removing the human element and thereby decreasing the quality of work. Thus while large firms may use better quality management, superior management

techniques and modern managerial technological aids, the resulting benefits must be traded off against the general deadening effects of bureaucracy. Scherer goes so far as to suggest that despite all the trappings of modern management, large firms bear a higher unit administrative cost burden than medium and small sized firms. (27)

Also the relationship between size and managerial quality is often difficult to verify indicating that, on balance, large firms are at a net managerial disadvantage. (28)

One of the standard remedies for overcoming the problems of large corporations is to decentralise the organisational structure. While the benefits associated with this strategy are beyond the scope of this debate it should nevertheless be pointed out that such a strategy has one overriding weakness. That is, if a company is to benefit from product specialisation and massed reserves then some form of central control is essential. As Henderson, in very general terms, explains:

"A multi divisional company without an overall strategy is not even as good as the sum of its parts. It is merely a portfolio of unrelated investments which has added overhead costs. Such investments properly sell at a discount from the sum of the parts". (29)

One final issue of importance here concerns the fact that there is some doubt regarding the degree of profit directed effort management of large firms will put into their tasks when the fruits of that effort accrue with the

firms shareholders. It is held, for example, that "management may become less diligent with resulting x-inefficiency" (30) and that "there is a tendency for the managers of large firms to seek satisfaction from extra staff, emoluments and discretionary spending on "non-essential" projects, all of which tend to raise costs".(31) Furthermore, absentee ownership increases managements reluctance to undertake risk. The reason for this is that management remuneration is relatively inflexible. Should a high risk decision turn out well management is unlikely to receive any significant permanent addition to its income stream. However, according to Baumol should a failure occur the results could be disastrous.

"The executive who gambles successfully may find that his reward is worse than meagre - sometimes he will suffer an indirect penalty. In fact extraordinary but unrepeatable success may cost him almost as dear as failure. If one year his efforts have brought in 20 percent returns, the next year he can expect to be asked why only 12 percent was earned". (32)

As a result management may even be tempted to avoid extraordinary profits. If it is true that conservatism breeds mediocrity, the large firm may indeed by paying a sizeable management based profit penalty in this regard.

5.3.3. Uncertainty and Firm Size

The available theory relating firm size to risk and uncertainty is scant indeed. Undoubtedly difficulties in determining the exact nature of the variables (and hence problems of conducting empirical research) have contributed

towards this unsatisfactory situation. However, there are nevertheless some general propositions which can be put forward on the subject.

Under uncertainty it is probable that management will be compelled to make a relatively large number of decisions, or more relatively complex decisions, during any given time period. This problem is compounded by the fact that decisions taken within the same firm must be consistent with one another which tends to result in the "rapidly" increasing cost of coordinating related decisions by different persons". (33) As a result the long run average cost curve will tend to begin to rise at a smaller size under conditions of relative uncertainty, placing a natural constraint on firm size. Uncertainty may also have the effect of reducing maximum firm size by negating some of the advantages of specialisation. Schwatzman explains:

"Specialisation entails advanced planning of production in order to permit purchasing, scheduling, arranging of machines, etc., and the resulting complex arrangement is not easily changed. Unspecialised processes, by contrast, employ operators and machines for a variety of tasks and they may be shifted rapidly from one product to another. The need for flexibility under uncertainty reduces the gains from specialisation." (34)

Uncertainty, here, will manifest itself in the form of the unpredictable nature of demand. Robinson (35) identifies four different variations in demand (permanent changes, cyclical variations, erratic variations and

seasonal variations) all of which result in uncertainty and all of which will, therefore, affect the maximum size of the firm to some degree. Thus where any one, or any combination of these demand fluctuations exist, the resulting size of the average firm is likely to be reduced accordingly.

5.3.4. Invention, Innovation and Firm Size

Technological change through invention and innovation is important in the analysis of firm size for two reasons. Firstly efforts by firms to produce larger and larger volumes of output give rise to technological problems which help to stimulate invention and innovation. Secondly, inventions and innovations themselves may make possible production on a scale which was previously thought impossible. In either case the end result is an extension of the maximum economic size of the firm.

FIGURE 5.1

THE EFFECT OF INVENTION AND INNOVATION ON FIRM SIZE 1

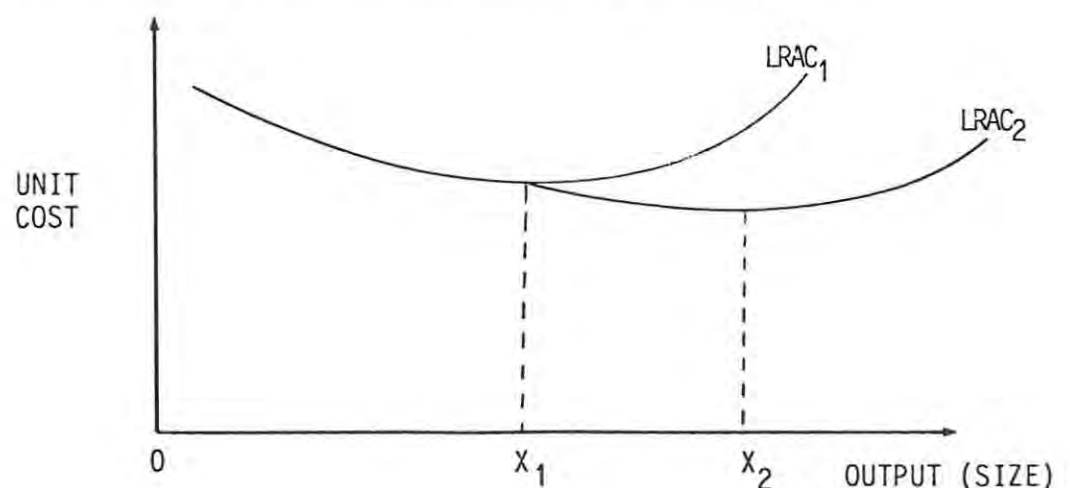
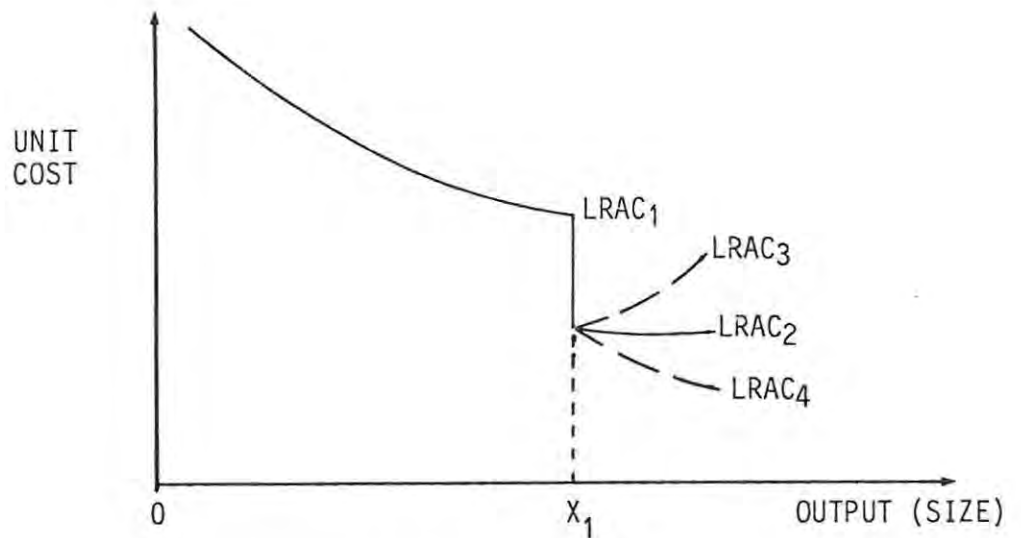


FIGURE 5.2

THE EFFECT OF INVENTION AND INNOVATION ON FIRM SIZE 2

If firm size is measured in terms of sales and the normal assumption that total output is in fact sold is applied, the effect of invention and innovation on firm size can be illustrated in two ways.

In Figure 5.1 the firm is operating originally at maximum economic size OX_1 on $LRAC_1$. As a result of an invention or innovation of some sort the maximum level of output is increased along a new cost curve $LRAC_2$ to output OX_2 . There is, theoretically, nothing to stop this process from being repeated thus creating an ever advancing maximum economic size. (36)

In Figure 5.2 the firm is producing at maximum economic output of OX_1 . At this output the introduction of some

invention or innovative technological process results in the immediate reduction of unit output costs. If the cost curve operative after this cost decrease is $LRAC_3$ then OX_1 remains the maximum economic size of the firm. If, however, further output can be achieved at the new unit cost ($LRAC_2$) or at an even lower unit cost ($LRAC_4$) then the maximum economic size of the firm will be at some point beyond OX_1 .

The theoretical outline presented above serves to emphasise two things. Firstly, in theory, size itself leads to invention, innovation and technological change as new frontiers are reached and ultimately broken. If this proposition is true it can be expected that large firms will partake in more inventive and innovative activity than small firms and hence are at a distinct advantage over small firms purely because of their size. Secondly, inventions and innovations may unexpectedly make greater output possible at the same or at a lower unit cost. This category of technological change is not discovered as a result of size and thus, on average, would benefit both large and small firms to the same degree. Hence inventions and innovations occurring in this second manner are of no significance to the present analysis.

A firm's inventive and innovative activity can be measured in terms of its expenditure on research and development.

From the argument presented thus far it could be expected that large firms devote a relatively large proportion of corporate resources to research and development related activities. Before such an hypothesis can be tested, however, it is first necessary to make some explanatory comments regarding the nature of research and development.

Before research and development effort by the firm can be measured in any meaningful way it is necessary to clarify exactly what is meant by the terms innovation, invention and technological change. These terms are, in fact largely inter-related in that innovation may be regarded as "a process, one of the early stages of which is invention - the generation of new scientific principles new techniques or new ideas" which can ultimately be successfully utilised. (37) If this is the case, then it would appear that the large firm is far more suited to innovative activities than the small firm. The large firm has an advantage in gathering financial support for costly and risky research and development programmes. Only by employing large numbers of people in expensive research and development divisions and only by massive capital investment can modern innovation take place. Also, the high risk associated with innovation, in that much of the total innovative activity can bear no fruit at all, is consistent with the idea that only larger firms can undertake such activities successfully. Large diversified firms can also employ people qualified in many different disciplines giving rise to cross

fertilisation of ideas.

It would appear, therefore, that large firms have a distinct advantage as far as innovative activity is concerned, and this is largely reflected in the literature. Freeman has found, for example, that research and development is mainly performed in large firms and that "the vast majority of small firms (probably over 95 percent) do not perform any specialised research and development programs". (38) Johnson similarly concludes that "innovations in industries that were capital intensive and were therefore likely to require heavy investment were almost entirely produced by large firms". (39) However, he found a more positive innovative role in small firms than Freeman in that "small firms were relatively more important in industries where development and investment costs are typically lower, and where entry barriers are also low". (40) It is also possible that small firms have a lower rate of successful innovations than large firms. (41) Soete finds the relationship between firm size and innovative activity very strong, and concludes "that innovational effort, as measured by company financed research and development expenditure, tends to increase more than proportionately with firm size". (42)

Schmookler concludes that one of the most significant factors influencing innovation is the nature of demand. (43)

Presumably where demand is highly changeable innovative activity would be more prevalent. This, however, does not preclude the likelihood that large firms within a particular

demand pattern undertake relatively more research and development than do small firms. Scherer notes that small firms may have an innovation advantage because "the cumbersome decision making processes of large organisations may impede innovation and drive out the creative individuals most apt to make significant new technical contributions". (44)

On balance it would appear that large firms can further improve their economic performance in relation to small firms by virtue of the fact that they are more prolific and more successful innovators than small firms.

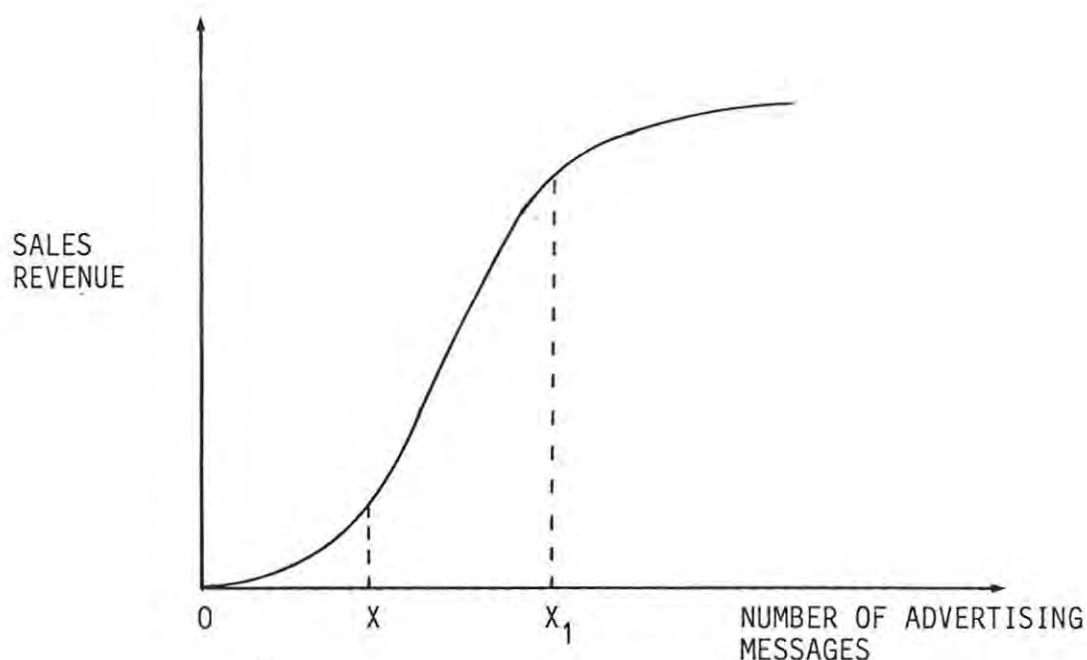
5.3.5. Advertising, Promotion and Firm Size (45)

Large firm size can, theoretically, favour an advertiser in many ways. Among the most important of these are the following:

1. Various advertising media often offer discounts to the advertiser who buys advertising space or time in large quantities.
2. Large firms can make use of media which are not economical for smaller firms, such as television and sizeable adverts in national newspapers.
3. Creating awareness and interest in consumers frequently requires considerable repetition of the identical or some central theme in advertising. Below a certain minimum threshold value advertising may achieve little in the way of demand response. Figure 5.3 illustrates this relationship where

FIGURE 5.3

A TYPICAL RESPONSE FUNCTION OF SALES REVENUE TO THE NUMBER OF ADVERTISING MESSAGES



up to the number of advertising messages OX , very little effect on sales is achieved. Advertising volumes between OX and OX_1 are extremely cost effective, whilst at OX_1 the saturation point is reached. Beyond OX_1 consumers react less and less favourably towards increased advertising.

By virtue of its greater financial resources the ability of the large firm to operate in the cost effective zone $OX - OX_1$ is enhanced, thus giving it a distinct advantage over its smaller rival who is operating below OX . Should the small firm attempt to operate between OX and OX_1 the advertising cost per unit it incurs will be greater than that incurred by the large

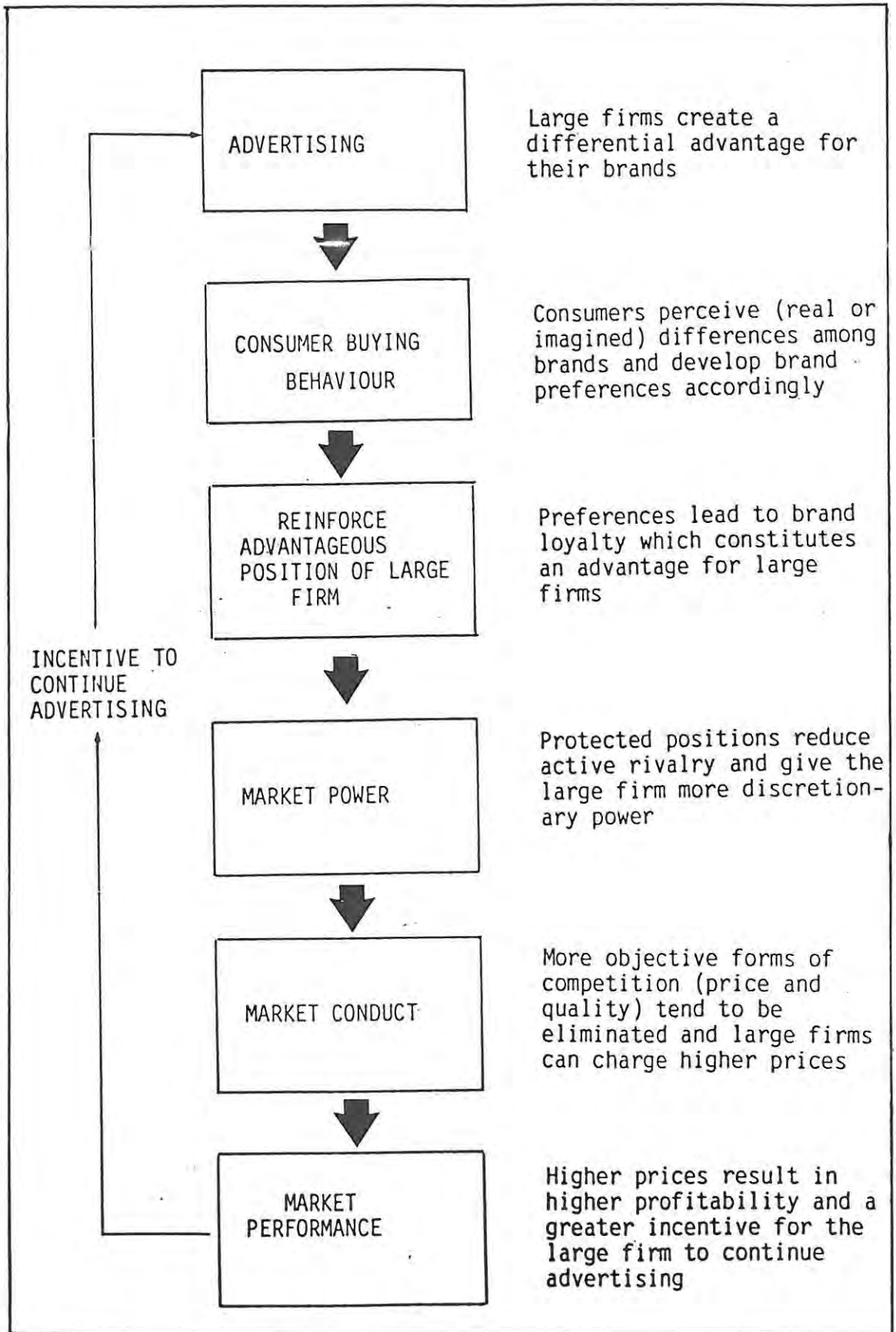
firm because of its smaller total output. Hence, although sales revenue may look particularly favourable, gross profit per unit is adversely affected (in comparison with the larger rival) due to increased unit cost.

4. Preparing an advertising campaign may involve certain fixed costs which the larger firm can better withstand by virtue of the fact that they can be spread over a larger number of units of output.

If it is accepted that the major objective of advertising is to create consumer preference for the brand through differentiation, then advertising will influence the relationship between large and small firms by affecting both relative costs and relative prices. That is, firstly, in terms of the criteria outlined above, small firms must spend more per unit on advertising in order to be able to compete with their larger rivals. This increases the relative costs of small firms. Secondly, also in terms of the above criteria, large firms can better differentiate their products from those of their small competitors. This effectively shifts the demand curve vertically upwards, thus influencing relative prices by enabling the large firm to charge a higher price for the same volume of sales.

In general terms, the process whereby large firms gain competitive advantage, through advertising, over their smaller rivals is illustrated in Figure 5.4.

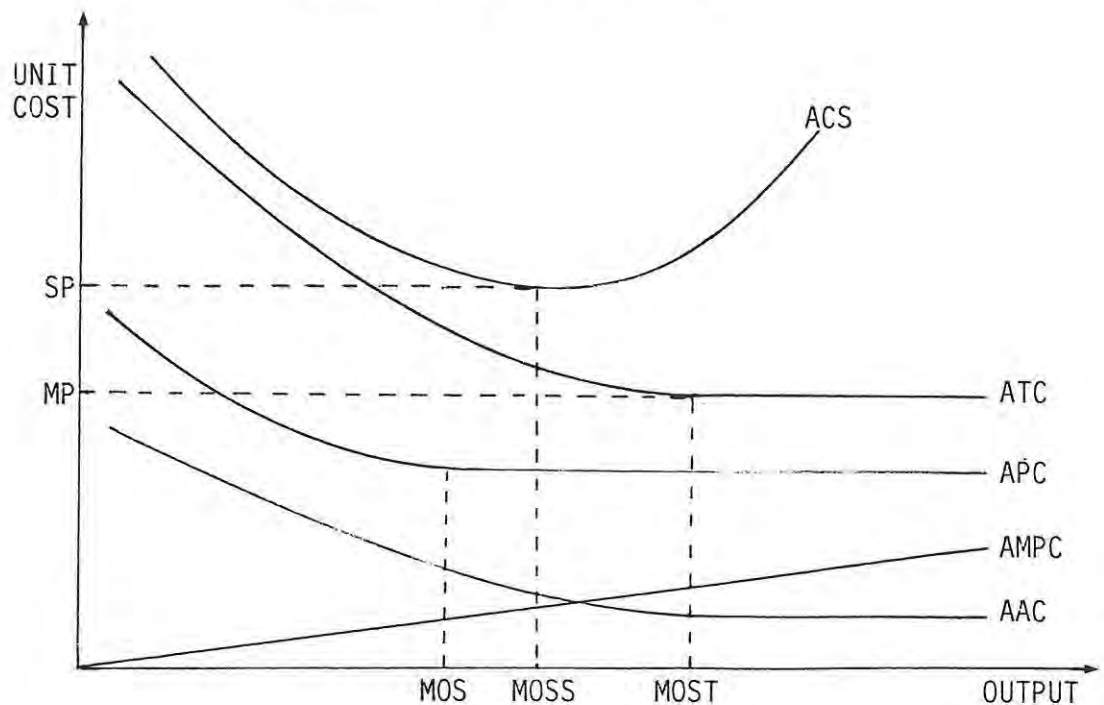
ADVERTISING AND THE COMPETITIVE ADVANTAGE OF LARGE FIRMS



SOURCE: Adapted from J J Lambin. Advertising, Competition and Market Conduct in Oligopoly over Time. Amsterdam. North-Holland. 1976. Page 9.

This model, of course, puts forward the extreme view and it would appear more likely that the ability of the large firm to control its market in the manner suggested by the model is limited. (46) However, there is little doubt that the model does hold partial validity, indicating that advertising related factors can and do give the large firm a superior competitive position vis-a-vis smaller competitors. This advantage is clearly illustrated in Figure 5.5. which takes a microeconomic view of the advertising/firm size relationship.

FIGURE 5.5
ADVERTISING AND FIRM SIZE



SOURCE: Adapted from W S Comanor Advertising and Market Power. Cambridge Mass. Harvard University Press. 1974. Page 62

The curve APC represents the average production costs for large and small firms. MOS is the minimum optimum scale of production. The curve AAC represents average advertising costs for all firms, large and small. AAC represents the advertising costs that are required to maintain market share. The curve ATC represents the vertical sum of AAC and APC and is the average total costs of firms in that industry. Accordingly, MOST represents the minimum optimum scale when both production and advertising costs are considered.

The curve AMPC represents average market penetration costs for small firms wishing to increase their market share. This curve illustrates that the greater the market share gain sought by the small firm the more the unit cost will be. As such AMPC reflects the growing difficulty involved in enticing the customers of the large well established firms to switch allegiance to the product of a small firm.

The curve ACS represents the average total cost, including penetration costs, for small firms. The minimum optimum scale which small firms must try to achieve if they wish to penetrate the market is MOSS and this output must be achieved at a price of at least SP if such firms are to cover their average cost.

Figure 5.5. serves to illustrate two things very clearly. Firstly, any firm producing less than quantity MOST is incurring higher unit costs of production and advertising. Such a firm may be classified as relatively small and can only

exist in the market should the price charged for the product in the market be greater than MP. Should the large firm producing at or beyond MOST set the market price at MP, thereby just covering its average cost (which incorporates normal profit), then the small firm will be forced out of the market in the long run.

Secondly, should the small firm wish to increase its market share with the intention of competing more aggressively with its larger rival, it can only do so if the price set by the larger rival in the market is equal to or greater than SP. Due to the increasing penetration costs, shown by the curve AMPC, any penetration attempt on the part of the small firm at a price of less than SP means a loss on each unit sold and hence ultimate failure. Therefore, as long as the large firm (price leader) holds the price somewhere between MP and SP its position is, ceteris paribus, completely protected.

Apart from the potential advertising benefits which, from the preceding analysis, would appear to accrue to large firms, there are other aspects of the firms promotion mix which could strengthen this advantage.

While it is difficult to make valid predictions regarding the relationship between firm size and sales promotions, it is logical to suggest that, due to their potentially bigger and better trained salesforce, the personal selling effort of large firms is likely to be more effective than that of their small

counterparts. Furthermore, because large firms have more social impact, their potential to benefit from publicity would appear, once again, greater than that of small firms.

Due to the nature of the variables discussed in this section empirical analysis of the firm size/promotion relationship is extremely difficult. Nevertheless, this by no means invalidates the logical conclusion that the aggregate potential for large firms to accrue some advantage over their smaller rivals is undoubtedly positive. Whether this potential is actually realised may indeed be debatable, but even more so is the idea that small firms possess some promotional advantage over their larger counterparts.

5.3.6. Financial Economies of Size

Financial economies of size refer largely to the ability of the firm to raise capital, be it through share issues or by borrowing from financial institutions. There is considerable evidence to suggest that large firms enjoy significant advantages over small firms in this respect. (Whether it can put this capital to more productive use than the small firm is not at issue here).

The main reason for the existence of size related capital cost difference is risk. Studies by Jacquemin et al (47) Jacquemin and Saez (48), Scherer (49), Winn (50) and

Pomfret and Shapiro (51) for example, indicate that the profitability of large firms is more stable than that of small firms. As a result it would appear that investments in large firms are less risky as returns are less variable and bankruptcies more rare.

There are two major reasons which account for the apparent stability of large firms' earnings. Firstly, the ability of a company to spread risks increases with size. If a company has many plants, in many geographic areas, producing a wide variety of products it is less likely to be affected by fluctuations in the social, economic or political environment. Secondly, earnings stability can be more of a nominal and less of a real phenomenon depending on the accounting technique used by any particular firm. Large firms may more often have the ability to smooth reported profits through using such accounting techniques.

As a general rule, stability of earnings is very important to investors in capital markets. They will invest their capital at lower rates of interest and dividend payouts - which means a lower cost of capital to the firm - if returns are stable. This is so largely because where profits fluctuate considerably, there is a greater probability that a few consecutive poor years could lead to bankruptcy and hence the total loss of the investment. (54)

In addition to earnings stability there are a number of, perhaps, secondary factors contributing towards the financial disadvantage of small firms. In the first instance small firms often have to rely on short term credit to finance their operations, and this type of credit is more costly. As Steindle remarks:

"Since small firms have to rely on short term finance, and since, on the other hand, they are driven to borrow relatively much by the inadequacy of their own capital in comparison to the funds required for a reasonably efficient conduct of the business, their financial position is almost always rather insecure". (55)

In addition, by virtue of their size, small firms are forced to raise their capital in smaller increments which further adds to the cost of that capital.

Secondly, the shares of larger firms are usually better known and are more likely to be traded on major stock exchanges. This makes it easier for investors to buy and sell as they wish. The higher probability of investors being caught with illiquid, thinly traded shares leads them to buy small firm shares only when this risk is reflected adequately in the price of the share.

Thirdly, savings in insurance and pension funds have channelled vast amounts of money into large financial institutions. Such institutions do not "find it economic to parcel out this money into the small amounts required

by small firms, but invest the bulk of it in government securities, the equity and loan stock of quoted companies and property". (56) In fact Bannock goes so far as to maintain that:

"It can be shown that in most cases differences in the cost of borrowings are not very important in determining the relative competitiveness of small and large firms in practice; what is more important is that small firms may not be able to borrow at all and cannot therefore get themselves in a position to compete".
(57)

In conclusion, it appears reasonable to state that large firms enjoy considerable advantages over their smaller counterparts in respect of financial benefits as defined in this section. In fact the greater ease with which large firms can borrow money may be one of the main reasons why many large firms today are so highly diversified. That is, they can invest in unrelated product/market areas purely because they have the financial ability to do so and not because of any particular adherence to the principles of strategic planning.

5.3.7. Procurement Costs, Distribution Costs and Firm Size

For the sake of completeness it is necessary to analyse the relationship, if any exists, between firm size and the cost of factor inputs, and firm size and the effectiveness of distribution.

Firm size may confer considerable advantages in the procurement of raw materials and parts, although, once again, individual companies are loathe to divulge the exact form and magnitude of these economies. Nevertheless it is fairly self evident that a supplier faced with a regular and large order is likely to charge a lower unit cost for such an order. In this respect a large firm has greater bargaining power with the supplier than smaller rivals have. The large firm can also afford to employ specialised buyers who can ensure not only a low cost source of supply but also that any inputs into the firms processing system meet stringent specification requirements.

Although it is difficult to assess how important these purchasing economies actually are it is unlikely that the necessity to buy in bulk works against the purchaser. Hence large companies enjoy, at the very least, a potential benefit over their smaller counterparts.

As regards distribution, a larger (and especially a multi-plant) firm supplying large geographic regions or with a broad product range, could enjoy more cost effective access to the market in several ways. (58)

Firstly, when salesmen must call on a large number of actual or potential customers they should be able to achieve larger potential sales per call with a broad product line. Secondly, salesmen should be able to spend more time on each call with less time spent on unproductive

travel between calls. Thirdly, they may specialise and focus their efforts on a narrow portion of the product range, thus doing a better selling job of the products concerned. This is especially important where buyers are only prepared to spend a limited amount of time with the salesmen, so to be effective he must focus his efforts on a few products. Furthermore, increasingly complex products often demand specialisation on the part of salesmen.

Finally, on the macro level, where transportation costs are significant, a large firm operating multiple, geographically dispersed plants each supplying the nearest market, will have far lower distribution costs than a smaller single plant competitor. It is, of course, a prerequisite that each market be large enough to enable each plant to be of at least minimum optimum size.

5.4. COMPANY SIZE - CONCLUSIONS

The relationship between firm size and economic performance would appear to be more contentious than the relationship between economies of scale or experience and economic performance. This confusion is amply reflected in both size/performance theory and in empirical research conducted on the subject over the last fifty years.

On the one hand it is held that the size/profitability relationship is negative. This is typically explained by 'diseconomies of scale to the firm, by x-inefficiencies

generated by large size or by non-profit-maximising behaviour".

(59) This view also receives substantial empirical support.

For example, Samuels and Smyth (60) and Jenny and Weber (61) propose that size and profitability are inversely related.

Devine et al similarly suggest that:

"there is a close association between the extent of diversification and firm size. In general neither the extent of diversification nor firm size are associated with above average rates of profit or growth". (62)

On the other hand there is an abundance of theoretical support for a positive size/profitability relationship. As Williamson explains:

"Empirical evidence has provided no substantiation for the thesis of a long-run U-shaped cost curve and, since firms are not restricted to the sale of a single product or even a particular range of products, there is no more reason to expect profitability to decline with size than there is evidence to suggest that it does". (63)

Baumol puts forward a similar hypothesis:

"Increased money capital will not only increase the total profits of the firm, but because it puts the firm in a higher echelon of imperfectly competing capital groups it may very well also increase its earnings per dollar of investment". (64)

On balance the evidence seems to suggest that a positive size/profitability relationship is prevalent, though the magnitude of this relationship is empirically inconsistent. Crum concludes, "The foregoing analysis has brought about a remarkable apparent correlation between rates of return on equity and the sizes of corporations, as reflected by total assets". (65)

Hall and Weiss (66) and Pessemier (67) come to a similar conclusion though the relationship they find is not as strong as Crum implies. Robinson postulates that the size/profitability relationship varies according to various firm size categories:

"In several industries we find evidence of what we may, perhaps, call a 'Pessimum Firm'. It is a size of firm which combines the technical disadvantages of smallness with the managerial disadvantages of being too large for individual control. In some industries it would appear there is a tendency for firms to fail at one particular size, a size usually that entails a departure from individual management and a local market, in the direction of organised and coordinated management, and a national market. The problem of growth in these industries, the problem of jumping over, or rushing through this pessimum size and the ultimate attainment of the optimum scale of production depends upon the possession of sufficient strength or momentum to carry the small growing firm through the critical point". (68)

It is also held by some authorities that the analysis of size and profitability in isolation is methodologically unsound as size itself is influenced by other variables which must, therefore, also be included in any acceptable analysis. Accordingly, Hurdle (69), Shepherd (70), Gale (71), Jacquemin and Cardon de Lichbuer (72) and Thomadakis (73) suggest the necessity to include risk analysis in any meaningful study. On the other hand Hay and Harris (74), Imal and Helberger (75) and Winn (76) focus on industry structure and concentration in explaining and analysing size and profitability.

In addition to risk and industry structure, the size/profitability relationship may also be significantly influenced by the rate of growth of the firm (77) and the ownership/management circumstances of the firm. (78)

It may be concluded that large firms appear to possess the potential to gain economic advantage over their smaller counterparts. Whether they actually make effective use of this potential is uncertain and results vary with time, samples and methodologies. (79) However, the idea that the size/profitability relationship is negative holds limited appeal as small firms clearly don't possess any overall advantage over their larger rivals. This is particularly evident when drawing conclusions from significant differences in size.

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CHAPTER 6

RESEARCH HYPOTHESES AND METHODOLOGY

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6.1. INTRODUCTION

Chapters 1 - 5 have detailed the theoretical foundations upon which this research is built. Market share has been suggested to be an important factor in the determination of a company's basic cost structure. While the evidence is by no means irrefutable, it is, to say the least, highly convincing.

Through the benefits of learning and experience it has been shown that, in the medium to long term and given certain operational and administrative conditions, those companies producing the greatest cumulative output will be at a cost advantage over competitors producing smaller volumes. The exact size of this cost advantage can only be calculated at the level of the individual company and where exhaustive data requirements are met.

It has also been suggested that the increased volume of physical output within a given period of time gives rise to a reduction in the unit cost of output, through so called 'economies of scale'. Such economies differ most notably from learning and experience cost benefits in that they accrue through volume achievements over a limited time period and not through cumulative volume of output. Economies of scale result from an improvement in the

efficiency of production and distribution of both physical products and services. Although the measurement of scale economies is fraught with complications the theory relating to their existence is most persuasive.

Size per se, on the part of organisations, would also appear to bestow certain advantages on the large company. While empirical evidence is sadly inadequate, it is possible that large companies enjoy important advantages in fields such as production technology, general management, risk management, innovative potential, promotion and distribution. There appears some doubt, however, as to whether large organisations actually make maximum use of these advantages or whether they find it easier and more convenient to sink into the malaise of bureaucratic mediocrity.

In aggregate there can be little doubt that these three criteria namely, experience, scale and size, create the infrastructure within which vast relative cost reduction potential exists. Whether this potential is realised under actual operating conditions is worthy of detailed analysis. Are cost reductions frittered away in unnecessarily high expense structures, or lost in the corridors of bureaucracy? Or are they aggregated over vast quantities of output to result in, ultimately, substantial competitive advantage over smaller, less experienced low volume companies? This Chapter will provide the framework within which these and related issues can be meaningfully investigated.

Chapter 2 has indicated that, apart from relative market share considerations, the growth rate of the market in which the company operates is also significant for strategic management. Different growth rates place different demands on the systems within each functional area of the firm. Various market growth rates place different demands on asset management, operations management, purchasing and sales management. The way in which these demands are managed will have a profound impact on the medium and long run performance of the organisation.

The issues identified, isolated and analysed in the preceding chapters should be of urgent concern to management involved in the strategic planning process within every organisation. If these issues can be addressed and ultimately incorporated into the firms' overall planning system in a meaningful way, one more partial solution to strategy related problems will have been added to management's repertoire.

6.2. RESEARCH OBJECTIVES

In sympathy with many 'recommended approaches to strategic planning' this research has multiple rather than a singular objective, though obviously not all of these objectives can be allocated identical weightings. Taking cognizance of the theoretical and empirically based research foundations presented in previous chapters, the following objectives have been formulated:

- to investigate and report on the relationship between market share, in relation to relevant competition, and the financial performance of appropriate South African quoted companies.
- to investigate and report on the relationship between the rate of market growth and the financial performance of appropriate South African companies within selected markets.
- to investigate and report on the relationship between the simultaneous effect of relative market share and market growth on the financial performance of appropriate South African quoted companies.
- to determine which strategic attributes (as discussed in chapter 2) are significantly influenced by changes in relative market share, changes in the market growth rate or both.
- to determine the nature of the relationship, if any, between the financial performance of companies and their strategic attributes.

Having outlined the research objectives it is now possible to construct the research hypotheses through which the objectives should be achieved.

These issues form the basis of the B.C.G. growth/share portfolio matrix, a complete appraisal of which has been provided in preceding chapters.

6.3. THE RESEARCH HYPOTHESES

Due to the nature of the contingent variables comprising the model under investigation, it was necessary to approach the task of hypothesis construction from three viewpoints.

Firstly, some hypotheses could be developed on the basis of the expected relationships between companies competing in markets of varying growth rates.

Secondly, some hypotheses could be developed on the basis of the expected relationships between companies possessing varying levels of relative market share.

Thirdly, some hypotheses could be developed on the basis of expected relationships between companies characterised by varying market growth rates and relative market share positions.

Furthermore, for each of the above three categories, tests of financial performance as well as tests to determine significant strategic attributes, were carried out.

6.3.1. Hypotheses Relating to the Financial Performance of Businesses within the B.C.G. Growth/Share Matrix

Based on the assertions of the Boston Consulting Group and confirmed by the research conducted by Hambrick et al (1) the cash flow of companies within different cells of the B.C.G. growth/share matrix can be expected to differ. It was thus hypothesised that:

Hypothesis P1: The size of the cash flow on investment ratio will vary according to the four cells of the B.C.G. growth/share matrix. The ratio will be highest for Cash Cow companies followed by Star, Dog and Wildcat companies.

High relative market share companies possess the potential for superior financial performance in comparison with their low relative share counterparts. This proposal is supported by the overwhelming weight of evidence on economies of scale, corporate size benefits and experience

effects. Supporting evidence provided by Hambrick et al (2) and the Strategic Planning Institute (through the PIMS project) suggests the formulation of the following hypothesis:

Hypothesis P2: The profitability, as measured by return on investment, of high relative market share companies will be greater than that of low relative market share companies.

Based on the premise that profit generating opportunities are more abundant in high growth markets (3) it was further hypothesised that:

Hypothesis P3: The profitability, as measured by R.O.I., of businesses competing in high growth markets will be greater than that of businesses competing in low growth markets.

Due to the volatile nature of high growth markets (4) it was hypothesised that:

Hypothesis P4: Businesses operating in high growth markets will show a greater variability of return on investment than those operating in low growth markets.

Due to the fact that high growth markets present a more favourable opportunity for market share gaining tactics in that a share gain by one business need not necessarily imply a decrease in sales of one of it's competitors, it was hypothesised that:

Hypothesis P5: Companies competing in high growth markets will display larger relative market share changes than companies competing in low growth markets.

According to the dimensions of the B.C.G. matrix it is anticipated that businesses operating in high growth markets are faced with an abundance of growth opportunities. (6) As such businesses will naturally tend to take advantage of these opportunities it was hypothesised that:

Hypothesis P6: Businesses competing in high growth markets will show a higher maximum sustainable growth rate than businesses competing in low growth markets.

Having presented the research hypotheses with respect to the financial performance of companies within the B.C.G. growth/share matrix, the following section is devoted to constructing hypotheses with respect fo the strategic attributes of companies within such a matrix.

6.3.2. Hypotheses Relating to the Strategic Attributes of Businesses within the B.C.G. Growth/Share Matrix

6.3.2.1. Hypotheses Related to Asset Structure Attributes (ASA)

Due to the more favourable future prospects in high growth markets companies should show little reluctance to implement

capital projects. In low growth markets where future prospects are less favourable a build up of fixed costs must be carefully controlled. It was thus hypothesised that:

Hypothesis ASA1: Businesses operating in high growth markets will have a higher fixed assets to total assets ratio than businesses operating in low growth markets.

Low relative market share businesses may consciously keep a tight rein on fixed assets in order to reduce fixed costs and hence break even volumes. On the other hand, high relative market share businesses may encourage fixed asset accumulation in order to increase operating leverage. (7) As a result it was hypothesised that:

Hypothesis ASA2: Businesses operating at high levels of relative market share will have a higher fixed assets to total assets ratio than businesses operating at a low level of relative market share.

According to the combined effect of hypotheses ASA1 and ASA2 above it was further hypothesised that:

Hypothesis ASA3: The fixed assets to total assets ratio will vary between the four cells of the B.C.G. growth/share matrix. Star businesses will possess the highest value while Dog businesses will possess the lowest value.

Due to the fact that stock turnover rates may vary between high and low growth markets (8) it was hypothesised that:

Hypothesis ASA4: Businesses operating in high growth markets will have a lower stock to total assets ratio than businesses operating in low growth markets.

In order to keep pace with market growth the investment requirements of companies in high growth markets should tend to exceed those of companies in low growth markets. Accordingly it was hypothesised that:

Hypothesis ASA5: The ratio of long term loans advanced to total assets and short term loans advanced to total assets will be lower for companies operating in high growth markets than for those operating in low growth markets.

According to the predictions of the B.C.G. growth/share matrix high relative market share companies should be financially stronger than their low relative market share counterpart. Thus it was hypothesised that:

Hypothesis ASA6: High relative market share businesses will have a higher long term loans advanced to total assets ratio and short term loans advanced to total assets ratio than businesses with low relative market shares.

Taking the combined effect of hypotheses ASA5 and ASA6 it was further hypothesised that:

Hypothesis ASA7: The long term loans advanced to total assets ratio and the short term loans advanced to total assets ratio will vary between the four cells of the B.C.G. growth/share matrix. Cash Cow businesses will have the highest ratio while Wildcat businesses will have the lowest ratio.

6.3.2.2. Hypotheses Related to Current Asset Attributes (CAA)

The composition of current assets may be expected to vary according to market growth rate. (9) This enabled the construction of the following two hypotheses:

Hypothesis CAA1: The proportion of stock in current assets will be lower for companies operating in high growth markets.

Hypothesis CAA2: The proportion of debtors in current assets will be higher for companies operating in high growth markets.

The superior financial position of high relative market share businesses should reflect itself in improved liquidity for such businesses. As a result it was hypothesised that:

Hypothesis CAA3: The current ratio (that is current assets to current liabilities) and the acid test ratio (that is, current assets less stocks to current liabilities) will be higher for businesses with a high relative market share.

6.3.2.3. Hypotheses Related to Funds Structure Attributes (FSA)

High relative market share businesses can be expected to have a lower level of borrowings than their low relative share counterparts. (10) It was thus hypothesised that:

Hypothesis FSA1: The ratios of long term borrowings to total funds and short term borrowings to total funds will be lower for high relative market share businesses than low relative market share businesses.

6.3.2.4. Hypotheses Related to Borrowed Funds Attributes (BFA)

Due to the varying characteristics of high and low growth markets (11) businesses within each growth type will vary with regard to their propensity to accumulate long or short term borrowings. (12) Accordingly it was hypothesised that:

Hypothesis BFA1: Businesses competing in high growth markets will accumulate a greater proportion of long term loan capital in relation to total borrowed funds than businesses competing in low growth markets.

High relative market share businesses can be expected to exploit, to some degree, their dominant position in the market. One principal area where exploitation could occur is in the payment of creditors. It was thus hypothesised that:

Hypothesis BFA2: The creditors to total current liabilities ratio will be higher for businesses with high relative market share than for businesses with low relative market share.

6.3.2.5. Hypotheses Related to Asset Growth Attributes (AGA)

Due to the nature of high growth markets (13) companies competing in such markets should display an asset growth rate somewhat higher than companies competing in low growth markets. Therefore, the following hypothesis was formulated:

Hypothesis AGA1: The asset growth rate (measured in terms of both fixed asset growth and current asset growth) for companies in high growth markets will be greater than for companies in low growth markets.

6.3.2.6. Hypotheses Related to Capital Utilisation Attributes (CUA)

According to the theory on experience, scale and size effects as presented in chapters 3, 4 and 5, high relative market share businesses are more cost efficient than low relative share businesses because at the current market price they earn higher gross profit margins. This supposition allows the formulation of the following hypotheses:

Hypothesis CUA1: High relative market share businesses will turn over their assets more rapidly than low relative market share businesses.

Hypothesis CUA2: High relative market share businesses will turn over current liabilities more rapidly than low relative market share businesses.

Due to the possibility that the limited opportunities found in low growth markets may force businesses operating in such markets to reduce their rate of asset accumulation (14) it was further hypothesised that:

Hypothesis CUA3: Businesses competing in low growth markets will turn over their assets more rapidly than businesses competing in high growth markets.

According to the Boston Consulting Group, businesses operating in high growth markets should be experiencing cash flow difficulties and may thus increase their liabilities in relation to businesses operating in low growth markets. As a result the following hypothesis was formulated:

Hypothesis CUA4: The turnover of current liabilities will be lower for businesses in high growth markets than for businesses in low growth markets.

The combined effect of Hypothesis CUA1 and CUA3 and Hypotheses CUA2 and CUA4 enabled the construction of the following two hypotheses:

Hypothesis CUA5: The turn over of total assets will vary between the four cells of the B.C.G. growth/share matrix. Cash Cow businesses will turn over their assets more rapidly while Wildcat businesses will turn over their assets least rapidly.

Hypothesis CUA6: The turnover of current liabilities will vary between the four cells of the B.C.G. growth/share matrix. Cash Cow businesses will have the highest turnover of current liabilities while Wildcat businesses will have the lowest turnover of current liabilities.

6.3.2.7. Hypotheses Related to Attributes Reflected on the Income Statement (ISA)

Due to the greater experience, scale and size of high relative market share businesses it was hypothesised that:

Hypothesis ISA1: High relative market share businesses will have higher gross profit and trading profit margins than low relative market share businesses.

Based on the recommendations of the Boston Consulting Group it can be expected that the only categories of businesses within the growth/share matrix which should be pursuing growth strategies are Wildcat businesses and, if the situation is favourable, Star businesses.

Accordingly it was hypothesised that:

Hypothesis ISA2: The various categories of businesses within the B.C.G. growth/share matrix will display different rates of increase in turnover. Wildcat businesses will display the highest rate of increase in turnover followed by Star businesses. Dog and Cash Cow businesses will display the lowest rate of increase in turnover.

In developing the hypotheses the impact of relative market share and the impact of the market growth rate (or product life cycle stage) on the strategic attributes and the financial performance of businesses have been analysed both in isolation from each other and in terms of their joint and simultaneous effect. This approach has been adopted for two reasons: Firstly, each variable on its own has the ability to affect business performance significantly and thus deserves individual attention. Secondly, by analysing each variable independently it is possible to gain some indication of the relative

contribution of each to the attributes and performance of businesses within the growth/share matrix.

6.3.3. The Nature and Degree of Relationship Between the Statistically Significant Performance Measures and Significant Strategic Attributes

Once the hypothesis outlined above had been tested it was necessary to determine the following.

6.3.3.1. Which performance measures were related to the statistically significant strategic attributes?

6.3.3.2. Was the relationship between performance measures and strategic attributes a positive or negative one?

The completion of the final aspect of the research (as explained in Chapter 2, Section 2.7.3.) enables the researcher to link, in a formal manner, specific attributes to specific performance measures.

6.4. GENERAL RESEARCH PROBLEMS AND LIMITATIONS

The research was conducted on a carefully selected group of South African industrial companies over the period 1977 - 1981 inclusive. The time period considered created numerous complications, the most important of which are outlined below:

6.4.1. The Limited Number of South African Quoted Industrial Companies

During the period under analysis, there were approximately 250 industrial companies which remained unaltered in name quoted on the Johannesburg Stock Exchange. Those

companies were divided amongst 21 industrial sectors and 80 industry groups. As a result, where the nature of the research necessitates the elimination of certain companies from the study, because they do not meet certain requirements, it is possible that too few companies remain for a meaningful analysis in certain sectors.

Due to the requirements of this research 60% of industrial companies could not be included in the final investigation.

6.4.2. Inflationary Conditions

The rate of inflation in the South African Economy during the years over which this study was conducted is given in Table 6.1

TABLE 6.1.
INFLATION IN SOUTH AFRICA 1977 - 1981

YEAR	NET CHANGE IN THE C.P.I.
1977	11,3%
1978	10,9%
1979	13,2%
1980	13,8%
1981	15,2%
AVERAGE	12,88

SOURCE: Trends: A Statistical Analysis of Economic Trends Bureau of Economic Research.
University of Stellenbosch. Vol 5 No. 1
March 1982 Table 4,1.

The average rate of inflation, as measured by the consumer price index was thus 12,88%. However, it is reasonable to assume that different rates of inflation would exist within each of the 21 industrial sectors and 80 industrial groups for each of the years under consideration. However, data of this nature is not presently available in South African published statistics. Due to the need to avoid estimations of a potentially arbitrary nature it was decided to work on the basis of nominal Rand values in each case, and thus no adjustment for inflation was made.

Furthermore, the majority of statistics consulted for this research were given only at current market prices which, similarly, make no allowance for inflationary effects.

6.4.3. South African Economic Growth

Closely allied to the issue of inflation is the real (or nominal) growth of South Africa's Gross Domestic Product (G.D.P.) over the years 1977 - 1981. As with the inflation rate the G.D.P. varied considerably during this period, as Table 6.2 shows, with an average growth of 18,74% p.a.

TABLE 6.2

THE NOMINAL GROWTH OF SOUTH AFRICA'S GROSS DOMESTIC
PRODUCT 1977 - 1981

YEAR	CHANGE IN THE G.D.P. (%)
1977	11,7
1978	15,5
1979	20,4
1980	34,1
1981	12,0
AVERAGE	18,74

SOURCE: Trends: A Statistical Analysis of Economic Trends . Vol 5 No 1. March 1982.
Bureau of Economic Research. University of Stellenbosch. Table 4.1.

The average growth rate of G.D.P. is composed of the average growth for all economic activities during the period. The companies comprising the research population were, however, all industrial companies and the industrial sector could not be presumed to be growing at the same rate as the economy in general. As a result, in order to establish some meaningful yardstick on which to base the market growth rate dimension of the B.C.G. matrix it was necessary to isolate the growth rate of the industrial sector of the South African economy. (See Tables 6.8 and 6.9).

6.4.4. Data Availability

The unavailability of data presents a particularly serious problem to the South African researcher. Firstly, government statistical sources are extremely unsystematically organised, reducing, to a large degree, the value of available information. Secondly, the disclosure requirements of South African companies in terms of The Company's Act, No. 61 of 1973 (As Amended) are totally inadequate for serious research purposes. For example, companies are not required to disclose turnover figures for the year, nor are they required to disclose their cost of sales or the duration of lease agreements. These deficiencies impose severe limitations, especially on the researcher who requires reliable profitability estimates or any estimate of approximate market share.

Due to the fact that the disclosure of turnover figures is "generally accepted accounting practice" in South Africa, a growing number of companies do in fact disclose such information. However, when the researcher is dealing with data dating back a number of years, fewer and fewer turnover figures are available.

Wherever data was unavailable the firms concerned were only removed from the investigation if that data was vital to the research. Otherwise the companies were included in the analysis and the variable concerned was merely listed as missing data.

6.5. THE RESEARCH POPULATION

The initial research population was 'all industrial companies quoted on the Johannesburg Stock Exchange at the 31st December 1981'. This population was then subjected to scrutiny along several dimensions in order to arrive at the final population suitable for investigation. Of the initial 250 companies analysed all but 94 were eliminated as being unsuitable for the following reasons:

1. Those companies quoted on the Johannesburg Stock Exchange in 1981 which were not quoted for the entire 5 year period under investigation were eliminated. Those companies which had merely changed their registered name were kept in the population for further scrutiny.
2. All remaining companies were categorised according to their industry group as defined by the Standard Industrial Classification system. This group is identified by the four figure S.I.C. code.
3. Those companies which were found to be competing in more than one industry group, and where these groups were incompatible, were eliminated from the population.
4. Any company which had changed from one industry group to another during the time period under consideration was dropped from the population.

These elimination procedures are fully discussed and evaluated in section 6.7. of this chapter, "Research Methodology".

The remaining 94 companies constitute the final research population.

A breakdown of the research population according to industrial sector is given in Table 6.3.

TABLE 6.3

THE RESEARCH POPULATION BY INDUSTRIAL SECTOR AS DEFINED
BY THE JOHANNESBURG STOCK EXCHANGE

INDUSTRIAL SECTOR	ABSOLUTE FREQUENCY
Beverages and Hotels	1
Building and Construction	8
Chemicals and Oil	4
Clothing, Footwear & Textiles	19
Electronics, Electrical and Battery	4
Engineering	4
Fishing	6
Food	6
Furniture & Household Goods	5
Motor	3
Paper and Packaging	6
Pharmaceutical & Medical	3
Printing and Publishing	6
Steel and Allied	3
Stores	14
Preference Shares	1
Debentures	1
TOTAL	94

All companies suitable for the research purposes were included in the final population, hence all statistical problems associated with sampling have been completely avoided.

A list of the research population by industrial sector is given in Appendix 1.

6.6. THE DATA SOURCES

The following data sources were used in developing the research methodology:

1. The Bureau of Market Research at the University of South Africa was used to assist in the placement of companies into the relevant four digit S.I.C. code market.
2. The Johannesburg Stock Exchange Handbooks Vols 1 and 2 1977 to 1981 were used to assist in the placement of companies into the relevant four digit S.I.C. code market.
3. The Investors' Guide Manuals (Published by Financial Analysis Pty Ltd - Johannesburg) 1977 to 1981 were used to assist in the placement of companies into the relevant four digit S.I.C. code market.
4. The Standard Industrial Classification of All Economic Activities. 3rd Edition. 1981. (Department of Statistics) was used to reference companies to their relevant major industry groups.
5. The Bulletin of Statistics Vols 1 - 4 1980 to 1982 (Department of Statistics) was used to source the annual sales, at current prices, of each major industrial group for the period 1977 to 1981.
6. Stats. May 1982 Volume 18. No. 5. (George Warman Publications. Cape Town) was used to source the South African gross national product by retail sales for the period 1977 to 1981.
7. The Bureau of Financial Analysis at The University of Pretoria was used to provide a vast quantity of necessary financial data and ratios on the research population.
8. Published company accounts were used where necessary to supplement the above data sources.

9. Trends: A Statistical Analysis of Economic Trends. (Published by the Bureau of Economic Analysis at Stellenbosch University was used to source South African Gross Domestic Product.
10. The South African Reserve Bank Quarterly Bulletin was used to source South African Gross Domestic Product by type of Economic Activity.

6.7. THE RESEARCH METHODOLOGY

In order for a company to qualify for inclusion in the final research population, several stringent requirements had to be met. These requirements are detailed in the following sections 6.6.1 to 6.6.4.

6.7.1. The Classification of Companies into Markets

The classification of companies into their relevant markets was necessary in order to be able to make intra-industry comparisons of data.

The entire process was governed by the need to meet, as far as was possible, the following two requirements identified by Abel and Hammond:

"First, the definition (of the market) must be such that relative market share bears some relationship to relative costs. Otherwise the underlying cash flow relationships on which the displays are based become meaningless. Practically speaking this means that the level should be selected in a way that takes account of shared experience or economies of scale arising from shared production or marketing activities on the part of you or your competitors. It can occasionally indicate a narrower definition, especially when there are unique economies of scale or experience in serving a particular market segment.

Secondly, the definition should separate markets which are essentially different in terms of competitors, strategies, growth rates" (15)

The central issue in the allocation of companies to various markets was, as identified by Abel and Hammond, whether this should be done on the basis of the market which the company served, or on the basis of the total market for the company's product category. On many occasions these two were synonymous in which case the allocative process was relatively simple. Where there was a significant difference between the served and the total market, the latter definition was used, on the basis that the broader the market definition the more likely the benefits of relatively high market share would make themselves evident.

In some cases, for example the rubber products industry, it was possible to define the market in terms as broad as the three digit Standard Industrial Classification code.

In many instances the definition of a market was strongly influenced, if not completely controlled, by the nature of available data on the market concerned. For example, sales data on the footwear market is available only in aggregate form, thus any company producing only mens and boys or ladies and girls footwear was necessarily deemed to be competing in the total footwear market.

In order to accomplish the allocation of firms to their relevant markets, extensive use was made of the Standard Industrial Classification (SIC) system. The South African

Classification system was used. This system is based on the International Standard Industrial Classification System drawn up by the Statistical Office of the United Nations. Suitable adaptations for local conditions exist in the South African version.

The use of the S.I.C. system was made for a number of reasons. Firstly, much research data was gathered from government statistics which are, in the main, presented in terms of the various S.I.C. code levels. The manipulation of this data to conform with some other system, for example the Johannesburg Stock Exchange Sectoral Classification, could lead to arbitrary allocations and result in spurious research findings. Secondly, the S.I.C. system is extremely flexible in that any economic activity can be classified at any of five different activity levels as Table 6.4 illustrates.

TABLE 6.4.

THE FIVE DIFFERENT ECONOMIC ACTIVITY LEVELS PROVIDED BY THE STANDARD INDUSTRIAL CLASSIFICATION SYSTEM: AN EXAMPLE OF THE MANUFACTURING SECTOR

STANDARD INDUSTRIAL CLASSIFICATION	DESIGNATION	NAME
3	Major Division	Manufacturing
32	Division	Textile, Wearing Apparel and Leather industries
321	Major Group	Manufacture of Textiles
3213	Industry	Knitting Mills
32130	Sub Group	Garment & Hosiery Knitting Mills

As a result of the flexibility provided by the system it was possible to allocate various companies to more meaningful markets - which were defined in terms of the S.I.C. system.

A final reason for making use of the S.I.C. system for this research is provided by the Secretary for Statistics:

"All government departments, other public and private bodies and private persons engaged in any type of work which involves the classification of establishments as statistical units, are requested to adopt this classification as a standard, as far as this is feasible. The general application of the principles and definitions of this classification will promote uniformity and comparability of statistics available from different sources". (16)

Using the data sources outlined in sections 6.6 of this chapter, the research population was allocated to the relevant markets in the following manner:

- The nature of the companies business was ascertained at three different points in time, being the years 1977, 1979 and 1981. Any company which changed the fundamental nature of its business was considered unsuitable for the research and was eliminated from the research population.

The rationale behind this procedure lies in the fact that no meaningful comparison of companies is possible if they are not competing in essentially the same market. Thus a company's average performance, for example, over the five year period under investigation must be derived from a business of one basic nature and not from a business which has changed fundamentally in nature.

- Companies partaking in two or more businesses of any essentially different nature were eliminated from the research population. (Where companies were vertically

integrated the activities of the company were considered to be of a related nature and hence such companies were retained).

- All companies in the research population were initially categorised according to industry group (four figure S.I.C. code).
- Companies partaking in two or more businesses of essentially similar natures, for example the manufacture of carpets, rugs and cordage, rope and twine, were allocated a dual industry group classification.
- Companies officially falling within the same S.I.C. category but which were obviously in different industries, for example newspaper printing and publishing and printing and publishing in general, were separated on the basis of the researcher's discretion.
- Where companies were vertically integrated, for example the operation of knitting mills (S.I.C. code 3213) and the manufacture and sale of garments (S.I.C. code 3220), the industry was defined in terms of the activity performed closest to the ultimate consumer. This industry can logically be viewed as reflecting the market in which that company intends to compete. Any operation prior to the last downstream activity was treated purely as a complementary operation as opposed to a separate business.
- Companies involved in the manufacture of rubber products were all found to manufacture such a wide range of products that they could be allocated to a three digit S.I.C. market.
- All retailing concerns were more aptly described by the 5 digit S.I.C. code, which is the industry sub-group level.

It should be noted that, due to the selection procedures used the final research population is, in terms of the research objectives, without bias. As a result the research population is identical in all respects to a random sample and hence can be manipulated using any accepted statistical procedure.

A list of the research population by industry sub-group, industry group and by major group (where applicable) is provided in

Appendix 2. The industry group breakdown of the research population is given in Table 6.5.

TABLE 6.5

THE RESEARCH POPULATION BY S.I.C. INDUSTRY GROUP

3,4 OR 5 DIGIT S.I.C. CODE	INDUSTRY DESCRIPTION	ABSOLUTE FREQUENCY
3111	Slaughtering, preserving and preparing meat	1
3113	Canning and preserving of fruit and vegetables	1
3114	Canning, preserving and processing of fish crustacea and similar foods; manufacture of fish oil and meal	7
3116/7	Grain mill products. Manufacture of bakery products	2
3119	Manufacture of cocoa, chocolate and sugar confectionery	1
3131	Distilling, rectifying and blending spirits; wine industries	1
3211	Spinning, weaving and finishing textiles	4
3213	Knitting mills	2
3214/5	Manufacture of carpets and rugs. Cordage, rope and twine industries	1
3220	Manufacture of wearing apparel, except footwear	11
3231	Tanning and leather finishing	1
3240	Manufacture of footwear	3
3311	Sawmills, planing and other wood mills	1
3320	Manufacture of furniture and fixtures except primarily of metal	2

3,4 OR 5 DIGIT S.I.C. CODE	INDUSTRY DESCRIPTION	ABSOLUTE FREQUENCY
3412	Manufacture of containers and boxes of paper, paper board and paper substitutes	3
3419	Manufacture of pulp, paper and paperboard articles not elsewhere classified	1
3420 (i)	Printing, publishing and allied industries including publishing as a separate business	3
3420(ii)	Printing, publishing and allied industries including publishing as a separate business - predominantly newspaper	4
351	Manufacture of industrial chemicals	2
3512	Manufacture of fertilizers and pesticides	1
3521	Manufacture of paints, varnishes and lacquers	1
3522	Manufacture of medicinal and pharmaceutical preparations	1
3523	Manufacture of soap and cleaning preparations, perfumes, cosmetics and other toilet preparations	1
355	Manufacture of rubber products	3
3559	Manufacture of rubber products not elsewhere classified	1
3691	Manufacture of structural clay products	1
3692	Manufacture of cement	1
36990	Plaster and other composite sheets, pipes, etc. from gypsum, cement, asbestos etc.	3
3710	Iron and steel basic industries	2
3812	Manufacture of furniture and fixtures primarily of metal	2
3813	Manufacture of structural metal products	1

3, 4 OR 5 DIGIT S.I.C. CODE	INDUSTRY DESCRIPTION	ABSOLUTE FREQUENCY
38193	Headed and threaded articles	1
3825	Manufacture of office computing and accounting machinery	1
38299	Machinery and equipment except electrical, not elsewhere classified	1
3831	Manufacture of electrical industrial machinery and apparatus	1
3832	Manufacture of radio, television and communication equipment and apparatus	1
3833	Manufacture of electrical appliances and houseware	1
38390	Insulated wires and cables	3
3862	Manufacture of photographic and optical goods	1
62004	Mens Outfitters	1
62006	General Outfitters and dealers in piece goods and textiles	3
62008	Dealers in furniture, household requisites and household appliances	4
62010	Jewellers	1
62016	General departmental stores	2
62017	General dealers	4
	TOTAL	94

6.7.2. Calculation of Market Growth According to the Relevant Standard Industrial Classification Code

Having identified the markets with which the research was concerned, the growth rates of such markets over the period 1977 - 1981 was calculated. The market growth rate, which may be viewed as a surrogate for product life cycle stage, comprises the vertical axis of the B.C.G. model under investigation.

Using statistics provided by the Department of Statistics, through the Bulletin of Statistics, market growth rates for the 44 markets covered in the investigation were calculated. All relevant data involved in this process is provided in Appendix 3.

All calculations were based on current prices with no adjustment being made for inflation. As all Rand statistics in the research were used on this basis no inconsistencies in research findings are expected.

A summary of the various market growth rates is provided in Table 6.6.

TABLE 6.6.

MARKET GROWTH RATES (5 YEAR AVERAGE) 1977 - 1981

S.I.C. CODE	MARKET (INDUSTRY DESCRIPTION)	GROWTH RATE %
3111	Slaughtering, preserving and preparing meat	15,0
3113	Canning and preserving of fruit and vegetables	15,0
3114	Canning, preserving and processing of fish, crustacea and similar foods; manufacture of fish oil and meal	18,0
3116/7	Grain mill products. Manufacture of bakery products	21,0
3119	Manufacture of cocoa, chocolate and sugar confectionery	20,0
3131	Distilling, rectifying and blending spirits; wine industries	17,0
3211	Spinning, weaving and finishing textiles	15,0
3213	Knitting mills	18,0
3214/5	Manufacture of carpets and rugs. Cordage, rope and twine industries	47,0
3220	Manufacture of wearing apparel, except footwear	19,0
3231	Tanneries and leather finishing	25,0
3240	Manufacture of footwear	25,0
3311	Sawmills, planing and other wood mills	25,0
3320	Manufacture of furniture and fixtures except primarily of metal	25,0
3412	Manufacture of containers and boxes of paper, paper board and paper substitutes	18,0
3419	Manufacture of pulp, paper and paperboard articles not elsewhere classified	23,0

S.I.C. CODE	MARKET (INDUSTRY DESCRIPTION)	GROWTH RATE (%)
3420	Printing, publishing and allied industries including publishing as a separate business	22,0
351	Manufacture of industrial chemicals	29,0
3512	Manufacture of fertilizers and pesticides	21,0
3521	Manufacture of paints, varnishes and lacquers	19,0
3522	Manufacture of medicinal and pharmaceutical preparations	26,0
3523	Manufacture of soap and cleaning preparations, perfumes, cosmetics and other toilet preparations	18,0
355	Manufacture of rubber products	21,0
3559	Manufacture of rubber products not elsewhere classified	25,0
3691	Manufacture of structural clay products	30,0
3692	Manufacture of cement	25,0
36990	Plaster and other composite sheets, pipes, etc. from gypsum, cement, asbestos etc.	12,0
3710	Iron and steel basic industries	22,0
3812	Manufacture of furniture and fixtures primarily of metal	18,0
3813	Manufacture of structural metal products	37,0
38193	Headed and threaded articles	28,0
3825	Manufacture of office, computing and accounting machinery	31,0
38299	Machinery and equipment except electrical, not elsewhere classified	24,0
3831	Manufacture of electrical industrial machinery and apparatus	10,0
3832	Manufacture of radio, television and communication equipment and apparatus	12,0
3833	Manufacture of electrical appliances and housewear	15,0
38390	Insulated wires and cables	28,0
3862	Manufacture of photographic and optical goods	15,0

S.I.C. CODE	MARKET (INDUSTRY DESCRIPTION)	GROWTH RATE (%)
62004	Mens Outfitters	16,0
62006	General Outfitters and dealers in piece goods and textiles	16,0
62008	Dealers in furniture household requisites and household appliances	15,0
62010	Jewellers	15,0
62016	General departmental stores	16,0
62017	General dealers	8,0

6.7.3. Constructing The Market Growth Rate Dimension of the B.C.G. Matrix

The B.C.G. model in its simplest form relies on an arbitrarily determined real market growth rate of 10% p.a. to separate high and low growth markets. Hambrick *et al* (17) in their study use this approach because, they claim, of "the absence of systematic data on alternatives".

6.7.3.1. South African Gross Domestic Product (G.D.P.) 1977 - 1981

It may be argued, on conceptual grounds, that any industry which grows at a rate greater than the economy in general is a high growth industry, while for a low growth industry the converse is true. However, the use of the G.D.P. as an indicator of average market growth poses certain problems, the most serious being the composition of the statistic. Total G.D.P. is calculated as the sum of the

contributions of the various activities performed in the economy during the year. Should any of these activities exert a significant influence on the total G.D.P. any unusual movement in such an activity would likewise distort the total figure. In South Africa the value of the mining and quarrying activity poses such a problem in that over the period 1977 to 1981 this activity constituted an average of 19,8% of the total G.D.P.

The total G.D.P. and the proportion contributed by mining and quarrying is given in Table 6.7.

TABLE 6.7

SOUTH AFRICAN G.D.P. 1977 - 1981 - TOTAL AND MINING AND QUARRYING ACTIVITY. (R Millions)

YEAR	TOTAL G.D.P.	GROWTH (RANDS)	GROWTH %	MINING & QUARRYING	GROWTH (RANDS)	GROWTH %	MINING AS % OF TOTAL
1977	28 089			3 997			14,2
1978	32 451	4 362	15,5	5 601	1 604	40,1	17,3
1979	39 069	6 610	20,4	8 187	2 586	46,2	21,0
1980	52 402	13 333	34,1	13 400	5 213	63,7	25,6
1981	58 671	6 296	12,0	11 024	-2 376	-17,7	21,0
AVERAGE			20,5			33,1	19,8

SOURCE: Adapted from: The South African Reserve Bank Quarterly Bulletin. June 1982. Page 84

Table 6.7 illustrates that while South Africa's G.D.P. was growing at some 20,5% p.a. from 1977 to 1981, the mining and quarrying activity over the same period grew by an average of 33,1%.

Given the fact that mining and quarrying constitute nearly 20% of the total G.D.P., without the mining and quarrying activity South Africa's G.D.P. would be far less impressive.

As a result of the potential distortion of the National Accounts by mining and quarrying, or any other activity, the use of total G.D.P. as the central statistic from which to calculate high or low market growth rates was rejected.

In order to categorise high and low growth markets use was made of the average growth rate of the economic activity within which that market fell. Thus the growth rate of the footwear market, for example, was classified as "high" due to the fact that this market grew at 25% p.a. on average between 1977 and 1981 while the average growth rate for all manufacturing activities over the same period was only 21,3%.

Broadly speaking, all the markets within which the research population compete fall into two economic categories; retail and manufacturing. The average growth rate of these activities is shown in tables 6.8 and 6.9.

TABLE 6.8

SOUTH AFRICAN GROSS DOMESTIC PRODUCT BY KIND OF ACTIVITY:
MANUFACTURING. 1977 - 1981 (AT CURRENT PRICES)

YEAR	VALUE (R MILLIONS)	GROWTH	GROWTH %
1977	7 511		
1978	8 301	790	10,5
1979	10 106	1 805	21,7
1980	13 235	3 129	31,0
1981	16 136	2 901	21,9
AVERAGE			21,3

SOURCE: Adapted from: The South African Reserve Bank
Quarterly Bulletin. June 1982. Page 84.

TABLE 6.9

SOUTH AFRICAN GROSS DOMESTIC PRODUCT BY KIND OF ECONOMIC ACTIVITY :
RETAIL 1977 - 1981 (AT CURRENT PRICES)

YEAR	VALUE (R 000's)	GROWTH	GROWTH %
1977	10 914		
1978	11 564	650	6,0
1979	12 752	1 188	10,3
1980	15 961	3 209	25,2
1981	19 533	3 572	22,4
AVERAGE			16,0

SOURCE: Adapted from: STATS . Vol. 18 No. 5 May 1982.
Page 64 and STATS . Vol. 17 No. 1 January
1981. Page 3 (George Warman Publications.
Cape Town).

In terms of the data presented above, the markets identified in table 6.5 were divided into "low" and "high" growth categories on the following basis:

Market Growth Rate Definition No. 1

- Any market which displayed a 5 year average growth rate of less than its relevant economic activity category was classified as a "low" growth market.
- Any market which displayed a 5 year average growth rate of more than its relevant economic activity category was classified as a "high" growth market.

In terms of actual growth rates achieved this means that any market in the manufacturing field which grew at a nominal rate of 22% p.a. or more was classified as a high growth market, while the converse was true for markets growing at less than 22% p.a.

In the retail sector the high/low market growth rate dividing line was drawn at 16% p.a., calculated at current prices.

However, a comparison of tables 6.5 and 5.6. show that the growth rates of several markets fall within a narrow range either side of the relevant G.N.P. growth percentage. These markets had the potential to bias the analysis by creating a heavy weighting around the mean G.N.P. where the distinction between high and low market growth is somewhat blurred. In order to eradicate this potential bias a second analysis was performed on three market growth rate categories; high, medium and low each of which was defined as follows:

Market Growth Rate Definition No. 2

- Any market within the manufacturing activity, which grew at less than a nominal 5 year average rate of 20% p.a. was classified as a low growth market.
- Any market, within the retail activity which grew at less than a nominal 5 year average rate of 14% p.a. was classified as a low growth market.
- Any market, within the manufacturing activity which grew at a nominal 5 year average rate of between 20% p.a. - 24% p.a. inclusive was classified as a medium growth market.
- Any market within the retail activity which grew at a nominal 5 year average rate of between 14% p.a. - 18% p.a. inclusive, was classified as a medium growth market.
- Any market, within the manufacturing activity which grew at a nominal 5 year average rate of more than 24% p.a. was classified as a high growth market.
- Any market within the retail activity which grew at a nominal 5 year average rate of greater than 18% p.a. was classified as a high growth market.

In this way those markets which grew at more or less the same rate as their relevant G.N.P. activity were isolated into a "medium" growth rate category and thus could not affect the analysis of clearly high or low growth markets.

The distribution of markets between high/low and high/medium/low categories is given in table 6.10.

TABLE 6.10

THE DISTRIBUTION OF RESEARCH MARKETS BY HIGH/LOW (DEFINITION NO. 1) AND HIGH/MEDIUM/LOW (DEFINITION NO. 2) GROWTH RATE CATEGORIES

Market: S.I.C. Code	Growth Rate (%)	Definition No. 1		Definition No. 2		
		High	Low	High	Medium	Low
3111	15		X			X
3113	15		X			X
3114	18		X			X
3116/7	21		X		X	
3119	20		X		X	
3131	17		X			X
3211	15		X			X
3213	18		X			X
3214/5	47	X		X		
3220	19		X			X
3231	25	X		X		
3240	25	X		X		
3311	25	X		X		
3320	25	X		X		
3412	18		X	X		
3419	23	X			X	
3420	22	X			X	
351	29	X		X		
3512	21		X		X	
3521	19		X			X
3522	26	X		X		
3523	18		X			X
355	21		X		X	
3559	25	X		X		
3691	30	X		X		
3692	25	X		X		
36990	12		X			X
3710	22	X			X	
3812	18		X			X
3813	37	X		X		
38193	28	X		X		
3825	31	X		X		
38299	24	X			X	
3831	10		X			X
3832	12		X			X
3833	15		X			X
38390	28	X		X		
3862	15		X			X
62004	16	X			X	
62006	16	X			X	
62008	15		X		X	
62010	15		X		X	
62016	16	X			X	
62017	8		X			X
AVERAGE	20,9	-	-	-	-	-
TOTAL	-	21	23	15	13	16

6.7.4. The Relative Market Share Dimension

The calculation of relative market share for each company in the research population was vital for research purposes in that this variable comprises the horizontal axis of the B.C.G. model under investigation.

Using the standard approach to the model relative market share was defined as:

The ratio of the market share held by the company under investigation, relative to the market share held by its leading competitor.

The ratio of the market shares of companies must be identical to the ratio of those companies' turnovers (in units). Thus it is unnecessary to calculate actual market share in order to calculate relative market share.

The relative market share of each company in the research population was calculated using turnover figures in Rand values as no unit sales data was available. This technique is not optimal as traditionally experience effects and economies of scale, in particular, are linked to unit volumes not sales values. However, the use of sales values does not invalidate the analysis, as has been explained in chapter 2. It merely requires the assumption that all units sold are sold at an average industry price, in which case sales values will be directly proportionate with sales in units.

The assumption of an average industry price would appear to be totally acceptable in that it is already implicit in the theory

of experience effects, economies of scale and corporate power through size. That is, due to these factors some companies have lower unit costs and hence receive greater margins than others at the average industry price.

Using the traditional approach to the B.C.G. model, companies were initially divided into high and low relative market share categories as follows:

Relative Market Share Definition No. 1

- Any company which displayed a 5 year average relative market share value of less than 1,0 was, by definition, a market follower and was categorised as having a low relative market share.
- Any company having a 5 year average relative market share value of more than 1,0 was, by definition, the market leader and was categorised as having a high relative market share.

The nature of the relative market share calculation tends to portray a greater separation of companies (in relative market share terms) than actual turnover figures would suggest. This is presumably the main reason behind the use of a log scale on the relative market share axis. For example, in a simple two company market, if the market follower has a turnover of 50% of the market leader's, it would have a relative market share of only 25% of the leader's. This mathematical illusion has the effect of dispersing companies away from the 1,0 relative market share value on the portfolio matrix. Thus, companies closest to the 1,0 value should not be viewed as clearly high or low relative market share companies.

A number of companies in the research population fell close to the 1,0 relative market share dividing line. Due to the fact that such companies were not clearly high or low relative market share companies they were isolated into an "average" relative market share group. This procedure, like that followed for the categorisation of market growth rates, was designed to prevent a distortion of the characteristics of clearly high and low relative market share companies. Accordingly an alternative definition of relative market share categories was developed.

Relative Market Share Definition No. 2

- Any company which displayed a 5 year average relative market share value of less than 0,5 was categorised as having a low relative market share.
- Any company which displayed a 5 year average relative market share value of between 0,5 and 2,0 was categorised as having a medium relative market share.
- Any company which displayed a 5 year average relative market share value of greater than 2,0 was categorised as having a high relative market share.

According to theory, the benefits of experience, scale and size, as outlined in chapters 3, 4 and 5, are most likely to be found where there are significant share, cumulative output or size differences between companies. These benefits should be clearly identified when comparing companies of high and low relative market share according to the second definition of relative market share categories.

The relative market share of the relevant companies in the research population is given in Appendix 4.

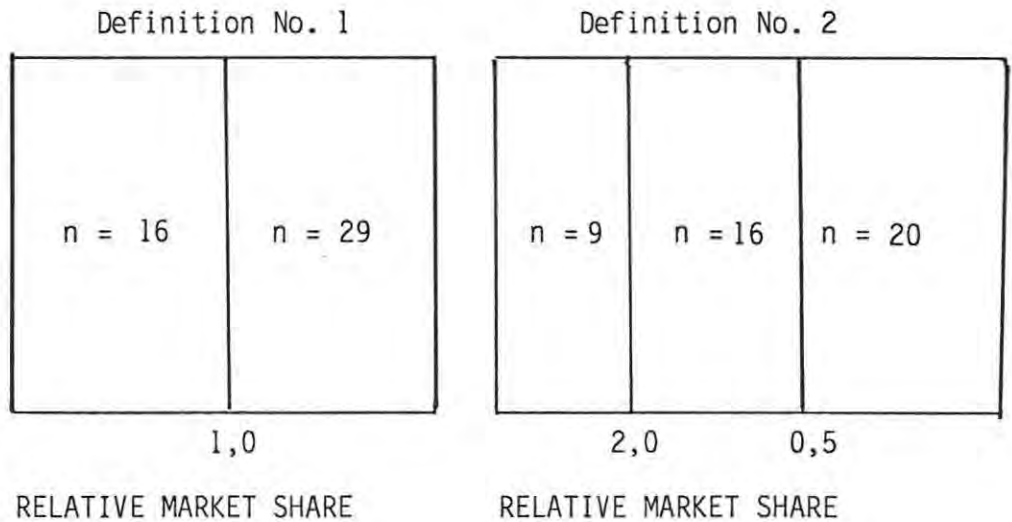
6.8. THE DISTRIBUTION OF THE RESEARCH POPULATION WITHIN THE B.C.G. PORTFOLIO MATRIX

According to the methodology developed thus far, each company in the research population was placed in the B.C.G. portfolio matrix on the basis of firstly, its relative market share, secondly, the growth rate of the market in which it competes and thirdly, the cell into which it fell.

The results of this process are summarised in figures 6.1, 6.2, 6.3, and 6.4.

FIGURE 6.1

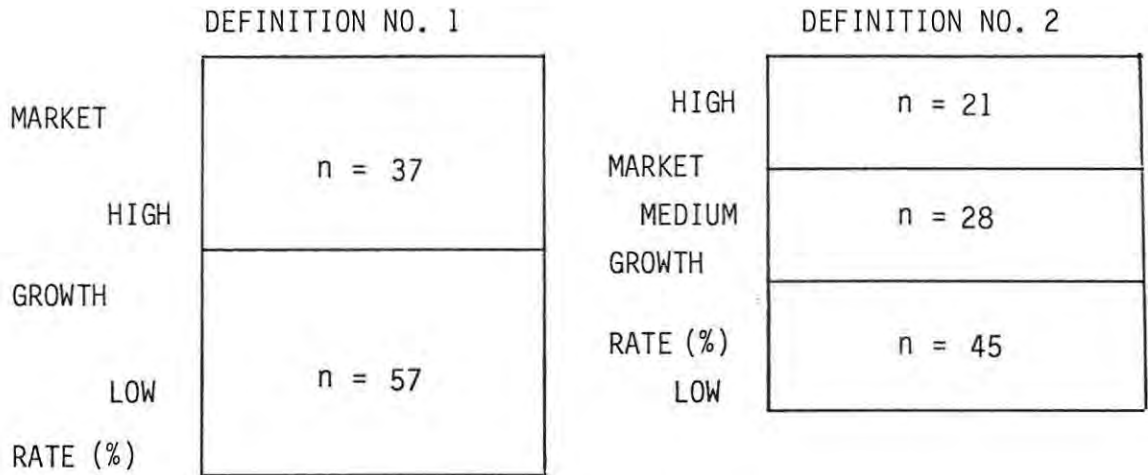
THE DISTRIBUTION OF THE RESEARCH POPULATION BY RELATIVE MARKET SHARE POSITION



The research population by market share position is given in Appendix 5.

FIGURE 6.2

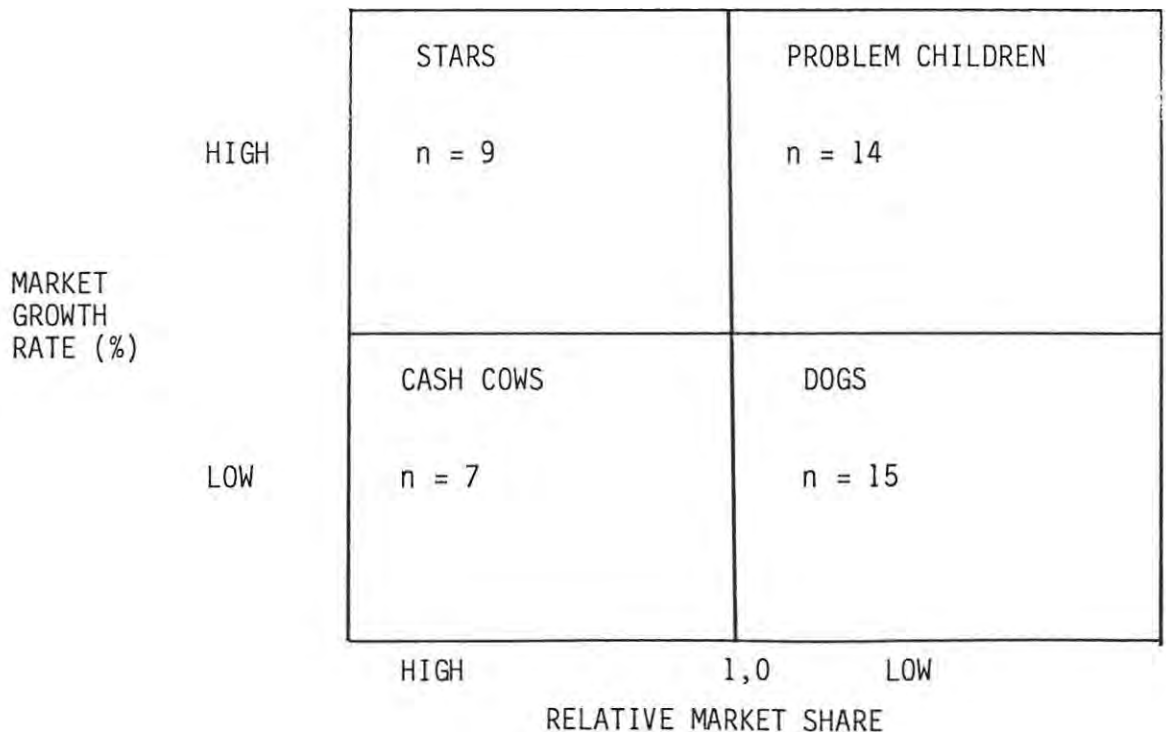
THE DISTRIBUTION OF THE RESEARCH POPULATION BY MARKET GROWTH RATE CATEGORY



The research population by market growth rate category is given in Appendix 6.

FIGURE 6.3

THE DISTRIBUTION OF THE RESEARCH POPULATION AMONGST THE FOUR CELL B.C.G. PORTFOLIO MATRIX DEVELOPED ACCORDING TO MARKET GROWTH RATE AND RELATIVE MARKET SHARE DEFINITION NO. 1



The distribution of the research population between the four cells of the matrix given in Figure 6.3 is given in Appendix 7.

FIGURE 6.4

THE DISTRIBUTION OF THE RESEARCH POPULATION AMONGST THE NINE CELL PORTFOLIO MATRIX DEVELOPED ACCORDING TO MARKET GROWTH RATE AND RELATIVE MARKET SHARE DEFINITION NO. 2

MARKET GROWTH RATE (%)	HIGH	CELL NO. 1 "STAR" n = 2	CELL NO. 4 n = 3	CELL NO. 7 "WILDCAT" n = 2
	MEDIUM	CELL NO. 2 n = 4	CELL NO. 5 n = 9	CELL NO. 8 n = 7
	LOW	CELL NO. 3 "CASH COW" n = 3	CELL NO. 6 n = 4	CELL NO. 9 "DOG" n = 11
		2,0	1,0	0,5
		HIGH	MEDIUM	LOW
		RELATIVE MARKET SHARE		

The distribution of the research population amongst the cells of the nine cell matrix shown above is given in Appendix 8.

The nine cell portfolio matrix is shown here purely in the interest of completeness. While such a cell structure may give rise to a more meaningful analysis of the effects of relative share and

market growth on business units, the number of cases within each cell in this instant is too limited to allow statistical analysis.

6.9. THE RESEARCH VARIABLES

The vast majority of variables used to analyse the research population took the form of financial ratios. Although ratio analysis can be justly criticised in various circumstances, it is perfectly acceptable where interest is focused exclusively on the composite variable rather than the individual components involved. In all cases where ratios were used in analysing the research population interest was indeed on the composite variable, and hence use of ratios was not considered to be a critical obstacle.

The following variables were used in the analysis of the research population:

6.9.1. General Variables

- The company name and code number
- The market in which the company was competing
- The company's national economic activity category

6.9.2. Positioning Variables

These are the variables used to place each company into the B.C.G. portfolio matrix

- The company's relative market share
- The growth rate of the market in which the company was competing
- B.C.G. matrix category

6.9.3. Performance Measures

- Return on Investment (R.O.I.)
- Variability of Return on Investment or Return Per Risk (R.P.R.)
- Cash Flow on Investment (CFOI)
- Market Share Change (MSC)
- Maximum Sustainable Growth Rate (MSGR)

6.9.4. Strategic Attributes

6.9.4.1. Attributes Related to the Asset Structure

- Fixed Assets to Total Assets (FA/TA)
- Stock to Total Assets (S/TA)
- Long Term Loans Advanced to Total Assets (LL/TA)
- Short Term Loans Advanced to Total Assets (SL/TA)

6.9.4.2. Attributes Related to Current Assets

- Stock to Current Assets (S/CA)
- Debtors to Current Assets (D/CA)
- Debtors Turnover Ratio (Dx12/T0)
- Current Ratio (CA/CL)
- Acid Test Ratio (CA-S/CL)

6.9.4.3. Attributes Related to Funds Structure

- Long Term Borrowings to Total Funds (LTB/TD)
- Short Term Borrowings to Total Funds (STB/TF)

6.9.4.4. Attributes Related to Borrowed Funds

- Long Term Borrowings to Total Borrowed Funds (LTB/TBF)
- Creditors to Current Liabilities (C/CL)

6.9.4.5. Attributes Related to Capital Utilisation

- Turnover of Total Assets
- Turnover of current liabilities (CL/TO)

6.9.4.6. Attributes Related to Asset Growth

- Operating Asset Growth (COA)
- Total Asset Growth (CTA)
- Fixed Asset Growth (CFA)
- Current Asset Growth (CAG)

6.9.4.7. Attributes Reflected on the Income Statement

- Gross Profit Margin (GP/TO)
- Trading Profit Margin (TP/TO)
- Growth of Turnover (GTO)

Having isolated the research variables it was necessary to determine the statistical procedures which should be

applied to these variables in order to test the research hypotheses. This process is discussed in the following section.

6.10. TESTING THE RESEARCH HYPOTHESES

The basic category of test required for the research purposes was one which was capable of comparing the means of the various subgroups into which the research population had been divided. Such a facility was best provided by the Analysis of Variance Test. Specifically, this test enables the researcher to determine whether the means of two or more samples differ significantly, where significance is represented by the F Ratio. Where means do in fact differ significantly this may be taken as an indication that the samples were unlikely to have been drawn from the same normally distributed population. As such the analysis of variance test admirably suited the requirements of the research which are listed below:

1. To determine the effect of relative market share on selected performance measures and strategic attributes.
2. To determine the effect of the market growth rate on selected performance measures and strategic attributes.
3. To determine the simultaneous effect of relative market share and the market growth rate on selected performance measures and strategic attributes.

The two variables relative market share and market growth rate, have been combined to create a third categorical variable - the B.C.G. growth/share matrix cell. As will be explained in due course this procedure results in a considerable simplification of the research methodology without detracting from the validity of the results obtained.

4. To determine the relationship, if any, between the selected performance measures and the strategic attributes.

The analysis of variance test can be performed in many ways as the following explains:

"If one is interested in the possible effects of a single factor the analysis is termed a one-way analysis of variance. If one is interested in the simultaneous effects of n factors the analysis is referred to as an n-way analysis of variance."
(18)

Relating this information to the requirements of the research as listed above, it is evident that in all cases a one-way analysis of variance test is called for. In all cases the research is concerned with the effect of a single factor (relative market share or market growth rate or matrix cell) on various performance measures and strategic attributes. Had the single factor "matrix cell" not been created, then a two-way analysis of variance would have been called for to determine the combined and simultaneous effect of relative market share and market growth on the independent variable. However, the factor "matrix cell" can be considered as a single categorical variable and hence any investigation using this variable clearly calls for a one-way analysis of variance.

Finally, as a check procedure a two-way analysis of variance was performed using relative market share and market growth rate in place of the single factor "matrix cell". While the significance of the results achieved was generally lower they did not suggest different conclusions.

6.11. CONCLUSIONS

This chapter has detailed the hypotheses arising out of the literature review presented in chapters 1 to 5 and has fully discussed the methodology to be used in testing these hypotheses.

The development of the methodology was hindered by three problems in particular. Firstly, the dimensions of the B.C.G. growth/share matrix was very broadly defined. As a result it is difficult to place companies accurately into the matrix. Secondly, the available information on South African companies both in terms of the true nature and extent of their business and in terms of their financial reports is sadly lacking. Thirdly, the format and detail of government statistics seldom dovetails with the format and detail of statistics sourced in the private sector. As a result when using both of these data sources the researcher is unavoidably exposing his analysis to potential error.

Using the methodology detailed in this chapter the research hypotheses were tested and the results of these tests are given in Chapter 7.

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CHAPTER 7

THE RESEARCH FINDINGS

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7.1. INTRODUCTION

The purpose of this chapter is to present and explain the results of the research which was conducted in terms of the methodology described in Chapter 6. Tabulations of all results together with the relevant statistical data are given in Appendices 9 to 15.

In order to satisfactorily interpret some of the research findings it was necessary to make use of a number of variables not listed in the methodology. Such variables are included in Appendices 9 to 15.

This chapter will firstly give a brief review of the research objectives, then the research findings will be presented followed by the necessary interpretation of these findings.

7.2. A BRIEF OVERVIEW OF THE RESEARCH OBJECTIVES

The basic drive of this research effort has been to investigate the impact of relative market share and market growth on the strategic attributes and financial performance of selected South African companies. Relative market share and market growth are the contingent variables comprising the horizontal and vertical axes of the Boston Consulting Group Growth/Share Portfolio Matrix. This matrix is based on an assumed positive relationship between market share and financial performance. The validity of this share/performance

assumption has been fully evaluated in Chapters 3, 4 and 5.

This research was also designed to identify the nature of the relationship between the financial performance of companies and their significant strategic attributes, that is, how attributes and performance are linked within each of the four cells of the growth/share matrix.

7.3. THE OVERALL RESEARCH FINDINGS

The overall research findings lend credibility to the Boston Consulting Group approach to portfolio management. In most cases the anticipated relationship between variables was found to exist in the research population, though often the relationship was weaker than had been predicted.

Due to the relatively small size of the research population, which for some tests was further divided into four sub-groups, the statistical significance of the research findings was generally low. This, however, does not negate the validity of the research findings as low statistical significance would only be of great concern if it were associated with findings which showed a largely random relationship between the test variables. As this was not the case the research findings were accepted.

The overall research findings in terms of financial performance and strategic attributes are given in the following sections.

7.3.1. The Overall Research Findings on the Financial Performance of Businesses Within the B.C.G. Growth/Share Matrix

The research findings show that the financial performance of businesses varies significantly according to relative market share position and the market growth rate. As expected the relative market share dimension proved to be a particularly important variable with respect to financial performance.

The research findings show that all the performance measures used, with the exception of return on investment, justified their selection. That return on investment did not operate well as a measure of performance is unexplained. Perhaps this measure, being a popular one, is manipulated by under-performing businesses in order to disguise their true financial predicament.

7.3.2. The Overall Research Findings on The Strategic Attributes of Businesses Within the Growth/Share Matrix

The strategic attributes of businesses (represented by selected ratios) vary significantly according to relative market share and market growth. The relative market share dimension proved to be particularly important, as was expected, in determining the strategic characteristics of a company. Market growth, while less influential as a contingent variable was, nevertheless, found to influence many strategic attributes.

In the case of both relative market share and market growth the use of a three category dimension (high, medium and low)

proved to be rewarding. Many companies which were clustered around the high/low dividing value on each axis tended to blur some findings until they were isolated into the 'medium' category and analysed as a separate unit. On the other hand there were some instances when the use of the three category system resulted in less significant findings than under the two category system. This occurred only when the two category system effectively divided companies according to a particular attribute. In this case the introduction of a third category, while confirming the general trend, only serves to make the achievement of statistical significance more difficult. In those few instances where the two and three category systems indicated different trends the results were discarded.

7.4. TESTING THE RESEARCH HYPOTHESES

As explained in Chapter 6 the research hypotheses were tested using the test of analysis of variance. The following sections 7.4.1. to 7.4.3. present and interpret the results of this process. In the interests of clarity and readability results are given only for the two category definitions of market growth and relative market share unless these results are inadequate in representing the variable under investigation. Where this is the case the results according to both definitions are presented and interpreted. Furthermore, only the data means are presented and referred to in this chapter in order to prevent the presentation of important findings

being confused by a proliferation of statistical information.

Full statistical information is provided with all research results in Appendices 9 to 14.

7.4.1. Testing Hypotheses Concerning Financial Performance

7.4.1.1. Introduction

The research findings presented below have been distorted to a limited extent by certain categories of businesses following unexpected strategies. While the implications of these strategies will become clear as each hypothesis is tested, some explanation is required at the outset. This explanation is provided below.

Star businesses in the research population have generally performed poorly. They have been guilty of expanding assets without being able to maintain relative market share and without increasing turnover to any appreciable degree. As a result, due to the definitional relationship between Stars and Wildcats, the relative performance of Wildcat businesses appears far better than had been anticipated.

Cash Cow businesses in the research population have also performed poorly for their matrix position. The cause of their poor performance is clearly attributable to the pursuit of market share gaining strategies. Market share gains by Cash Cows can only be achieved at considerable expense and hence their performance is generally below expectations.

7.4.1.2. Testing the Hypotheses

Based on the assertions of the Boston Consulting Group and supported by the research conducted by Hambrick et al as discussed in Chapter 2, the financial performance of various businesses within the B.C.G. growth/share matrix can be expected to differ. It was therefore hypothesised:

Hypothesis P1: The size of the cash flow on investment ratio will vary according to the four cells of the B.C.G. growth/share matrix. The ratio will be highest for Cash Cow companies, followed by Star, Dog and Wildcat companies.

The research findings in respect of this hypothesis are presented in Table 7.1.

TABLE 7.1

THE RATIO OF CASH FLOW ON INVESTMENT FOR BUSINESSES WITHIN THE FOUR CELLS OF THE B.C.G. GROWTH/SHARE MATRIX

	Star Businesses	Cash Cow Businesses	Wildcat Businesses	Dog Businesses
C.F.O.I. (%)	31,29	33,18	28,62	19,75

Table 7.1 shows that, as expected, Cash Cow businesses have the most favourable cash flow on investment ratio, followed by Star, Wildcat and Dog businesses.

It is somewhat surprising that Wildcat businesses perform so well on the cash flow on investment measure. There are, however, two possible explanations for this situation.

Firstly, due to the factors outlined in section 7.4.1. above, the relative performance of both Star and Cash Cow businesses is below standard. Accordingly the relative performance of Wildcats is exaggerated. Secondly, unlike the Dog businesses in Hambrick's sample (1), Dog businesses in this research population consistently performed poorly on all performance measures. Hence their cash flow on investment may also be considered as being below par, thus once again enhancing the relative performance of Wildcats.

In order to test the profitability of companies in the research population the following hypothesis was established:

Hypothesis P2: The profitability, as measured by return on investment, of high relative market share companies will be greater than that of low relative market share companies.

The research findings pertaining to Hypothesis P2 are presented in Table 7.2.

TABLE 7.2

THE PROFITABILITY OF BUSINESSES WITHIN THE B.C.G. GROWTH/SHARE MATRIX

	High Relative Market Share		Low Relative Market Share	
(%) NPBIT/TA	16,63		18,21	
	Stars	Cash Cows	Wildcats	Dogs
(%) NPBIT/TA	18,18	16,25	17,08	18,25

Table 7.2 clearly shows that there is no significant variation in profitability between high and low relative market share businesses or between businesses in each of the four cells of the B.C.G. matrix. Hypothesis P2 is thus rejected.

Profit figures are, of course, relatively easily manipulated yet even so it is surprising that Dog Businesses were able to perform so well on the profitability ratio. A possible answer to this anomaly is that such businesses are generating funds by reducing market share and depleting their asset base.

The relatively poor performance of Cash Cow businesses was also unexpected. However, as explained previously, the apparent propensity of such business to seek growth may account for this poor performance.

Based on the premise that profit generating opportunities may be more abundant in high growth markets it was further hypothesised that:

Hypothesis P3: The profitability, as measured by return on investment, of businesses competing in high growth markets will be greater than that of businesses competing in low growth markets.

These research findings support Hypothesis P3 as Table 7.3 illustrates:

TABLE 7.3

THE PROFITABILITY OF BUSINESSES OPERATING IN HIGH GROWTH, MEDIUM GROWTH AND LOW GROWTH MARKETS.

	High Growth Markets	Medium Growth Markets	Low Growth Markets
(%) NPBIT/TA	20,26	16,99	15,38

Due to the volatile nature of high growth markets it was hypothesised that:

Hypothesis P4: Businesses operating in high growth markets will show a greater variability of return on investment than businesses operating in low growth markets.

The research findings support Hypothesis P4, as Table 7.4 shows, and the hypothesis is, therefore, accepted.

TABLE 7.4

THE VARIABILITY OF RETURN ON INVESTMENT (RETURN PER RISK) FOR BUSINESSES WITHIN THE B.C.G. GROWTH/SHARE MATRIX *

	High Market Growth		Low Market Growth	
Variability of R.O.I. (R.P.R.)	0,52		0,73	
	Stars	Wildcats	Cash Cows	Dogs
Variability of R.O.I. (R.P.R.)	0,54	0,47	0.70	0.73

* NOTE: The lower the RPR index, the greater has been the variability of return on investment

Due to the fact that high growth markets present an environment more likely to produce both gains and losses in relative market share it was hypothesised that:

Hypothesis P5: Companies competing in high growth markets will display larger relative market share changes than companies competing in low growth markets.

The research findings on this hypothesis are presented in Table 7.5.

TABLE 7.5

RELATIVE MARKET SHARE CHANGE FOR BUSINESSES WITHIN THE B.C.G. GROWTH/SHARE MATRIX

	High Growth Markets		Low Growth Markets	
Market Share (%) Change	23,33		- 6,38	
	Stars	Wildcats	Cash Cows	Dogs
Market Share (%) Change	- 12,14	45,91	11,75	- 15,44

Table 7.5 illustrates that the relationship between relative market share change and market growth rate is in the expected direction. Wildcat businesses performed particularly well while Star businesses were unable to maintain relative market share as they should. The relative market share gains made by Cash Cows is another indication that such businesses are

not attempting to hold market share but are using their advantageous market position to attempt to increase share. This strategy (which becomes more evident during the testing of hypotheses on strategic attributes) is responsible for the relatively poor financial performance of such businesses. As Abell and Hammond point out:

"Holding share is appropriate for mature businesses with leading or strong shares; it is a preservation of a desirable status quo. Strongly established products have the advantage of greater experience and consequent lower costs and higher profitability than their rivals with lower shares. Holding share is appropriate for such products because building share is very costly and time consuming in slowly growing markets". (2)

Due to the more favourable growth opportunities found in high growth markets and the assumed propensity of businesses to take advantage of such opportunities, it was hypothesised that:

Hypothesis P6: Businesses competing in high growth markets will show a higher maximum sustainable growth rate than businesses competing in low growth markets.

Table 7.6 shows that the research findings are in the expected direction and hence Hypothesis P7 is accepted.

TABLE 7.6

THE MAXIMUM SUSTAINABLE LONG TERM ASSET GROWTH RATE OF
BUSINESSES WITHIN THE B.C.G. GROWTH/SHARE MATRIX

	High Growth Markets		Low Growth Markets	
M S G R	174,26		108,60	
	Stars	Wildcats	Cash Cows	Dogs
M S G R	173,57	177,91	157,74	95,05

Once more the one outstanding feature of these findings is the commitment to growth made by Cash Cow companies. The M S G R index for Cash Cows is only marginally lower than that for Stars and Wildcats yet the latter operate in markets far more suitable for growth.

7.4.1.3. Financial Performance and the B.C.G. Growth/Share Matrix -
Summary

The research findings on the financial performance of businesses within the growth/share matrix corroborate the basic assertions of the Boston Consulting Group. Cash flows do indeed vary significantly between the four cells of the matrix. Furthermore, the performance of businesses on a wide range of other performance criteria has been shown to lie in the expected direction. Accordingly, the basic premise of portfolio analysis as postulated by the Boston Consulting Group must be supported. That is, relative market share and the rate of market growth are contingent variables of considerable

importance in portfolio management.

The following section will supplement the analysis of financial performance by determining what characteristics of strategic importance are possessed by the various categories of businesses within the growth/share matrix. Determining how these attributes are related to financial performance will be the final aspect of this research.

7.4.2. Testing Hypotheses Concerning Strategic Attributes

Hypotheses concerning strategic attributes were formulated for the following categories of variables:

1. The asset structure.
2. Current assets.
3. The funds structure.
4. Borrowed funds.
5. Asset growth.
6. Capital utilisation.
7. Items reflected on the income statement.

The test of hypotheses for each category is discussed below.

7.4.2.1. Hypotheses Concerning Asset Structure Attributes. (ASA)

Due to the favourable nature of high growth markets it can be anticipated that businesses in such markets will show a greater propensity to initiate capital projects than businesses in low growth markets. Accordingly it was hypothesised that:

Hypothesis ASA1: Businesses operating in high growth markets will have a higher fixed assets to total assets ratio than businesses operating in low growth markets.

The research findings with respect to this hypothesis are as expected as shown in Table 7.7. According to both definitions of market growth there is a significant difference in the fixed asset proportions of businesses in high and low growth markets. Hypothesis ASA1 is, therefore, accepted.

TABLE 7.7

THE RATIO OF FIXED ASSETS TO TOTAL ASSETS (FA/TA) FOR BUSINESSES IN HIGH AND LOW GROWTH MARKETS

	High Growth Markets	Low Growth Markets
FA/TA (%)	32,95	25,52

It would appear that businesses in high growth markets do indeed respond positively to favourable market trends even at the risk of increasing their fixed expenses. The significance of the result obtained is particularly evident when one considers that there may in fact be a lag effect in the accumulation of fixed assets in high growth markets which is reducing the fixed to total asset ratio. Such an effect would occur when businesses delay capital projects until favourable trends in the market are clearly evident.

Hypothesis ASA2 stated:

Hypothesis ASA2: Businesses operating at high levels of relative market share will have a higher fixed assets to total assets ratio than businesses operating at a low level of relative market share.

The relationship between fixed and total assets and relative market share detailed in Hypothesis ASA2 is confirmed by the research findings as shown in Table 7.8.

According to both definitions of relative market share high relative share businesses have a greater proportion of fixed assets in their total asset structure than low relative share businesses.

TABLE 7.8

THE RATIO OF FIXED ASSETS TO TOTAL ASSETS (FA/TA) FOR HIGH, MEDIUM AND LOW RELATIVE MARKET SHARE BUSINESSES

	High Relative Market Share	Low Relative Market Share	
FA/TA (%)	34,33	27,54	
	High Relative Market Share	Medium Relative Market Share	Low Relative Market Share
FA/TA (%)	37,41	30,53	20,14

The general trend towards increasing fixed assets with gains in relative market share is clearly evident. It would appear that businesses operating at low levels of relative market share are reducing their overhead costs as

much as possible in order to lower their fixed expenses and their break even volumes. Conversely, high relative share businesses, with their much greater volumes, may in fact be increasing their fixed assets in a deliberate attempt to increase operating leverage.

Given that the ratio of fixed to total assets varied by both relative market share and market growth it was further hypothesised that:

Hypothesis ASA3: The fixed assets to total assets ratio will vary between the four cells of the B.C.G. growth/share matrix. Star businesses will possess the highest value while Dog businesses will possess the lowest value.

The research findings confirm the above hypothesis, as Table 7.9 shows, but at such a low level of significance (30%) that the hypothesis is rejected.

TABLE 7.9

THE RATIO OF FIXED ASSETS TO TOTAL ASSETS (FA/TA) FOR BUSINESSES WITHIN EACH CELL OF THE B.C.G. GROWTH/SHARE MATRIX

	Star Businesses	Cash Cow Businesses	Wildcat Businesses	Dog Businesses
FA/TA (%)	38,19	30,46	31,63	24,66

In order to test the stock portion of total assets for the various businesses within the growth/share matrix the following hypothesis was formulated:

Hypothesis ASA4: Businesses operating in high growth markets will have a lower stock to total assets ratio than businesses operating in low growth markets.

The research findings do not support the above hypothesis. The stock to total assets ratio remained constant between high and low growth markets as Table 7.10 shows. As a result Hypothesis ASA4 is rejected.

TABLE 7.10

THE STOCK TO TOTAL ASSETS RATIO (S/TA) FOR BUSINESSES OPERATING IN HIGH AND LOW GROWTH MARKETS

	High Growth Markets	Low Growth Markets
S/TA (%)	29,42	29,06

It is evident from the results obtained that companies are able to effectively alter their stock holdings according to the demands of the marketplace. Thus the anticipation that companies in low growth markets may allow their stockholdings to accumulate while those in high growth markets may experience stock shortages is completely unfounded.

In order to investigate the outside investments of businesses in high and low growth markets the following hypothesis was set up:

On the basis of the assumed better financial situation of high relative market share businesses the following hypothesis was established:

Hypothesis ASA6: High relative market share businesses will have a higher long term loans advanced to total assets ratio and short term loans advanced to total assets ratio than businesses with low relative market shares.

The research findings presented in Table 7.12 do not confirm the expected relationship between loans advanced and relative market share. In fact the findings show a relationship which is precisely the reverse of that expected. The hypothesis is thus rejected.

TABLE 7.12

THE RATIOS OF SHORT TERM LOANS ADVANCED TO TOTAL ASSETS (STLA/TA) AND LONG TERM LOANS ADVANCED TO TOTAL ASSETS (LTLA/TA) FOR HIGH AND LOW RELATIVE MARKET SHARE BUSINESSES

	High Relative Market Share Businesses	Low Relative Market Share Businesses
STLA/TA (%)	2,35	13,07
LTLA/TA (%)	2,50	6,81

These findings argue that high relative share businesses gain satisfactory returns from their operations and, therefore, do not need to invest money in outside ventures in order to improve earnings. On the other hand low relative market

Hypothesis ASA5: The ratio of long term loans advanced to total assets and short term loans advanced to total assets will be lower for companies operating in high growth markets than for those operating in low growth markets.

The research findings as shown in Table 7.11 confirm this hypothesis. According to both definitions of market growth, businesses in low growth markets consistently advance more long term and short term loans than their counterparts in high growth markets. The hypothesis is, therefore, accepted.

TABLE 7.11

THE RATIOS OF SHORT TERM LOANS ADVANCED TO TOTAL ASSETS (STLA/TA) AND LONG TERM LOANS ADVANCED TO TOTAL ASSETS (LTLA/TA) FOR BUSINESSES OPERATING IN HIGH AND LOW GROWTH MARKETS.

	High Growth Markets	Low Growth Markets
STLA/TA (%)	4,70	10,89
LTLA/TA (%)	2,77	4,77

In terms of the research findings on Hypothesis ASA5, it is evident that the need to keep pace with market growth in high growth markets absorbs most available funds in the company. Accordingly few loans are advanced to either corporate officers or to other businesses.

share businesses may find themselves at a considerable disadvantage in the market and hence they increase their outside investments in order to bolster their performance.

Due to the fact that the loans advanced to total assets relationship discussed above was not in the expected direction the following hypothesis, which was based partly on this relationship, was not expected to hold true:

Hypothesis ASA7: The long term loans advanced to total assets ratio and the short term loans advanced to total assets ratio will vary between the four cells of the B.C.G. growth/share matrix. Cash Cow businesses will have the highest ratio while Wildcat businesses will have the lowest ratio.

As was anticipated after the results of Hypothesis ASA6 were obtained, Hypothesis ASA7 must be rejected. (See Table 7.13):

TABLE 7.13

THE RATIOS OF SHORT TERM LOANS ADVANCED TO TOTAL ASSETS (STLA/TA) AND LONG TERM LOANS ADVANCED TO TOTAL ASSETS (LTLA/TA) FOR BUSINESSES WITHIN EACH OF THE FOUR CELLS OF THE B.C.G. GROWTH SHARE MATRIX

	Star Businesses	Cash Cow Businesses	Wildcat Businesses	Dog Businesses
STLA/TA (%)	2,86	1,92	5,96	18,99
LTLA/TA (%)	2,84	2,16	2,29	10,12

The highest ratio of short term loans advanced to total assets and long term loans advanced to total assets was found in the Dog business category, with mean values of 18,99% and 10,12% respectively. Cash Cow businesses in fact displayed the lowest mean values with scores of 1,92% and 2,16% respectively.

While the hypothesis is rejected it should be noted that these findings are largely consistent with the results obtained for Hypotheses ASA5 and ASA6. In other words, because Dog businesses are competing in low growth markets they will not experience the shortage of funds prevalent in high growth markets. Thus they have more funds available for outside investment. However, because they have small relative market shares they are poorly placed in the market and hence look elsewhere for better returns. These two situations combine to produce a high ratio of loans advanced to total assets. Star businesses, according to these criteria should possess the lowest loans advanced to total assets ratio in that the market growth rate limits their available funds and their strong market position means they are gaining good returns from their current operations. Thus, not only do they possess limited liquid resources for outside investment, they also have little reason to pursue such investment. However, Star businesses have a higher short term loans advanced to total assets ratio (2,86%) and long term loans advanced to total assets ratio (2,84%) than Cash Cow businesses (1,92% and 2,16% respectively). While these differences are small indeed, it is disturbing that the relationship is in the wrong direction. Such findings remain unexplained.

7.4.2.2. Hypotheses Concerning Current Asset Attributes (CAA)

In order to investigate differences in the composition of current assets for businesses in high and low growth markets, the following hypothesis was established:

Hypothesis CAA1: The proportion of stock in current assets will be lower for companies operating in high growth markets.

The research findings, as shown in Table 7.14, do not support this hypothesis.

TABLE 7.14

THE STOCK TO CURRENT ASSETS RATIO (S/CA) FOR BUSINESSES IN HIGH AND LOW GROWTH MARKETS

	High Growth Markets	Low Growth Markets
S/CA (%)	46,57	44,24

In common with Hypothesis ASA4, which dealt with the stock to total assets ratio, it appears that businesses in high growth markets are well able to maintain their stock levels in the face of rapidly increasing demand. This trend is fully supported by the stock turnover ratio which was 2,08 times for businesses in high growth markets and 2,33 times for businesses in low growth markets. Hypothesis CAA1 is thus rejected.

Hypothesis CAA2: The proportion of debtors in current assets will be higher for companies in high growth markets.

This hypothesis grew out of Hypothesis CAA1. If the stock portion of current assets was low due to a strong demand for the product it stood to reason that the debtors portion of current assets should be relatively large. As the research findings rejected Hypothesis CAA1 it is not surprising that they do not support Hypothesis CAA2. There was no significant difference between the debtors portion of current assets for businesses in high and low growth markets. (See Table 7.15):

TABLE 7.15

THE DEBTORS TO CURRENT ASSETS RATIO (D/CA) FOR BUSINESSES IN HIGH AND LOW GROWTH MARKETS

	High Growth Markets	Low Growth Markets
D/CA (%)	42,60	43,90

These findings are supported by the debtors turnover ratio which also did not differ significantly between markets with different growth rates. The turnover for companies in high growth markets was 2,04 times and for those in low growth markets 2,47 times.

Of interest with regard to the debtors to current assets ratio is that this ratio is largest for Wildcat businesses.

(See Table 7.16):

TABLE 7.16

THE DEBTORS TO CURRENT ASSETS RATIO (D/CA) FOR BUSINESSES
WITHIN EACH OF THE FOUR CELLS OF THE B.C.G. GROWTH/SHARE
MATRIX

	Star Businesses	Cash Cow Businesses	Wildcat Businesses	Dog Businesses
D/CA (%)	42,38	46,96	47,38	34,34

This is consistent with the theory that low relative share businesses in high growth markets may tend to "buy" market share by relaxing their credit control requirements. It would also appear that because of their relatively favourable financial position Cash Cow businesses are less concerned about outstanding debtors than they might be.

The anticipated more favourable liquidity of high relative market share companies led to the formulation of the following hypothesis:

Hypothesis CAA3: The current ratio (that is, current assets to current liabilities) and the acid test ratio (that is, current assets less stocks to current liabilities) will be higher for businesses with a high relative market share.

The anticipated relationship was not confirmed by the research findings. Both the current and acid test ratio were lower

for high relative market share businesses than low relative market share businesses. The hypothesis is thus rejected.

TABLE 7.17

THE CURRENT RATIO (CA/CL) AND THE ACID TEST RATIO (CA-S/CL)
FOR BUSINESSES WITH HIGH AND LOW RELATIVE MARKET SHARE POSITIONS

	High Relative Market Share	Low Relative Market Share
CA/CL (%)	1,70	2,23
CA-S/CL (%)	0,93	1,57

These findings indicate that high relative market share businesses are not attempting to maintain relative market share, rather they are pursuing growth strategies. As a result they are accumulating liabilities in order to finance this growth. In fact Star and Cash Cow businesses have the lowest current and acid test ratios in the growth/share matrix. (See Appendix 13)

As may be expected the current and acid test ratios were found to be significantly lower in high growth markets than in low growth markets. (See Table 7.18):

TABLE 7.18

THE CURRENT RATIO (CA/CL) AND THE ACID TEST RATIO (CA-S/CL)
FOR BUSINESSES IN HIGH AND LOW GROWTH MARKETS

	High Growth Markets	Low Growth Markets
CA/CL (%)	1,88	2,30
CA-S/CL (%)	1,04	1,43

The investment demands of high growth markets obviously requires a build up of liabilities in order to help finance growth.

7.4.2.3. Hypotheses Concerning Funds Structure Attributes (FSA)

In order to investigate the composition of the total funds of different categories of businesses within the growth/share matrix the following hypothesis was established:

Hypothesis FSA1: The ratios of long term borrowings to total funds and short term borrowings to total funds will be lower for high relative market share businesses than for low relative market share businesses.

The rationale behind this hypothesis was that high relative share businesses should be able to generate more of any funds they may require than low relative share businesses can. Hence their level of borrowings should be lower than that of low relative share businesses. The research findings, however,

do not support this hypothesis. There is no significant difference in the ratio of either long term or short term borrowings between high and low relative share businesses.

Investigation to determine the cause of this finding revealed that Star businesses are characterised by particularly high levels of borrowed funds, especially in the form of long term loan capital. Due to the fact that they constitute 50 percent of the high relative market share businesses in the sample they have a significant influence on this category. When viewed in this light the research finding is not surprising.

The total long term loan capital and short term borrowings of businesses in each cell of the growth/share matrix is given in Table 7.19:

TABLE 7.19

THE PROPORTION OF LONG TERM CAPITAL AND SHORT TERM BORROWINGS TO TOTAL FUNDS FOR THE FOUR CELLS OF THE B.C.G. GROWTH/SHARE MATRIX

	Stars	Cash Cows	Wildcats	Dogs
Long term loan Capital (%)	12,50	7,63	12,41	6,68
Short term Borrowings (%)	6,00	3,95	6,45	5,33

Table 7.19 illustrates the expected pattern of borrowed funds requirements in each of the four cells of the growth/share matrix. Cash Cow businesses are able to generate most of

their funds requirements and hence borrow very little. Dog businesses with their low activity levels and limited growth potential also require few borrowed funds. Star and Wildcat businesses on the other hand require substantial funds in order to at least keep pace with market growth hence their levels of borrowings are higher than the other categories.

7.4.2.4. Hypotheses Concerning Borrowed Funds Attributes (BFA)

Having investigated borrowed funds in relation to total funds it was necessary to make an analysis of the composition of borrowed funds themselves. Accordingly the following hypotheses were established:

Hypothesis BFA1: Businesses competing in high growth markets will accumulate a greater proportion of long term borrowings in relation to total borrowed funds than businesses competing in low growth markets.

The research findings as shown in Table 7.20 support this hypothesis.

TABLE 7.20

THE RATIO OF LONG TERM BORROWINGS TO TOTAL BORROWED FUNDS (LTB/TBF) FOR BUSINESSES IN HIGH, MEDIUM AND LOW GROWTH MARKETS

	High Growth Markets	Medium Growth Markets	Low Growth Markets
LTB/TBF (%)	24,32	22,45	18,94

Although the two category market growth rate definitions reflect the same trend, the results were not significant at the required level. Hypothesis BFA1 is thus accepted.

These findings confirm the view that companies operating in high growth markets take advantage of the favourable market conditions by initiating capital projects (see Hypothesis ASA1) which they finance with long term loan capital.

In order to examine the creditor portion of borrowed funds the following hypothesis was formulated:

Hypothesis BFA2: The creditors to total current liabilities ratio will be higher for businesses with high relative market shares than for businesses with low relative market shares.

The research findings with respect to this hypothesis are as expected. (See Table 7.21):

TABLE 7.21

THE CREDITORS TO TOTAL CURRENT LIABILITIES RATIO (C/TCL) FOR BUSINESSES WITH HIGH AND LOW RELATIVE MARKET SHARES

	High Relative Market Share	Low Relative Market Share
C/TCL (%)	54,47	47,92

Hypothesis BFA2 is, therefore, accepted.

It would appear that high relative market share businesses do in fact behave in the expected manner by stretching their creditors and thus expanding the volume of creditors as a component of current liabilities.

7.4.2.5. Hypotheses Concerning Asset Growth Attributes (AGA)

In terms of the dimensions of the B.C.G. growth/share matrix companies in high growth markets should be expanding their asset base at a more rapid rate than companies in low growth markets. It was thus hypothesised that:

Hypothesis AGA1: The asset growth rate (measured in terms of both fixed asset growth and current asset growth) for companies in high growth markets will be greater than for companies in low growth markets.

The research findings do not confirm the above hypothesis. There is no statistically significant difference for either fixed asset growth or current asset growth between companies in high growth markets and companies in low growth markets. (See Table 7.22):

TABLE 7.22

FIXED ASSET GROWTH AND CURRENT ASSET GROWTH FOR BUSINESSES IN HIGH AND LOW GROWTH MARKETS *

	High Growth Markets	Low Growth Markets
Fixed Asset Growth (%)	18,70	30.90
Current Asset Growth (%)	23,25	23,83

* Not statistically significant

These findings were somewhat unexpected as in terms of the dimensions of the growth/share matrix, high growth markets are undoubtedly more conducive to asset growth than low growth markets. In an effort to explain this anomaly the asset growth rates of each category of business within the matrix was examined. The results of this investigation are given in Table 7.23:

TABLE 7.23

THE ASSET GROWTH RATE OF EACH CATEGORY OF BUSINESS WITHIN THE FOUR CELLS OF THE B.C.G. GROWTH/SHARE MATRIX

	Star Businesses	Cash Cow Businesses	Wildcat Businesses	Dog Businesses
Growth Rate of Current Assets (%)	22,81	39,19	36,38	10,18
*Growth Rate of Fixed Assets (%)	18,61	13,31	23,89	11,95
Growth Rate of Operating Assets (%)	19,23	24,36	32,28	8,72
Growth Rate of Total Assets (%)	19,15	22,45	29,63	11,99

* Not statistically significant

The contents of Table 7.23 clearly illustrate why businesses in high growth markets do not experience a significantly higher rate of asset growth than businesses in low growth markets. On all measures of asset growth, apart from fixed asset growth, Cash Cow businesses rank either first or second. Although Dog businesses consistently rank fourth on all measures their asset growth rate is not low enough to significantly reduce the average obtained when both Cash Cow and Dog businesses are combined to form the low market growth rate category.

This finding is extremely important in that it gives a strong indication that Cash Cow businesses are not being managed according to the recommendations of the Boston Consulting Group and others, as outlined in Chapter 2. (The finding is, however, not altogether surprising when viewed in conjunction with the relative market share change performance measure evaluated in section 7.4.1.) The recommended strategy for Cash Cow businesses is one of holding market share in order to produce strong cash flows. Cash Cow businesses can only build market share at considerable expense and with a resulting negative effect on their financial performance. It is, therefore, likely that all performance related strategic attributes used to compare the various categories of businesses within the B.C.G. growth/share matrix will show, to some extent, results which are divergent from those expected. Such results must be carefully evaluated in the light of the current finding.

7.4.2.6. Hypotheses Concerning Capital Utilisation Attributes (CUA)

In order to evaluate the asset turnover of businesses within the B.C.G. growth/share matrix the following hypotheses were constructed:

Hypothesis CUA1: High relative market share businesses will turn over their assets more rapidly than low relative market share businesses.

Using the ratio of turnover to total assets as the relevant measure the research findings support the hypothesis.

(See Table 7.24):

TABLE 7.24

THE TOTAL ASSET TURNOVER (TO/TA) OF BUSINESSES WITH HIGH, MEDIUM AND LOW RELATIVE MARKET SHARES

	High Relative Market Share	Medium Relative Market Share	Low Relative Market Share
TO/TA	2,00 times	1,83 times	1,34 times

The trend shown in Table 7.24 is also evident in the results according to the two category relative market share dimension, but such results are not statistically significant at the required level.

This finding accords with the claims of the Boston Consulting Group that at the current market price high relative market share businesses earn higher gross profit margins which reflect their greater cost efficiency.

For the purposes of investigating the effectiveness with which borrowed funds (in the form of current liabilities) are put to use, the following hypothesis was formulated:

Hypothesis CUA2: High relative market share companies will turn over current liabilities more rapidly than low relative market share companies.

While the research findings as shown in Table 7.25 confirm the relationship hypothesised above, they do so at such a low level of statistical significance that the hypothesis is rejected.

TABLE 7.25

THE TURNOVER OF CURRENT LIABILITIES (TO/CL) BY HIGH AND LOW RELATIVE MARKET SHARE BUSINESSES

	High Relative Market Share	Low Relative Market Share
TO/CL	5,09 times	4,75 times

In attempting to locate the cause of this finding it became clear that the rapid expansion of current liabilities by Cash Cow businesses over the period under investigation, as shown in Table 7.26 was responsible.

TABLE 7.26

THE GROWTH RATE OF CURRENT LIABILITIES BY BUSINESSES WITHIN EACH CELL OF THE B.C.G. GROWTH/SHARE MATRIX

	Star Businesses	Cash Cow Businesses	Wildcat Businesses	Dog Businesses
Growth Rate of Current Liabili- ties (%)	28,38	46,08	47,91	12,59

It is apparent that the drive for growth by Cash Cow businesses has led them to expand their current liabilities to a relatively high level. On the other hand, because this growth is achieved only at relatively high cost the expanded current liabilities are not working as effectively as they could under a market share holding strategy and hence the turnover of current liabilities is relatively low.

In order to test whether there was any difference in the turnover of capital between companies in high and low growth markets it was hypothesised that:

Hypothesis CUA3: Businesses competing in low growth markets will turn over their assets more rapidly than businesses competing in high growth markets.

The research findings show no significant difference in the asset turnover ratio between companies in high and low growth markets. Hypothesis CUA3 is thus rejected.

TABLE 7.27

THE TOTAL ASSET TURNOVER (TO/TA) OF BUSINESSES OPERATING IN HIGH AND LOW GROWTH MARKETS

	High Growth Markets	Low Growth Markets
TO/TA	1,67 times	1,69 times

It would appear that a low rate of market growth does not result in a noticeable slow down of asset accumulation by businesses within such a market. This finding forewarned that it would be unlikely that the next hypothesis would be confirmed:

Hypothesis CUA4: The turnover of current liabilities will be lower for businesses in high growth markets than for businesses in low growth markets.

The research findings do not confirm the expected relationship and hence the hypothesis is rejected. (See Table 7.28):

TABLE 7.28

THE TURNOVER OF CURRENT LIABILITIES (TO/CL) FOR BUSINESSES IN HIGH GROWTH AND LOW GROWTH MARKETS

	High Growth Markets	Low Growth Markets
TO/CL	5,15 times	4,64 times

These findings were not significant at the minimum required level.

The research findings regarding Hypothesis CUA3 and Hypothesis CUA4 show that there is no apparent relationship between the turnover of total assets or current liabilities and the rate of growth of the market in which businesses compete. However, the period over which the research was conducted was a relatively prosperous one as evidenced by an average nominal rate of growth in the Gross National Product of 18,74%. (3) Accordingly most markets used in this study grew, in real terms, over the five years 1977 to 1981. This means that even in markets classified as "low growth" the general business outlook was probably positive and hence there was little cause to slow down asset build up and hence increase asset turnover.

The anticipated findings of Hypothesis CUA1 and Hypothesis CUA3 led to the construction of the following hypothesis:

Hypothesis CUA5: The turn over of total assets will vary between the four cells of the B.C.G. growth/share matrix. Cash Cow businesses will turn over their assets most rapidly while Wildcat businesses will turn over their assets least rapidly.

The research findings show no significant difference between the asset turnover of the various categories of businesses within the B.C.G. growth/share matrix and hence the hypothesis is rejected. See Table 7.29:

TABLE 7.29

THE TURNOVER OF TOTAL ASSETS (TO/TA) FOR BUSINESSES IN EACH CELL OF THE B.C.G. GROWTH/SHARE MATRIX

	Star Businesses	Cash Cow Businesses	Wildcat Businesses	Dog Businesses
TO/TA	1,66 times	1,90 times	1,76 times	1,44 times

These results were not statistically significant at the required level.

In view of the finding of Hypothesis CUA5 a similar finding was expected for Hypothesis CUA6.

Hypothesis CUA6: The turnover of current liabilities will vary between the four cells of the B.C.G. growth/share matrix. Cash Cow businesses will have the highest turnover of current liabilities while Wildcat businesses will have the lowest turnover of current liabilities.

The research findings as shown in Table 7.30 do not confirm the hypothesis.

TABLE 7.30

THE TURNOVER OF CURRENT LIABILITIES (TO/CL) FOR BUSINESSES IN EACH OF THE FOUR CELLS OF THE B.C.G. GROWTH/SHARE MATRIX

	Star Businesses	Cash Cow Businesses	Wildcat Businesses	Dog Businesses
TO/CL	4,73 times	5,46 times	5,69 times	4,09 times

This finding is surprising in that Wildcat businesses clearly outperform both Star and Dog businesses on this ratio. Their performance is made even more impressive by the fact that they also displayed the largest average increase in current liabilities (47,91%) over the five year period under review. This increase in current liabilities must have been more than matched by the increase in turnover over the same period. (4) The exceptional performance of Wildcat businesses for capital utilisation variables can only be explained by their rapid growth, as a result of market share gaining strategies, and the need to strive for efficiency because of their disadvantageous market share position. That they have succeeded so admirably on both these counts is somewhat unexpected.

7.4.2.7. Hypotheses Concerning Attributes Reflected on the Income Statement (ISA)

Due to the assumption that high relative market share businesses receive substantial experience, size and scale benefits it was hypothesised that:

Hypothesis ISA1: High relative market share businesses will have higher gross profit and trading profit margins than low relative market share businesses.

Due to the fact that gross profit was published by only one of the companies in the research population, this hypothesis rested solely on the trading profit margin. The research findings confirm Hypothesis ISA1. (See Table 7.31):

TABLE 7.31

THE TRADING PROFIT MARGIN (TP/TO) FOR BUSINESSES WITH HIGH AND LOW RELATIVE MARKET SHARES

	High Relative Market Share	Low Relative Market Share
TP/TO (%)	16,31	13,78

While this finding may be viewed with some scepticism in that the ratio concerned is easily manipulable and the statistical significance of the result is low, it would tend to support the theory that high relative market share businesses reap some performance benefits in their manufacturing and related operations. Also, viewed in conjunction with the performance measures tested in section 7.4.1. of this chapter, the finding is somewhat more convincing.

The Boston Consulting Group and others have suggested that the only businesses within the growth/share matrix which should be pursuing growth strategies are Wildcats and, if the situation is favourable, Stars. That is, only businesses in high growth markets should implement market share gaining tactics. In order to investigate whether companies were pursuing the "correct" strategy for their position in the matrix the following hypothesis was formulated:

Hypothesis ISA2: The various categories of businesses within the B.C.G. growth/share matrix will display different rates of increase in turnover. Wildcat businesses will display the highest rate of increase in turnover, followed by Star businesses. Dog and Cash Cow businesses will display the lowest rate of increase in turnover.

The research findings as shown in Table 7.32 support the hypothesis.

TABLE 7.32

THE CHANGE IN TURNOVER FOR BUSINESSES WITHIN EACH CELL OF THE B.C.G. GROWTH/SHARE MATRIX

	Star Businesses	Cash Cow Businesses	Wildcat Businesses	Dog Businesses
Change in Turnover (%)	22,10	19,41	33,69	10.88

Once again the noticeable feature of this finding is the relatively high rate of growth of turnover of Cash Cow businesses. Taken in conjunction with the high rate of growth of both current and operating assets and current liabilities for Cash Cow businesses (see Hypotheses AGA1 and CUA2) there is a strong indication that such businesses are striving for growth. Such a course of action can only be damaging to their performance, as is evidenced by the performance measures tested previously.

7.4.2.8. Strategic Attributes and the B.C.G. Growth/Share Matrix - Summary

The research findings with regard to the expected attributes of businesses within the B.C.G. growth/share matrix are positive. In a vast majority of cases the hypothesised relationship between variables was found to exist, albeit frequently at low levels of statistical significance. Where the expected relationship did not materialise the outcome of further investigation was usually able to account for this. In retrospect, therefore, it would appear that the contingent variables used by the B.C.G. growth/share matrix do exert an influence on the performance and characteristics of businesses across a broad spectrum of industries. Relative market share and the rate of market growth are undoubtedly relevant variables in the strategic planning process at the business level.

Having established the credentials of the B.C.G. growth/share matrix, the final objective of this research was to determine the relationship, if any, between businesses within the matrix and their significant strategic attributes. This process is discussed in the following section.

7.5. STRATEGIC ATTRIBUTES AND THE PERFORMANCE OF BUSINESSES WITHIN THE B.C.G. GROWTH/SHARE MATRIX

7.5.1. Introduction and Methodology

In terms of section 6.3.3. of the previous chapter, correlation between strategic attributes and performance

was tested using linear multiple regressions. These tests determine the nature of the relationship between various strategic attributes and performance measures (that is, whether they are negatively or positively related) as well as the strength of the relationship (that is, the level of statistical significance of the regression).

Due to the fact that the regression tests are linear they do not reveal any exponential or "U" shaped relationships which may exist between strategic attributes and performance measures. This was not considered a serious limitation as it is highly improbable that the relationship between a strategic attribute and a performance measure will deviate significantly from linearity. That is, there is little reason to believe that the same attribute can aid performance at one level and then hinder it at another, as a non-linear relationship would imply.

Regression tests were performed only on each of the four cells of the B.C.G. growth/share matrix and not individually on the market growth rate categories or relative market share categories. This was done because with correlation analysis it is essential that the researcher be satisfied that any discovered relationship between variables is a cause - effect relationship and not merely a chance relationship. The more general the dimensions used in a regression analysis the more likely it is that chance relationships will be found. As a result the dimensions of relative market share and market growth, as individual dimensions, were excluded and the analysis was performed on the most specific category of analysis available - the individual matrix cell.

7.5.2. The Research Variables used in Testing the Relationship Between Strategic Attributes and Performance

The performance measures used in this test were the same as those used in section 7.4.1. of this chapter, that is:

- Return on investment (ROI)
- Cash flow on investment (CFOI)
- Return on investment variability (RPR)
- Maximum sustainable long term asset growth rate (MSGR)

The strategic attributes used in the linear multiple regressions were only those which differed significantly between high growth and low growth markets, or high and low relative market share businesses, or the four cells of the B.C.G. growth/share matrix. These attributes were:

- Fixed assets to total assets (FA/TA)
- Stock to total assets (S/TA)
- Short term loans advanced to total assets (SLTA/TA)
- Long term loans advanced to total assets (LTLA/TA)
- Long term loan capital to total funds (LTLC/TF)
- Short term borrowings to total funds (STB/TF)
- Stock to total current assets (S/TCA)
- Debtors to total current assets (D/TCA)
- Stock turnover (Sx12/T0)

- Debtors turnover ($Dx12/T0$)
- Creditors to total current liabilities (C/TCL)
- Total long term loan capital to total borrowed funds ($TCTLCT/TBF$)
- Change in total fixed assets (CTFA)
- Change in debtors (CD)
- Change in total current assets (CTCA)
- Change in operating assets (CDOA)
- Change in total assets (CTA)
- Change in total current liabilities (CTCL)
- Turnover of current liabilities ($T0/CL$)
- Turnover of total assets ($T0/TA$)
- Trading profit margin ($TP/T0$)
- Change in turnover (CTO)
- The Current Ratio (CA/CL)
- The Acid Test Ratio ($CA-S/CL$)

7.5.3. The Research Findings Regarding the Relationship between Strategic Attributes and Performance

The testing of each of the above attributes with each performance measure gave rise to a number of interesting findings. The most significant of these are discussed in this section.

It must be strongly emphasised before the presentation and discussion of the research findings that although the methodology described above has given rise to a number of statistically significant relationships between strategic

attributes and specific performance measures, these findings must be treated with the utmost reserve. Apart from the study conducted by Hambrick et al (5) the methodology used here has yet to be subjected to the critical evaluation of researchers and academics. While the methodology would appear to be able to bridge the gap between an objective (in the form of the level of performance required) and the means of achieving that objective (through the monitoring and control of the salient strategic attributes) it is far from a proven methodology. Therefore, the researcher must be certain that any discovered relationship between a strategic attribute and a specific aspect of financial performance, is a valid relationship insofar as it accords with established strategy theory. It would be irresponsible for any researcher to advocate exactly which strategic attributes should be monitored and controlled, in order to achieve specified types of performance targets, on the basis of the discovery of a statistically strong, but logically tenuous relationship between the two variates. The research findings presented here are, therefore, only those which are consistent with accepted theory on the B.C.G. growth/share matrix or which accord with other research findings presented in this chapter. Furthermore, the explanations accompanying the research findings should be treated as purely tentative in view of the nature of the methodology, as discussed above. It is

clear that more extensive research and more comprehensive conceptual models are required in this field of study. As a result the following findings and their accompanying interpretations would most profitably be viewed as an experimental probe into a potentially fertile field of strategy analysis.

All research findings referred to in this section are listed in Appendix

7.5.3.1. Asset Structure Attributes and Business Performance

- 7.5.3.1.1. The fixed assets to total assets ratio is strongly negatively related to profitability for Wildcat and Dog businesses. This finding is consistent with the findings in respect of Hypothesis ASA2. A high level of fixed assets for Dog and Wildcat businesses leads to an upward shift in the break even volume. This could reduce profitability unless total revenue can be significantly increased - a tall order for businesses with poor market share positions. In order to improve profitability Dog and Wildcat businesses would do well to limit fixed asset growth as far as is feasible.
- 7.5.3.1.2. The fixed assets to total assets ratio is negatively related to cash flow performance for Wildcat businesses. Hence Wildcats appear to be particularly susceptible to poor performance as a result of an overabundance of fixed assets. However, such businesses probably need to accumulate considerable fixed assets as a basis for their growth requirements. Hence fixed asset build up may

constitute a necessary evil for Wildcat businesses.

- 7.5.3.1.3. The stock to total assets ratio is negatively related to profitability for all but Wildcat businesses. In other words, only within the Wildcat business category is there a positive correlation between stock levels, as a proportion of total assets, and improved profitability. Although the relationship between the variables is a tenuous one, this finding would seem to indicate that those Wildcat businesses in the research population which had relatively low stock to total assets ratios performed less satisfactorily than those with higher stock to total assets ratios. It is thus tempting to postulate that at least some Wildcat businesses may be experiencing stock shortages and that this is negatively affecting their performance. Hence, an improvement in their stock holdings may favourably affect their profitability.

This explanation is supported by the fact that Wildcat businesses, in theory at least, are characterised by a shortage of investment funds yet they must attempt to cope with rapid increases in demand for their products. Hence, of all business categories within the B.C.G. growth/share matrix, Wildcats are most likely to suffer from stock shortages. However, it should be noted, that as a group Wildcat businesses did not have a significantly lower stock to total assets ratio than any other category of business within the growth/share matrix. (6)

7.5.3.2. Funds Structure Attributes and Business Performance

7.5.3.2.1. The ratio of long term capital to total funds is positively related to profitability for Star and Cash Cow businesses but negatively related to profitability for Wildcat and especially Dog businesses. It would appear that Dog businesses, because of their very poor market position, are not able to use any increases in loan capital to generate the required level of profit return. Hence the more loan capital they raise the greater the interest and capital redemption burden they are forced to carry and the less favourable their profitability. This is a possible indication that Dog businesses would do well to avoid, as far as is feasible, accumulating external funds of a long term nature.

7.5.3.3. Current Asset Attributes and Business Performance

7.5.3.3.1. The stock to current assets ratio is negatively related to profitability for all but Wildcat businesses. On the assumption that the interpretation of the finding presented in section 7.5.3.1.3. is valid (that is, the relationship between profitability and the stock to total assets ratio) then this finding also implies that an improved stockholding would benefit Wildcat profit performance, presumably by reducing stock out situations.

- 7.5.3.3.2. The stock to current assets ratio is strongly related to market share change for Dog businesses. Due to the fact that market share change was negative for Dog businesses this indicates that they have allowed a significant upswing in stock levels as their relative market share position deteriorates. The ability of Dog businesses to either reduce stocks more effectively or to prevent loss of relative market share should, therefore, improve their overall performance.
- 7.5.3.3.3. There is a strong positive relationship between the debtors to current assets ratio and cash flow on investment for Star businesses but a strong negative relationship between the same variables for Dog businesses. This finding typifies the different nature of Star and Dog businesses. Star businesses are able to expand the scale of their operations and improve cash flow at the same time as they improve their market position. Dog businesses, on the other hand, must maintain or, as in this case, reduce the scale of their operations in order to improve cash flow.
- 7.5.3.3.4. The precarious position of Dog businesses is further illustrated by the fact that they are the only category of business within the B.C.G. growth/share matrix whose maximum sustainable growth rate is not improved by an increase in debtors.

7.5.3.4. Asset Growth Attributes and Business Performance

- 7.5.3.4.1. Return on investment variability is positively related to asset growth for Cash Cow businesses, but negatively related to asset growth for Wildcat businesses. This finding is explained by the fact that as Wildcat businesses grow they improve their market position thus reducing the variability of returns. On the other hand Cash Cow businesses are pursuing an inadvisable strategy when they seek growth, hence such a strategy results in an increase in the variability of return on investment.

7.5.3.5. Market Share Change and Business Performance

Until this stage market share change has been treated solely as a performance measure. However, it is clear that a change in market share can itself have a significant impact on other performance measures. As a result further linear regressions were run in order to capture any potential relationship between market share change and other performance measures. The results are given below.

- 7.5.3.5.1. Market share change has a strong negative association with return on investment for Cash Cow businesses. This finding is as expected in that Cash Cows can only build share at considerable expense and hence such a strategy will adversely affect performance.

- 7.5.3.5.2. Market share change is significantly negatively related to return on investment variability for Wildcat businesses. This is interpreted to mean that increases in market share will improve the position of Wildcat businesses and hence reduce the variation of returns.
- 7.5.3.5.3. Market share change is positively associated with cash flow on investment for both Wildcat and Dog businesses, and negatively associated with cash flow on investment for both Star and Cas Cow businesses. This finding supports the thesis that in order to improve their performance Dog businesses must obtain at least some minimum relative market share and Wildcat businesses must attempt to reach the Star category. Both of these cases, particularly in the instance of Wildcat businesses, imply increases in relative market share or, for Dog businesses, withdrawal from the market.

Cash Cow and Star businesses, on the other hand should attempt to hold market share and hence increases in market share are negatively associated with performance in terms of cash flow.

7.5.4. Strategic Attributes and the Performance of Businesses Within the B.C.G. Growth/Share Matrix - Summary

The research findings have shown that several strategic attributes are strongly associated with specific performance

measures. However, a limitation of this type of analysis is that the cause - effect relationship between such attributes and performance measures is often unclear. This limitation is likely to persist until more variables contingent on strategic attributes and financial performance are incorporated into the basic B.C.G. model. Attempting to ascribe all identifiable relationships between strategic attributes and financial performance to relative market share and market growth is a dangerous simplification. However, it is encouraging that such relationships can be found and meaningfully interpreted for businesses within a very general contingent model such as the growth/share matrix. Not only does this show that the basic structure of the model is acceptable as a strategic planning tool, it also augurs well for future refinements of this and other similar contingent models.

7.6. CONCLUSIONS

This chapter has presented and interpreted the research findings on the relevance of relative market share position and the rate of market growth to the strategic planning process. These variables form the basis of the Boston Consulting Group approach to portfolio analysis.

The impact of relative market share and the impact of the market growth rate (or product life cycle stage) on the

strategic attributes and financial performance of businesses have been analysed both in isolation from each other and in terms of their joint and simultaneous effect. This approach was adopted for two reasons: Firstly, each variable on its own has the ability to affect business performance significantly and thus deserves individual attention. Secondly, by analysing each variable independently it is possible to gain some indication of the relative contribution of each to the overall performance of the B.C.G. growth/share matrix.

It has been shown in this chapter that the strategic attributes and the financial performance of businesses do vary significantly according to the two dimensions of the B.C.G. growth/share matrix. Of the two variables considered relative market share has emerged as having the most powerful influence on the attributes and performance measures used in this study. The research findings strongly suggest that relative market share and market growth rate are variables which are very relevant to the strategic planning process at the business level.

On the negative side, this research has been hindered by some important limitations:

Firstly, the statistical tests essential for the successful completion of the research were not designed for small samples. As a result, and especially where the research population of ninety four was divided into sub-groups, the

statistical significance of the research findings was relatively low. This was unavoidable. It is, however, encouraging that even at low levels of statistical significance, the trends discovered in the research findings were not contradictory - though many were certainly unexpected.

Secondly, and possibly of greater importance, is the fact that the research conducted on the research population was cross-sectional in nature. That is, the B.C.G. growth/share matrix has been treated as a static rather than a dynamic model, by dealing with all data as five year averages. What this means is that the model ignores a business' current strategic effort and assumes that its performance is perfectly stable at the 5 year average level, that its strategic attributes are similarly unchanging and that its position in the growth/share matrix is a statement of where the business intends to be rather than representing one point on the road to where it intends going.

Notwithstanding these limitations, the B.C.G. growth/share matrix has performed admirably under the stringent methodology imposed by this research study.

REFERENCES AND NOTES

1. HAMBRICK, D.C., MacMILLAN, I.C. & DAY, D. "Strategic Attributes and Performance in the Four Cells of the B.C.G. Matrix". Unpublished Paper, Columbia University Graduate School of Business, July 1980. Page 19.
2. ABELL, D.F. & HAMMOND, J.S. Strategic Market Planning, Englewood Cliffs, New Jersey, Prentice Hall, 1979. Page 183.
3. Refer Chapter 6, Table 6.2.
4. Changes in turnover are the subject of Hypothesis ISA2 in Section 7.4.2.7. of this Chapter.
5. HAMBRICK, D.C. et. al., op cit., Page 1 - 9.
6. Refer Hypothesis ASA4, Section 7.4.2.1 of this Chapter.

CHAPTER 8

A SUMMARY OF THE MAJOR RESEARCH FINDINGS

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8.1. INTRODUCTION

The research findings presented in chapter 7 strongly suggest that, both individually and in conjunction with one another, the contingent variables comprising the B.C.G. growth/share matrix are pertinent to the analysis and practice of strategic planning at the business level. The more important findings relating to relative market share and the rate of market growth are summarised in this chapter.

8.2. SUMMARY OF MAJOR RESEARCH FINDINGS

8.2.1. Major Research Findings on the Performance of Businesses Within the B.C.G. Growth/Share Matrix

- 8.2.1.1. The financial performance of businesses is determined, to a considerable extent, by relative market share position. As a result it can be concluded that the predictions of the existing theory on experience, economies of scale and the benefits of large corporate size are valid. However, the evidence suggests that these factors do not confer benefits as sizeable as the theory contends.
- 8.2.1.2. Certain categories of businesses in South Africa are not being managed according to fundamental principles of strategic planning.
1. Businesses with dominant market positions in low growth markets (Cash Cow businesses) are jeopardising their financial performance

capabilities by pursuing growth strategies. These businesses should be holding rather than gaining market share. They should be investing in carefully selected related diversifications rather than in their current products and markets.

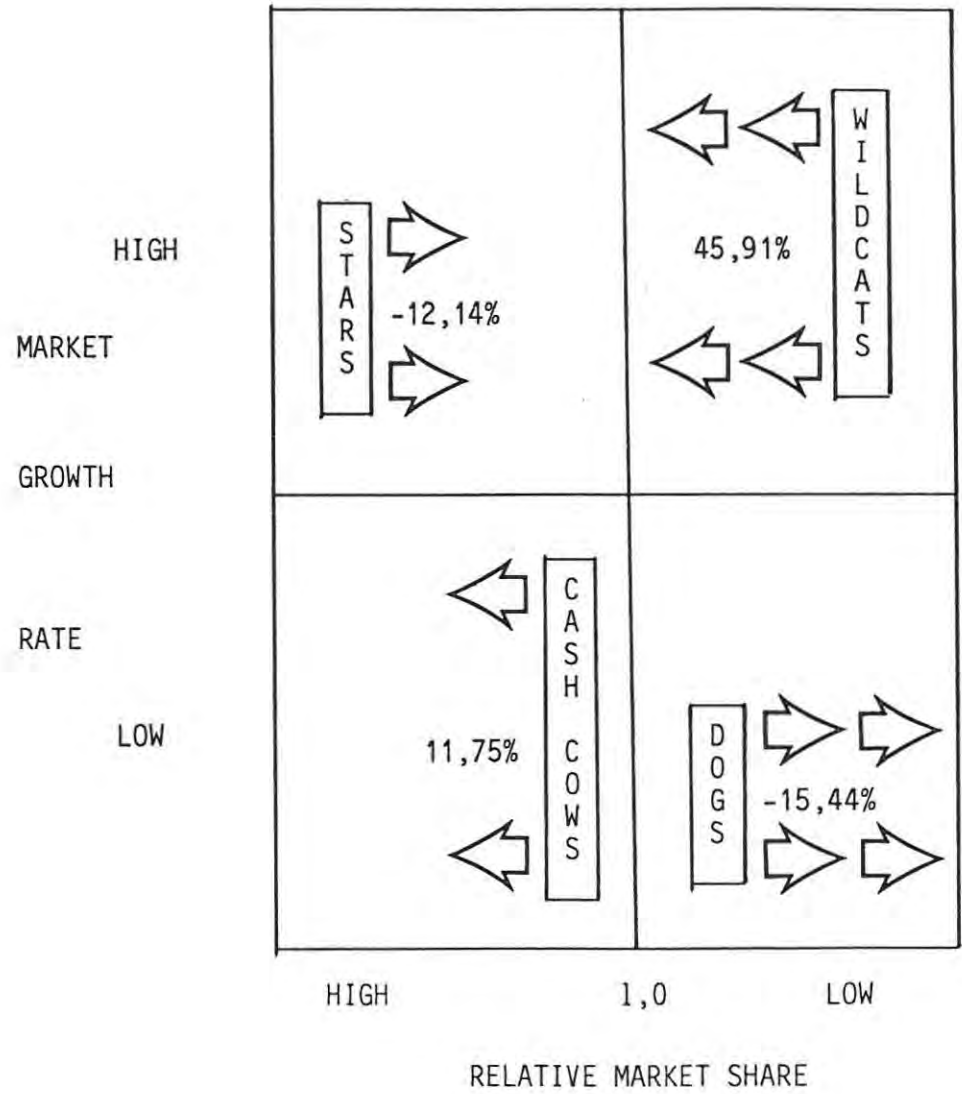
2. Businesses with dominant positions in high growth markets (Star businesses) are jeopardising their future financial performance through their inability to hold relative market share. These businesses are losing market share and are, therefore, following the so-called "disaster sequence". (1)

- 8.2.1.3. Businesses with small market share competing in low growth markets (Dog businesses) possess poor financial performance characteristics. These businesses are losing market share and they are characterised by very weak cash flow positions. These findings are in sharp contrast with the performance of Dog companies in the PIMS data base. (2)

A summary of relative market share gains and losses for businesses within the B.C.G. growth/share matrix over the period 1977/8 to 1980/1 is given in Figure 8.1.

FIGURE 8.1

RELATIVE MARKET SHARE CHANGES FOR THE RESEARCH POPULATION
 BY B.C.G. GROWTH/SHARE MATRIX CATEGORY (1977/8 TO 1980/1)



8.2.2. Major Research Findings on The Strategic Attributes of Businesses Within the B.C.G. Growth/Share Matrix

- 8.2.2.1. The strategic attributes of businesses, as represented by selected financial ratios, are influenced by both relative market share and the rate of growth of the market in which the business is competing.
- 8.2.2.2. The proportion of fixed assets in the total asset structure varies considerably for different categories of businesses within the growth/share matrix. High relative market share businesses tend to increase fixed assets possibly in an attempt to improve operating leverage. Businesses in high growth markets need to create an infrastructure for growth and hence they increase fixed assets beyond the level found in low growth markets.
- 8.2.2.3. Businesses in high growth markets appear to have no difficulty in keeping pace with market demand. The research findings show no evidence of stock shortages for either Wildcat or Star businesses.
- 8.2.2.4. The high debtors to current assets ratio found in Wildcat businesses strongly suggests that Wildcats are attempting to "buy" market share by significantly relaxing credit control requirements.
- 8.2.2.5. The research findings show that Wildcat businesses are both high growth and relatively high efficiency businesses. That is, not only do the demands of the market require that

they grow rapidly, but also their relatively weak market position necessitates a high degree of efficiency in their operations.

- 8.2.2.6. The growth strategies of Cash Cow businesses are evidenced by a high rate of asset growth, which is not counterbalanced by proportionate increases in turnover.
- 8.2.2.7. The relatively weak financial position of Dog businesses encourages these businesses to invest outside their own operations in order to gain acceptable returns. As a result they have a relatively low level of operating assets and a relatively high level of outside investments.

8.2.3. Major Research Findings on the Relationship Between Strategic Attributes and the Performance of Businesses Within the B.C.G. Growth/Share Matrix (3)

This field of study is still in its infancy but it nevertheless shows great potential. However, of particular importance with this type of analysis is the need to avoid making recommendations on the basis of random relationships between strategic attributes and financial performance. In order to ensure that correlations between attributes and performance are meaningful it will be necessary to refine the basic B.C.G. growth/share matrix by adding further contingent variables. As pointed out in Chapter 7, attempting to ascribe all identifiable relationships between strategic attributes and financial performance to relative market share position and the rate of market growth is a

dangerous simplification.

8.2.4. Further Research Possibilities

Further research in this field should be dominated by the need to develop and test a more comprehensive contingent model of strategy. However, this more comprehensive model must stop far short of incorporating as wide a range of contingent variables as found in the A.D. Little Matrix, the McKinsey General Electric Business Assessment Array or the Directional Policy Matrix. As Hambrick states, what are required are "empirically based mid-range theories about the content of business level strategy". (4) Perhaps a fruitful approach would be to add a strategic posture dimension to the growth/share matrix.

Also of importance in respect of future research is the need to test contingent models on large samples of businesses using strategic attributes which are more directly related to performance, such as those contained in the PIMS data base. Both of these requirements, however, are extremely difficult to fulfil given the current state and availability of business related data in South Africa.

8.3. CONCLUSIONS

Adherence to basic strategic management principles could go a long way towards improving the performance of many

South African businesses. Management needs to become more aware of the sorts of strategic (rather than administrative or operational) issues which impact on long run corporate performance. Contingent models in general, and limited dimension contingent models in particular, provide the type of framework within which management can make a meaningful analysis of such strategic issues at the business level.

REFERENCES AND NOTES

1. ABELL, D.F. & HAMMOND, J.S. Strategic Market Planning, Englewood Cliffs, New Jersey, Prentice Hall, 1979. Page 180.
2. HAMBRICK, D.C., MacMILLAN, I.C. & DAY, D. "Strategic Attributes & Performances in the Four Cells of the B.C.G. Matrix: A PIMS Based Empirical Analysis". Unpublished Paper, Columbia University Graduate School of Business, July 1980. Page 19.
3. The major findings in this regard are clearly outlined in Chapter 7, Section 7.5, hence they are not repeated here.

A P P E N D I X 1RESEARCH POPULATION (BY INDUSTRIAL SECTOR)BEVERAGES AND HOTELS

Bertrams Wines Limited

BUILDING AND CONSTRUCTION

Elmar Holdings Limited
Everite Limited
Goodhope Concrete Pipes Limited
Gypsum Industries Limited
National Veneer Holdings Limited
Otis Elevator Company Limited
Panafic Holdings Limited
Pretoria Portland Cement Company

CHEMICALS AND OIL

A E C I Limited
Chemical Holdings Limited
Plascon-Evans Paints Limited
Triomf Fertilizer Investments Limited

CLOTHING, FOOTWEAR AND TEXTILES

Adonis Knitwear Holdings Limited
Berkshire International (S A) Limited
Burlington Industries Limited
Consolidated Textile Mills Investment Corporation
Limited
Delswa Limited
Dugson Holdings Limited
Ensign Clothing Limited
Gubb and Inggs Limited
I L Back and Company Limited
Mooi River Textiles Limited
Ninian and Lester Holdings Limited
Progress Industries Limited

Rex Trueform Clothing Company Limited
Romatex Limited
South African Woollen Mills
Silverton Tannery Limited
Towles. Edgar Jacobs Company Limited (TEJ)
Textile Mills (1947) Holdings Limited
Veka Limited

ELECTRONICS. ELECTRICAL AND BATTERY

Abedare Cables Africa Limited
African Cables Limited
Allied Technologies Limited
Asea Electric South Africa Limited

ENGINEERING

Duro Industries Limited
Field Industries (Africa) Limited
Fintec Limited
National Bolts Limited

FISHING

Kaap Kunene Beleggings Beperk
Lamberts Bay Canning Company Limited
Sea Products (S W A) Limited
South West African Fishing Industries Limited
United Oceana Holdings Limited
Willem Barendz Limited

FOOD

Bakers South Africa Limited
Cadbury Schweppes (S A) Limited
Irvin & Johnson Limited
Karoo Vleisbeurs Beperk
Monis and Fattis Industries Limited
Picardi Cannery Limited

FURNITURE AND HOUSEHOLD GOODS

Associated Furniture Companies Limited (AFCOL)
B & S Steel Furniture Company Limited
Ellerine Holdings Limited
Montays Limited
Russell Holdings Limited

MOTOR

Dunlop South Africa Limited
Eureka Rubber Company of South Africa Limited
General Tire & Rubber Company of South Africa Limited

PAPER AND PACKAGING

Carlton Paper Corporation Limited
Canadian Overseas Packing Industries (COPI) Limited
Hortors Limited
Kohler Brothers Limited
Premier Paper Limited
Trio Rand South Africa Limited

PHARMACEUTICAL AND MEDICAL

General Optical Company Limited
South African Druggists Limited
Shulton Africa Limited

PRINTING AND PUBLISHING

Die Afrikaanse Pers (1962) Beperk
Argus Printing and Publishing Company Limited
Caxton Limited
Mathieson and Ashley Limited
South African Associated Newspapers Limited
Vaderland Beleggings Beperk

STEEL AND ALLIED

Dunswart Iron and Steel Works Limited
Highveld Steel and Vanadium Limited
Vereeniging Refractories Limited

STORES

A B C Shoe Corporation Limited
Bradlows Stores Limited
Edgars Stores Limited
Foschini Limited
Garlick Limited
Grand Bazaars Limited
Greatermans Stores Limited
Harrowes Limited

Hepworths Limited
Katz and Lourie Limited
O K Bazaars (1929) Limited
Pep Stores Limited
Pick 'n Pay Stores Limited
M & S Spitz Footwear Holdings Limited

PREFERENCE SHARES

Steel and Barnett Limited

DEBENTURES

Edworks (1936) Limited

A P P E N D I X 2THE RESEARCH POPULATION BY INDUSTRY SUB-GROUP,
INDUSTRY GROUP OR MAJOR GROUP

INDUSTRY CODE: 3111

INDUSTRY DESCRIPTION: Slaughtering, preserving and
preparing meat

LIST OF COMPANIES:

Karoo Vleisbeurs Beperk

INDUSTRY CODE: 3113

INDUSTRY DESCRIPTION: Canning and preserving of fruit
and vegetables

LIST OF COMPANIES:

Picardi Cannery Limited

INDUSTRY CODE: 3114

INDUSTRY DESCRIPTION: Canning, preserving and
processing of fish, crustacea
and similar foods; manufacture
of fish oil and meal

LIST OF COMPANIES:

Irvin and Johnson Limited
Koop Kunene Beleggings Beperk
Lamberts Bay Canning Company Limited
Sea Products (S W A) Limited
South West African Fishing Industries Limited
United Oceana Holdings Limited
Willem Barendz Limited

INDUSTRY CODE: 3116/7

INDUSTRY DESCRIPTION: Grain mill products. Manufacture of bakery products

LIST OF COMPANIES:

Bakers South Africa Limited
Monis and Fattis Industries Limited

INDUSTRY CODE: 3119

INDUSTRY DESCRIPTION: Manufacture of cocoa, chocolate and sugar confectionery

LIST OF COMPANIES:

Cadbury Schweppes (S A) Limited

INDUSTRY CODE: 3131

INDUSTRY DESCRIPTION: Distilling, rectifying and blending spirits; wine industries

LIST OF COMPANIES:

Bertrams Wines Limited

INDUSTRY CODE: 3211

INDUSTRY DESCRIPTION: Spinning, weaving and finishing textiles

LIST OF COMPANIES:

Consolidated Textile Mills Investment Corporation Limited
Gubb and Inggs Limited
Mooi River Textiles Limited
South African Woollen Mills Limited

INDUSTRY CODE: 3213

INDUSTRY DESCRIPTION: Knitting mills

LIST OF COMPANIES:

Adonis Knitwear Holdings Limited
Berkshire International (S A) Limited

INDUSTRY CODE: 3214/5

INDUSTRY DESCRIPTION: Manufacture of carpets and rugs.
Cordage, rope and twine industries

LIST OF COMPANIES:

Romatex Limited

INDUSTRY CODE: 3220

INDUSTRY DESCRIPTION: Manufacture of wearing apparel,
except footwear

LIST OF COMPANIES:

Burlington Industries Limited
Delswa Limited
Dugson Holdings Limited
Engisgn Clothing Limited
I L Back and Company Limited
Ninian and Lester Holdings Limited
Progress Industries Limited
Rex Trueform Clothing Company Limited
Towles, Edgar Jacobs Limited
Textiles Mills (1947) Holdings Limited
Veka Limited

INDUSTRY CODE: 3231

INDUSTRY DESCRIPTION: Tanneries and leather finishing

LIST OF COMPANIES:

Silverton Tannery Limited

INDUSTRY CODE: 3240

INDUSTRY DESCRIPTION: Manufacture of footwear

LIST OF COMPANIES:

A B C Shoe Corporation Limited
Edworks (1936) Limited
M & S Spitz Footwear Holdings Limited

INDUSTRY CODE: 3311

INDUSTRY DESCRIPTION: Sawmills, planing and other
wood mills

LIST OF COMPANIES:

National Veneer Holdings Limited

INDUSTRY CODE: 3320

INDUSTRY DESCRIPTION: Manufacture of furniture and
fixtures except primarily of
metal

LIST OF COMPANIES:

Associated Furniture Companies Limited
Steel and Barnett Limited

INDUSTRY CODE: 3412

INDUSTRY DESCRIPTION: Manufacture of containers and
boxes of paper, paper board and
paper substitutes

LIST OF COMPANIES:

Canadian Overseas Packing Industries Limited
 Kohler Brothers Limited
 Premier Paper Limited

INDUSTRY CODE: 3419

INDUSTRY DESCRIPTION: Manufacture of pulp, paper and
 paperboard articles not else-
 where classified

LIST OF COMPANIES:

Carlton Paper Corporation Limited

INDUSTRY CODE: 3420

INDUSTRY DESCRIPTION: Printing, publishing and allied
 industries including publishing
 as a separate business

LIST OF COMPANIES:

Die Afrikaanse Pers (1962) Beperk
 Argus Printing and Publishing Company Limited
 Caxton Limited
 Hortors Limited
 South African Associated Newspapers Limited
 Trio Rand Limited
 Vaderland Beleggings Beperk

INDUSTRY CODE: 351

INDUSTRY DESCRIPTION: Manufacture of industrial
 chemicals

LIST OF COMPANIES:

A E C I Limited
 Chemical Holdings Limited

INDUSTRY CODE: 3512

INDUSTRY DESCRIPTION: Manufacture of fertilizers and pesticides

LIST OF COMPANIES:

Triomf Fertilizers Investments Limited

INDUSTRY CODE: 3521

INDUSTRY DESCRIPTION: Manufacture of paints, varnishes and lacquers

LIST OF COMPANIES:

Plascon-Evans Paints Limited

INDUSTRY CODE: 3522

INDUSTRY DESCRIPTION: Manufacture of medicinal and pharmaceutical preparations

LIST OF COMPANIES:

South African Druggists Limited

INDUSTRY CODE: 3523

INDUSTRY DESCRIPTION: Manufacture of soap and cleaning preparations, perfumes, cosmetics and other toilet preparations

LIST OF COMPANIES:

Shulton Africa Limited

INDUSTRY CODE: 355

INDUSTRY DESCRIPTION: Manufacture of rubber products

LIST OF COMPANIES:

Dunlop South Africa Limited
Eureka Rubber Company of South Africa Limited
The General Tire and Rubber Company (S A) Limited

INDUSTRY CODE: 3559

INDUSTRY DESCRIPTION: Manufacture of rubber products
not elsewhere classified

LIST OF COMPANIES:

Field Industries (Africa) Limited

INDUSTRY CODE: 3691

INDUSTRY DESCRIPTION: Manufacture of structural clay
products

LIST OF COMPANIES:

Vereenigning Refractories Limited

INDUSTRY CODE: 3692

INDUSTRY DESCRIPTION: Manufacture of cement

LIST OF COMPANIES:

Pretoria Portland Cement Company

INDUSTRY CODE: 36990

INDUSTRY DESCRIPTION: Plaster and other composite sheets, pipes, etc. from gypsum, cement, asbestos, etc.

LIST OF COMPANIES:

Everite Limited
Goodhope Concrete Pipes Limited
Gypsum Industries Limited

INDUSTRY CODE: 3710

INDUSTRY DESCRIPTION: Iron and steel basic industries

LIST OF COMPANIES:

Dunswart Iron and Steel Works Limited
Highveld Steel and Vanadium Limited

INDUSTRY CODE: 3812

INDUSTRY DESCRIPTION: Manufacture of furniture and fixtures primarily of metal

LIST OF COMPANIES:

B & S Steel Furniture Company Limited
Panafic Holdings Limited

INDUSTRY CODE: 3813

INDUSTRY DESCRIPTION: Manufacture of structural metal products

LIST OF COMPANIES:

Duro Industries Limited

INDUSTRY CODE: 38193

INDUSTRY DESCRIPTION: Headed and threaded articles

LIST OF COMPANIES:

National Bolts Limited

INDUSTRY CODE: 3825

INDUSTRY DESCRIPTION: Manufacture of office, computing and accounting machinery

LIST OF COMPANIES:

Mathieson and Ashley Limited

INDUSTRY CODE: 3829

INDUSTRY DESCRIPTION: Machinery and equipment except electrical, not elsewhere classified

LIST OF COMPANIES:

Otis Elevator Company Limited

INDUSTRY CODE: 3831

INDUSTRY DESCRIPTION: Manufacture of electrical industrial machinery and apparatus

LIST OF COMPANIES:

Asea Electric South Africa Limited

INDUSTRY CODE: 3832

INDUSTRY DESCRIPTION: Manufacture of radio, television and communication equipment and apparatus

LIST OF COMPANIES:

Allied Technologies Limited

INDUSTRY CODE: 3833

INDUSTRY DESCRIPTION: Manufacture of electrical appliances and houseware

LIST OF COMPANIES:

Fintec Limited

INDUSTRY CODE: 38390

INDUSTRY DESCRIPTION: Insulated wires and cables

LIST OF COMPANIES:

Abedare Cables Africa Limited
African Cables Limited
Scottish Cables (South Africa) Limited

INDUSTRY CODE: 3862

INDUSTRY DESCRIPTION: Manufacture of photographic and optical goods

LIST OF COMPANIES:

General Optical Company Limited

INDUSTRY CODE: 62004

INDUSTRY DESCRIPTION: Mens Outfitters

LIST OF COMPANIES:

Hepworths Limited

INDUSTRY CODE: 62006

INDUSTRY DESCRIPTION: General Outfitters and dealers
in piece goods and textiles

LIST OF COMPANIES:

Edgars Stores Limited
Foschini Limited
Pep Stores Limited

INDUSTRY CODE: 62008

INDUSTRY DESCRIPTION: Dealers in furniture, household
requisites and household
appliances

LIST OF COMPANIES:

Bradlow's Stores Limited
Ellerine Holdings Limited
Montays Limited
Russell Holdings Limited

INDUSTRY CODE: 62010

INDUSTRY DESCRIPTION: Jewellers

LIST OF COMPANIES:

Katz and Lourie Limited

INDUSTRY CODE: 62016

INDUSTRY DESCRIPTION: General departmental stores

LIST OF COMPANIES:

Garlick Limited
Greatermans Stores Limited

INDUSTRY CODE: 62017

INDUSTRY DESCRIPTION: General dealers

LIST OF COMPANIES:

Grand Bazaars Limited
Harrowes Limited
O K Bazaars (1929) Limited
Pick 'n Pay Stores Limited

APPENDIX 3

MARKET GROWTH RATES BY INDUSTRY SUB-GROUP, INDUSTRY
GROUP OR MAJOR GROUP

NOTE: The calculation of market growth rate for 1981 is based on industry sales from January to September 1981. These were the latest figures available from the Department of Statistics at the time the research was conducted. Sales for the last quarter of 1981 (October to December) were estimated on a pro rata basis from sales in the first three quarters and added to the total sales of the first three quarters.

List of Defined Industries and their Associated Growth Rates
(5 year Ave.).

Industry Code: 3111

Industry Description: Slaughtering, preserving and preparing
meat

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	277 947		
1978	289 592	11 645	4
1979	296 902	7 310	3
1980	401 423	104 521	35
1981	471 784	70 361	17

5 year average growth = 15%

Industry Code: 3113

Industry Description: Canning and preserving of fruit and vegetables.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	298 290		
1978	324 969	26 679	9
1979	411 796	86 827	27
1980	495 968	84 172	20
1981	517 934	21 966	4

5 year average growth = 15%

Industry Code: 3114

Industry Description: Canning, preserving and processing of fish, crustacea and similar foods; manufacture of fish oil and meal.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	82 273		
1978	99 080	16 807	20
1979	115 572	16 492	17
1980	113 412	- 2160	- 2
1981	152 615	39 239	35

5 year average growth rate = 18%

Industry Code: 3116 + 3117

Industry Description: Grain mill products. Manufacture of bakery products.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	1 255 961		
1978	1 489 645	233 684	19
1979	1 848 078	358 433	24
1980	2 369 779	521 701	28
1981	2 631 218	261 421	11

5 year average growth = 21%

Industry Code: 3119

Industry Description: Manufacture of cocoa, chocolate and sugar confectionery

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	166 628		
1978	198 067	31 439	19
1979	225 529	27 462	14
1980	297 987	72 458	32
1981	337 804	39 817	17

5 year average growth = 20%

Industry Code: 3131

Industry Description: Distilling, rectifying and blending spirits; wine industries

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	559 684		
1978	623 431	63 747	11
1979	798 060	174 629	28
1980	963 281	165 221	21
1981	1 032 811	69 530	7

5 year average growth = 17%

Industry Code: 3211

Industry Description: Spinning, weaving and finishing textiles.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	609 923		
1978	703 771	93 848	15
1979	801 315	97 544	14
1980	974 491	173 176	22
1981	1 051 969	77 478	8

5 year average growth rate = 15%

Industry Code: 3213

Industry Description: Knitting Mills

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	228 056		
1978	245 261	17 205	8
1979	286 288	41 027	17
1980	368 330	82 042	29
1981	432 488	64 158	17

5 year average growth rate = 18%

Industry Code: 3214/5

Industry Description: Manufacture of carpets and rugs.
Cordage, rope and twine industries.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	No figs. available		
1978	99 205		
1979	160 459	61 254	62
1980	264 282	103 828	65
1981	299 428	35 146	13

4 year average growth rate = 47%

Industry Code: 3220

Industry Description: Manufacture of wearing apparel,
except footwear.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	660 180		
1978	765 359	105 179	16
1979	896 836	131 477	17
1980	1 121 476	224 640	25
1981	1 335 694	214 218	19

5 year average growth rate = 19%

Industry Code: 3231

Industry Description: Tanneries and leather finishing

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	62 564		
1978	82 533	19 969	32
1979	130 797	48 264	59
1980	121 586	- 9 211	- 7
1981	140 162	18 576	15

5 year average growth = 25%

Industry Code: 3240

Industry Description: Manufacture of footwear

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	222 696		
1978	278 170	55 474	25
1979	329 404	51 234	18
1980	408 784	79 380	24
1981	543 628	134 844	33

5 year average growth rate = 25%

Industry Code: 3311

Industry Description: Sawmills, planing and other wood mills

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	313 028		
1978	371 323	58 295	19
1979	494 211	122 888	33
1980	671 778	177 567	36
1981	742 157	70 397	11

5 year average growth = 25%

Industry Code: 3320

Industry Description: Manufacture of furniture and fixtures except primarily of metal.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	289 028		
1978	339 933	50 905	18
1979	416 626	76 693	23
1980	604 671	188 045	45
1981	677 489	72 818	12

5 year average growth rate = 25%

Industry Code: 3412

Industry Description: Manufacture of containers and boxes of paper, paper board and paper substitutes.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	351 702		
1978	416 297	64 595	18
1979	472 336	56 039	13
1980	566 191	93 855	20
1981	688 758	122 567	22

5 year average growth = 18%

Industry Code: 3419

Industry Description: Manufacture of pulp, paper and paperboard articles not elsewhere classified.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	127 135		
1978	153 687	26 552	21
1979	184 071	30 384	20
1980	244 536	60 465	33
1981	291 390	46 853	19

5 year average growth = 23%

Industry Code: 3420

Industry Description: Printing, publishing and allied industries including publishing as a separate business.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	473 004		
1978	567 658	93 664	20
1979	677 022	109 364	19
1980	901 042	224 020	33
1981	1 050 941	149 899	17

5 year average growth = 22%

Industry Code: 351

Industry Description: Manufacture of industrial chemicals.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	Not available		
1978	1 278 596	220 429	29
1979	1 772 377	493 781	39
1980	2 308 299	535 922	30
1981	2 667 972	359 673	16

4 year average growth = 29%

Industry Code: 3512

Industry Description: Manufacture of fertilizers and pesticides

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	389 256		
1978	473 097	83 841	22
1979	588 373	115 276	24
1980	759 603	171 230	29
1981	811 566	51 963	7

5 year average growth = 21%

Industry Code: 3521

Industry Description: Manufacture of paints, varnishes and lacquers.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	175 042		
1978	231 311	56 269	32
1979	269 136	37 825	12
1980	321 004	51 868	19
1981	344 472	23 468	7

5 year average growth = 19%

Industry Code: 3522

Industry Description: Manufacture of medicinal and pharmaceutical preparations.

Year	Value of Sales (R 000's)	Growth Sales (R 000's)	Growth of Sales (%)
1977	240 069		
1978	304 948	64 879	27
1979	397 700	92 752	30
1980	536 161	138 461	35
1981	598 887	62 726	12

5 year average growth = 26%

Industry Code: 3523

Industry Description: Manufacture of soap and cleaning preparations, perfumes, cosmetics and other toilet preparations.

Year	Value of Sales (R 000's)	Growth Sales (R 000's)	Growth of Sales (%)
1977	372 849		
1978	435 242	62 393	17
1979	548 221	112 797	26
1980	623 881	75 660	14
1981	714 265	90 384	15

5 year average growth = 18%

Industry Code: 355

Industry Description: Manufacture of rubber products.

Year	Value of Sales (R 000's)	Growth Sales (R 000's)	Growth of Sales (%)
1977	306 920		
1978	384 799	77 879	25
1979	434 855	50 056	13
1980	558 183	123 328	28
1981	654 010	95 827	17

5 year average growth = 21%

Industry Code: 3559

Industry Description: Manufacture of rubber products not elsewhere classified.

Year	Value of Sales (R 000's)	Growth Sales (R 000's)	Growth of Sales (%)
1977	100 193		
1978	129 617	29 429	29
1979	169 086	39 469	31
1980	214 717	45 631	27
1981	239 022	24 305	11

5 year average growth = 25%

Industry Code: 3691

Industry Description: Manufacture of structural clay products.

Year	Value of Sales (R 000's)	Growth Sales (R 000's)	Growth of Sales (%)
1977	186 325		
1978	244 381	58 056	31
1979	317 037	72 656	30
1980	453 653	136 616	43
1981	531 129	77 476	17

5 year average growth = 30%

Industry Code: 3692

Industry Description: Manufacture of Cement

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	149 743		
1978	182 680	32 937	22
1979	199 962	17 282	10
1980	292 048	92 086	46
1981	360 224	68 176	23

5 year average growth rate = 25%

Industry Code: 36990

Industry Description: Plaster and other composite sheets,
pipes, etc. from gypsum, cement,
asbestos, etc.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	Not available		
1978	1 014 770		
1979	1 168 947	154 177	15
1980	1 321 110	152 163	13
1981	1 430 520	109 410	8

4 year average growth rate = 12%

Industry Code: 3710

Industry Description: Iron and steel basic industries

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	1 677 106		
1978	2 085 456	408 350	24
1979	2 816 472	731 016	35
1980	3 260 932	444 460	16
1981	3 669 052	408 120	13

5 year average growth rate = 22%

Industry Code: 3812

Industry Description: Manufacture of furniture and fixtures primarily of metal.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	93 239		
1978	104 211	10 972	12
1979	123 231	19 020	18
1980	170 826	47 595	39
1981	177 937	7 111	4

5 year average growth rate = 18%

Industry Code: 3813

Industry Description: Manufacture of structural metal products

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	1 346 694		
1978	2 013 485	666 791	50
1979	2 761 185	747 700	37
1980	3 781 424	1 020 239	37
1981	4 654 444	873 020	23

5 year average growth rate = 37%

Industry Code: 38193

Industry Description: Headed and threaded articles.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	162 271		
1978	193 748	31 477	19
1979	248 168	54 420	28
1980	364 963	116 795	47
1981	424 354	59 391	16

5 year average growth rate = 28%

Industry Code: 3825

Industry Description: Manufacture of office, computing and accounting machinery.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	Not available		
1978	3 668		
1979	5 556	1 888	51
1980	6 736	1 180	21
1981	8 072	1 336	20

4 year average growth rate = 31%

Industry Code: 3829

Industry Description: Machinery and equipment except electrical, not elsewhere classified.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	Not available		
1978	506 171		
1979	588 788	82 617	16
1980	792 197	203 409	35
1981	960 826	168 629	21

4 year average growth rate = 24%

Industry Code: 3831

Industry Description: Manufacture of electrical industrial machinery and apparatus.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	437 975		
1978	418 893	- 19 082	- 4
1979	473 615	54 722	13
1980	478 355	4 740	1
1981	628 685	150 330	31

5 year average growth rate = 10%

Industry Code: 3832

Industry Description: Manufacture of radio, television and communication equipment and apparatus

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	Not available		
1978	427 517		
1979	383 941	- 43 576	- 10
1980	529 741	145 800	38
1981	579 274	49 533	9

4 year average growth rate = 12%

Industry Code: 3833

Industry Description: Manufacture of electrical appliances and houseware.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	64 176		
1978	54 307	- 9 869	- 15%
1979	65 304	10 997	20
1980	96 241	30 937	47
1981	104 920	8 697	9

5 year average growth rate = 15%

Industry Code: 38390

Industry Description: Insulated wires and cables

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	162 271		
1978	193 748	31 477	19
1979	248 168	54 420	28
1980	364 963	116 795	47
1981	424 355	59 392	16

5 year average growth rate = 28%

Industry Code: 3862

Industry Description: Manufacture of photographic and optical goods.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	Not available		
1978	11 418		
1979	14 646	3 231	28
1980	15 239	590	4
1981	17 146	1 907	13

4 year average growth rate = 15%

Industry Code: 62004 and 62006

Industry Description: Mens Outfitters.
General Outfitters and dealers in piece goods and textiles.

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	1 506 800		
1978	1 619 300	112 500	7
1979	1 929 800	310 500	19
1980	2 411 700	481 900	25
1981	2 665 600	253 900	11

5 year average growth rate = 16%

Industry Code: 62008

Industry Description: Dealers in furniture, household requisites and household appliances

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	1 033 000		
1978	1 105 800	72 800	7
1979	1 225 300	119 500	11
1980	1 633 000	407 700	33
1981	1 741 670	108 670	7

5 year average growth rate = 15%

Industry Code: 62010

Industry Description: Jewellers

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	109 000		
1978	113 400	4 400	4
1979	134 300	20 900	18
1980	172 300	38 000	28
1981	174 354	2 054	1

5 year average growth rate = 15%

Industry Code: 62016

Industry Description: General departmental stores

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	849 500		
1978	953 700	104 200	12
1979	996 500	42 800	4
1980	1 294 600	298 100	30
1981	1 530 900	236 300	18

5 year average growth rate = 16%

Industry Code: 62017

Industry Description: General dealers

Year	Value of Sales (R 000's)	Growth of Sales (R 000's)	Growth of Sales (%)
1977	1 402 600		
1978	1 478 600	76 000	5
1979	1 483 200	4 600	1
1980	1 748 600	265 400	18
1981	1 911 100	162 500	9

5 year average growth rate = 8%

A P P E N D I X 4

THE RELATIVE MARKET SHARE OF COMPANIES IN THE RESEARCH POPULATION (*)

COMPANY NAME	TURNOVER AND RELATIVE MARKET SHARE										AVERAGE RELATIVE MARKET SHARE	RELATIV MARKET SHARE CHANGE
	1977		1978		1979		1980		1981			
<u>INDUSTRY 3114 (+)</u>												
Irvin and Johnson Limited	142 970	2,85	156 511	2,85	163 940	2,35	199 534	3,18	263 348	4,12	3,07	+44%
United Oceana Holdings Limited	50 230	0,35	55 020	0,35	69 717	0,43	62 758	0,24	N/A	-	0,34	-31%
Lamberts Bay Canning Company Limited	49 224	0,34	54 601	0,35	69 628	0,42	62 743	0,24	N/A	-	0,34	-29%
S W A Fishing Industries Limited	11 025	0,08	9 497	0,06	11 487	0,07	8 430	0,04	10 665	0,04	0,06	-50%
Willem Barendz Limited	8 758	0,06	5 022	0,03	5 143	0,03	3 166	0,02	3 480	0,01	0,03	-83%
Kaap Kunene Beleggings Limited	25 113	0,18	19 088	0,12	22 275	0,10	21 936	0,11	26 648	0,10	0,13	-80%
Sea Products (S W A) Limited	9 815	0,07	6 939	0,04	7 783	0,05	4 808	0,02	N/A	-	0,05	-71%
<u>INDUSTRY 3211 (+)</u>												
Gubb and Inggs Limited	37 702	3,05	37 862	3,06	57 163	4,06	59 847	3,66	65 747	3,34	3,47	+ 3%
Mooi River Textiles Limited	11 592	0,31	12 357	0,33	14 063	0,25	16 370	0,27	19 684	0,30	0,29	- 3%
<u>INDUSTRY 3220 (+)</u>												
Progress Industries Limited	14 515	0,87	14 953	0,89	15 019	0,73	15 360	0,64	18 260	0,55	0,74	-37%
Textile Mills (1947) Holdings Limited	2 607	0,16	2 418	0,14	2 886	0,14	3 845	0,16	6 188	0,19	0,16	+19%
Veka Limited	16 593	1,14	16 814	1,13	20 513	1,37	24 108	1,57	33 160	1,82	1,41	+60%

COMPANY NAME	TURNOVER AND RELATIVE MARKET SHARE										AVERAGE RELATIVE MARKET SHARE	RELATIV MARKET SHARE CHANGE
	1977		1978		1979		1980		1981			
<u>INDUSTRY 3320 (+)</u>												
Associated Furniture Companies Limited	98 716	5,74	99 627	-	116 214	5,62	142 320	5,62	193 798	-	5,66	- 3%
Steel and Barnett Limited	17 198	0,17	N/A	-	20 694	0,18	25 337	0,18	N/A	-	0,18	+ 3%
<u>INDUSTRY 3412 (+)</u>												
Canadian Overseas Packing Industries Limited	40 904	0,37	50 342	0,55	56 508	0,50	70 881	0,50	78 618	0,45	0,47	+22%
Kohler Brothers Limited	111 329	2,72	92 176	1,83	113 286	2,00	142 260	2,01	173 732	2,21	2,15	-19%
Premier Paper Limited	18 999	0,17	24 136	0,26	24 562	0,22	29 987	0,21	25 435	0,15	0,20	-12%
<u>INDUSTRY 3420 (NEWSPAPER) (+)</u>												
Die Afrikaanse Pers (1962) Beperk	114 115	0,77	134 470	0,97	140 512	0,95	163 856	0,96	174 600	0,84	0,90	+ 9%
Argus Printing & Publishing Company Limited	148 284	1,30	139 018	1,03	147 470	1,05	171 267	1,04	207 653	1,19	1,12	- 8%
South African Associated Newspapers Limited	53 950	0,36	54 249	0,39	61 859	0,42	79 619	0,47	101 131	0,49	0,43	+36%
<u>INDUSTRY 3420 (+)</u>												
Caxton Limited	2 086	0,09	3 120	0,16	5 050	0,23	4 791	0,12	10 828	0,13	0,15	+44%
Hortors Limited	4 174	0,19	5 835	0,29	4 670	0,21	39 089	0,41	78 803	0,92	0,60	+384%
Trio Rand Limited	22 513	5,39	19 923	3,41	22 365	4,79	27 654	0,71	86 117	1,10	3,08	-80%

COMPANY NAME	TURNOVER AND RELATIVE MARKET SHARE										AVERAGE RELATIVE MARKET SHARE	RELATIVE MARKET SHARE CHANGE
	1977		1978		1979		1980		1981			
<u>INDUSTRY 355 (+)</u>												
Dunlop South Africa Limited General Tire & Rubber Company (S A) Limited	89 386	1,78	106 194	1,45	127 053	-	157 493	1,49	211 449	1,63	1,63	- 8%
	50 182	0,56	73 458	0,69	N/A	-	105 519	0,67	129 848	0,61	0,61	+ 8%
<u>INDUSTRY 3710 (+)</u>												
Dunswart Iron & Steel Works Limited	39 109	0,27	54 753	0,32	68 562	0,26	86 421	0,27	89 278	0,27	0,28	0%
Highveld Steel & Vanadium Limited	144 450	3,69	172 980	3,16	268 411	3,92	323 584	3,70	332 967	3,73	3,65	0%
<u>INDUSTRY 38390 (+)</u>												
Abedare Cables Africa Limited	36 228	0,91	35 619	0,80	49 455	1,06	78 160	1,04	97 698	1,14	0,99	+25%
African Cables Limited	39 898	1,10	44 384	1,25	46 739	0,95	75 105	0,96	85 758	0,88	1,03	-20%
Scottish Cables (S A) Limited	17 631	0,44	20 882	0,47	41 007	0,83	52 100	0,67	58 278	0,60	0,60	+36%
<u>INDUSTRY 62006 (+)</u>												
Edgars Stores Limited	169 918	1,86	194 391	1,77	228 912	1,81	296 152	1,87	409 199	2,03	1,87	+ 9%
Foschini Limited	87 948	0,52	97 836	0,50	112 304	0,49	144 932	0,49	189 727	0,49	0,49	- 6%
Pep Stores Limited	91 388	0,54	109 612	0,56	126 207	0,55	158 462	0,54	201 779	0,49	0,54	- 9%
<u>INDUSTRY 62008 (+)</u>												
Bradlows Stores Limited	22 545	0,21	20 991	0,18	34 489	0,26	33 148	0,20	42 911	0,19	0,21	-10%
Ellerine Holdings Limited	N/A	-	87 638	0,74	75 959	0,56	100 922	0,61	134 594	0,61	0,63	-18%
Russell Holdings Limited	109 297	-	117 872	1,35	135 238	1,78	166 414	1,65	222 152	1,65	1,61	+22%

COMPANY NAME	TURNOVER AND RELATIVE MARKET SHARE										AVERAGE RELATIVE MARKET SHARE	RELATIVE MARKET SHARE CHANGE
	1977		1978		1979		1980		1981			
<u>INDUSTRY 62016 (+)</u>												
Garlick Limited	32 368	0,06	33 203	0,05	32 941	0,05	41 429	0,05	50 335	-	0,25	-10%
Greatermans Stores Limited	568 903	17,58	610 430	18,39	680 022	20,64	792 232	19,12	N/A	-	18,98	+10%
<u>INDUSTRY 62017 (+)</u>												
Grand Bazaars Limited	30 720	0,06	34 829	0,06	45 154	0,08	53 558	0,10	68 010	-	0,08	+67%
O K Bazaars (1929) Limited	530 571	2,04	540 740	1,64	592 374	1,27	762 371	1,37	N/A	-	1,58	-33%
Pick 'n Pay Stores Limited	260 397	0,49	329 672	0,61	466 860	0,79	555 000	0,73	744 979	-	0,66	+49%
<u>INDUSTRY 351 (+)</u>												
A E C I Limited	590 200	19,31	703 500	20,30	896 000	20,63	N/A	-	N/A	-	20,08	+ 7%
Chemical Holdings Limited	30 566	0,05	34 654	0,05	43 433	0,05	57 887	-	101 800	-	0,05	- 7%
<u>INDUSTRY 3116/7 (+)</u>												
Monis & Fattis Industries Limited	18 901	0,33	21 434	0,34	24 096	0,33	29 258	0,33	33 074	0,26	0,32	-25%
Bakers South Africa Limited	57 644	3,05	62 895	2,93	72 157	3,00	89 724	3,07	127 282	3,85	3,18	+25%

(*) Relative Market Share figures are provided only for those companies who publish turnover figures and who are competing in the same market with some other company which also publishes its turnover.

(+) INDUSTRY DESCRIPTIONS:

3114: Canning, preserving and processing of fish, crustacea and similar foods; manufacture of fish oil and meal

3211: Spinning, weaving and finishing textiles

3220: Manufacture of wearing apparel, except footwear

3320: Manufacture of furniture and fixtures except primarily of metal

3412: Manufacture of containers and boxes of paper, paper board and paper substitutes

3420: Printing, publishing and allied industries including publishing as a separate business (predominantly newspaper)

3420: Printing, publishing and allied industries including publishing as a separate business

355: Manufacture of rubber products

3710: Iron and Steel basic industries

38390: Insulated wires and cables

62006: General Outfitters and dealers in piece goods and textiles

62008: Dealers in furniture, household requisites and household appliances

62016: General departmental stores

62017: General dealers

351: Manufacture of industrial chemicals

3116/7: Grain mill products. Manufacture of bakery products

A P P E N D I X 5THE RESEARCH POPULATION BY HIGH/LOW (DEFINITION NO. 1)
AND HIGH/MEDIUM/LOW (DEFINITION NO. 2) RELATIVE MARKET
SHARE POSITIONS1 Definition No. 1HIGH RELATIVE MARKET SHARE BUSINESSES

Abedare Cables Africa Limited
A E C I Limited
Associated Furniture Companies Limited
Argus Printing and Publishing Company Limited
Bakers South Africa Limited
Dunlop South Africa Limited
Edgars Stores Limited
Greatermans Stores Limited
Gubb and Inggs Limited
Highveld Steel and Vanadium Limited
Irvin and Johnson Limited
Kohler Brothers Limited
O K Bazaars (1929) Limited
Russell Holdings Limited
Trio Rand (South Africa) Limited
Veka Limited

LOW RELATIVE MARKET SHARE BUSINESSES

African Cables Limited
Die Afrikaanse Pers (1962) Beperk
Bradlows Stores Limited
Caxton Limited
Chemical Holdings Limited
Canadian Overseas Packing Industries Limited
Dunswart Iron and Steel Works Limited
Ellerine Holdings Limited
Foschini Limited
Garlick Limited
The General Tire and Rubber Company (South Africa)
Limited
Grand Bazaars Limited
Hortors Limited
Kaap Kunene Beleggings Beperk
Lamberts Bay Canning Company Limited
Monis and Fattis Industries Limited

Mooi River Textiles Limited
 Pep Stores Limited
 Pick 'n Pay Stores Limited
 Progress Industries Limited
 Premier Paper Limited
 South African Associated Newspapers Limited
 Scottish Cables (South Africa) Limited
 Sea Products (S W A) Limited
 Steel and Barnett Limited
 South West African Fishing Industries Limited
 Textile Mills (1947) Holdings Limited
 United Oceana Holdings Limited
 Willem Barendz Limited

2 Definition No. 2

HIGH RELATIVE MARKET SHARE BUSINESSES

A E C I Limited
 Associated Furniture Companies Limited
 Bakers South Africa Limited
 Greatermans Stores Limited
 Gubb and Inggs Limited
 Highveld Steel and Vanadium Limited
 Irvin and Johnson Limited
 Kohler Brothers Limited
 Trio Rand (South Africa) Limited

MEDIUM RELATIVE MARKET SHARE BUSINESSES

Abedare Cables Africa Limited
 African Cables Limited
 Die Afrikaanse Pers (1962) Beperk
 Argus Printing and Publishing Company Limited
 Dunlop South Africa Limited
 Edgars Stores Limited
 Ellerine Holdings Limited
 The General Tire and Rubber Company (South Africa)
 Limited
 O K Bazaars (1929) Limited
 Pep Stores Limited
 Pick 'n Pay Stores Limited
 Progress Industries Limited
 Russell Holdings Limited
 Scottish Cables (South Africa) Limited
 Veka Limited

LOW RELATIVE MARKET SHARE BUSINESSES

Bradlows Stores Limited
Caxton Limited
Chemical Holdings Limited
Canadian Overseas Packing Industries Limited
Dunswart Iron and Steel Works Limited
Foschini Limited
Garlick Limited
Grand Bazaars Limited
Hortors Limited
Kaaop Kunene Beleggings Beperk
Lamberts Bay Canning Company Limited
Monis and Fattis Industries Limited
Mooi River Textiles Limited
Premier Paper Limited
South African Associated Newspapers Limited
Sea Products (S W A) Limited
Steel and Barnett Limited
South West African Fishing Industries Limited
Textile Mills (1947) Holdings Limited
United Oceana Holdings Limited
Willem Barendz Limited

A P P E N D I X 6

THE RESEARCH POPULATION BY HIGH/LOW (DEFINITION NO. 1)
AND HIGH/MEDIUM/LOW (DEFINITION NO. 2) RATES OF
MARKET GROWTH

1 Definition No. 1

BUSINESS COMPETING IN HIGH GROWTH MARKETS

A B C Shoe Corporation Limited
 Abedare Cables Africa Limited
 A E C I Limited
 African Cables Limited
 Associated Furniture Companies Limited
 Die Afrikaanse Pers (1962) Limited
 Argus Printing and Publishing Company Limited
 Carlton Paper Corporation Limited
 Caxton Limited
 Chemical Holdings Limited
 Dunswart Iron and Steel Works Limited
 Duro Industries Limited
 Edgars Stores Limited
 Edworks (1936) Limited
 Field Industries (Africa) Limited
 Foschini Limited
 Garlick Limited
 Greatermans Stores Limited
 Hepworths Limited
 Highveld Steel and Vanadium Limited
 Hortors Limited
 Mathieson and Ashley Limited
 National Bolts Limited
 National Veneer Holdings Limited
 Otis Elevator Company Limited
 Pep Stores Limited
 Pretoria Portland Cement Company
 Romatex Limited
 South African Associated Newspapers Limited
 South African Druggists Limited
 Scottish Cables (South Africa) Limited
 Silverton Tannery Limited
 M & S Spitz Footwear Holdings Limited
 Steel and Barnett Limited
 Trio Rand (South Africa) Limited
 Vaderland Beleggings Beperk
 Vereeniging Refractories Limited

BUSINESSES COMPETING IN LOW GROWTH MARKETS

Adonis Knitwear Holdings Limited
Allied Technologies Limited
Asea Electric South Africa Limited
Bakers South Africa Limited
Berkshire International (South Africa) Limited
Bertrams Wines Limited
Bradlows Stores Limited
B & S Steel Furniture Company Limited
Burlington Industries Limited
Cadbury Schweppes (South Africa) Limited
Consolidated Textile Mills Investment Corporation Limited
Canadian Overseas Packing Industries Limited
Delswa Limited
Dugson Holdings Limited
Dunlop South Africa Limited
Ellerine Holdings Limited
Ensign Clothing Limited
Eureka Rubber Company of South Africa Limited
Everite Limited
Fintec Limited
General Optical Company Limited
The General Tire and Rubber Company (South Africa) Limited
Goodhope Concrete Pipes Limited
Grand Bazaars Limited
Gubb and Inggs Limited
Gypsum Industries Limited
Harrowes Limited
Irvin and Johnson Limited
I L Back and Company Limited
Kaa Kunene Beleggings Beperk
Karoo Vleisbeurs Beperk
Katz and Lourie Limited
Kohler Brothers Limited
Lamberts Bay Canning Company Limited
Monis and Fattis Industries Limited
Montays Limited
Mooi River Textiles Limited
Ninian and Lester Holdings Limited
O K Bazaars (1929) Limited
Panafic Holdings Limited
Picardi Cannery Limited
Pick 'n Pay Stores Limited
Plascon-Evans Paints Limited
Progress Industries Limited
Premier Paper Limited
Rex Trueform Clothing Company Limited
Russell Holdings Limited
South African Woollen Mills Limited

Sea Products (S W A) Limited
 Shulton Africa Limited
 South West African Fishing Industries Limited
 Towles, Edgar Jacobs Limited
 Textile Mills (1947) Holdings Limited
 Triomf Fertilizer Investments Limited
 United Oceana Holdings Limited
 Veka Limited
 Willem Barendz Limited

2 Definition No. 2

BUSINESSES COMPETING IN HIGH GROWTH MARKETS

A B C Shoe Corporation Limited
 Abedare Cables Africa Limited
 A E C I Limited
 African Cables Limited
 Associated Furniture Companies Limited
 Chemical Holdings Limited
 Duro Industries Limited
 Edworks (1936) Limited
 Field Industries (Africa) Limited
 Mathieson and Ashley Limited
 National Bolts Limited
 National Veneer Holdings Limited
 Otis Elevator Company Limited
 Pretoria Portland Cement Company
 Romatex Limited
 South African Druggists Limited
 Scottish Cables (South Africa) Limited
 Silverton Tannery Limited
 M & S Spitz Footwear Holdings Limited
 Steel and Barnett Limited
 Vereeniging Refractories Limited

BUSINESSES COMPETING IN MEDIUM GROWTH MARKETS

Die Afrikaanse Pers (1962) Beperk
 Argus Printing and Publishing Company Limited
 Bakers South Africa Limited
 Bradlows Stores Limited
 Cadbury Schweppes (South Africa) Limited
 Carlton Paper Corporation Limited
 Caxton Limited
 Dunlop South Africa Limited
 Dunswart Iron and Steel Works Limited
 Edgars Stores Limited
 Ellerine Holdings Limited

Eureka Rubber Company of South Africa Limited
 Foschini Limited
 Garlick Limited
 The General Tire and Rubber Company (South Africa)
 Limited
 Greatermans Stores Limited
 Hepworths Limited
 Highveld Steel and Vanadium Limited
 Hortors Limited
 Katz and Lourie Limited
 Monis and Fattis Industries Limited
 Montays Limited
 Pep Stores Limited
 Russell Holdings Limited
 South African Associated Newspapers Limited
 Trio Rand (South Africa) Limited
 Triomf Fertilizer Investments Limited
 Vaderland Beleggings Beperk

BUSINESSES COMPETING IN LOW GROWTH MARKETS

Adonis Knitwear Holdings Limited
 Allied Technologies Limited
 Asea Electric South Africa Limited
 Berkshire International (South Africa) Limited
 Bertrams Wines Limited
 B & S Steel Furniture Company Limited
 Burlington Industries Limited
 Consolidated Textile Mills Investment Corporation
 Limited
 Canadian Overseas Packing Industries Limited
 Delswa Limited
 Dugson Holdings Limited
 Ensign Clothing Limited
 Everite Limited
 Fintec Limited
 General Optical Company Limited
 Goodhope Concrete Pipes Limited
 Grand Bazaars Limited
 Gubb and Inggs Limited
 Gypsum Industries Limited
 Harrowes Limited
 Irvin and Johnson Limited
 I L Back and Company Limited
 Kaap Kunene Beleggings Beperk
 Karoo Vleisbeurs Beperk
 Kohler Brothers Limited
 Lamberts Bay Canning Company Limited
 Mooi River Textiles Limited
 Ninian and Lester Holdings Limited
 O K Bazaars (1929) Limited
 Panafic Holdings Limited

Picardi Cannery Limited
Pick 'n Pay Stores Limited
Plascon-Evans Paints Limited
Progress Industries Limited
Premier Paper Limited
Rex Trueform Clothing Company Limited
South African Woollen Mills Limited
Sea Products (S W A) Limited
Shulton Africa Limited
South West African Fishing Industries Limited
Towles, Edgar Jacobs Limited
Textile Mills (1947) Holdings Limited
United Oceana Holdings Limited
Veka Limited
Willem Barendz Limited

A P P E N D I X 7THE RESEARCH POPULATION BY THE FOUR CELLB.C.G. MATRIX CATEGORIESSTAR COMPANIES

A E C I Limited
Associated Furniture Companies Limited
Argus Printing and Publishing Company Limited
Edgars Stores Limited
Greatermans Stores Limited
Highveld Steel and Vanadium Limited
Trio Rand (South Africa) Limited

CASH COW COMPANIES

Bakers South Africa Limited
Dunlop South Africa Limited
Gubb and Inggs Limited
Irvin and Johnson Limited
Kohler Brothers Limited
O K Bazaars (1929) Limited
Russell Holdings Limited
Veka Limited

WILDCAT COMPANIES

Abedare Cables Africa Limited
Die Afrikaanse Pers (1962) Beperk
Caxton Limited
Chemical Holdings Limited
Dunswart Iron and Steel Works Limited
Foschini Limited
Garlick Limited
Hortors Limited
Pep Stores Limited
South African Associated Newspapers Limited
Scottish Cables (South Africa) Limited
Steel and Barnett Limited

DOG COMPANIES

Canadian Overseas Packing Industries Limited
The General Tire and Rubber Company (South Africa)
Limited
Grand Bazaars Limited
KaaP Kunene Beleggings Beperk
Lamberts Bay Canning Company Limited
Monis and Fattis Industries Limited
Mooi River Textiles Limited
Pick 'n Pay Stores Limited
Progress Industries Limited
Premier Paper Limited
Sea Products (S W A) Limited
South West African Fishing Industries Limited
Textile Mills (1947) Holdings Limited
United Oceana Holdings Limited
Willem Barendz Limited
Bradlows Stores Limited
Ellerine Holdings Limited

APPENDIX 8

FINANCIAL PERFORMANCE DATA FOR BUSINESSES COMPETING IN HIGH/LOW (DEFINITION NO.1) AND HIGH/MEDIUM/LOW (DEFINITION NO. 2)
GROWTH RATE MARKETS

PERFORMANCE MEASURE	POPULATION		MARKET GROWTH RATE (DEFINITION NO. 1)				'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'				MARKET GROWTH RATE (DEFINITION NO. 2)						'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'			
	MEAN	STANDARD DEVIATION	HIGH		LOW			0,05	0,10	0,25	>0,25	HIGH	MEDIUM		LOW		0,05		0,10	0,25	>0,25	
			MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION							MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION						
CFOI (%)	26,39	21,37	24,36	24,37	29,79	14,84	1,3382			X		26,81	12,69	31,45	15,96	24,25	26,53	0,7033				X
ROI (%)	17,24	8,60	18,06	9,12	16,71	8,29	0,5469				X	20,26	10,50	16,99	9,13	15,38	5,15	2,6068		X		
R P R	0,59	0,35	0,53	0,31	0,73	0,37	1,6651			X		0,53	0,36	0,59	0,33	0,62	0,35	0,4518				X
MSC (%)	6,36	69,52	23,33	94,02	- 6,38	41,09	1,9203			X		5,85	19,14	20,27	94,62	- 8,65	47,60	0,7716				X
M S G R	110,46	179,11	174,26	246,37	108,60	114,73	1,9574			X		107,23	167,58	175,65	260,51	74,62	93,64	2,6951		X		

KEY :

- CFOI = CASH FLOW ON INVESTMENT
- ROI = RETURN ON INVESTMENT
- R P R = RETURN PER RISK (RETURN ON INVESTMENT VARIABILITY)
- MSC = MARKET SHARE CHANGE
- M S G R = MAXIMUM SUSTAINABLE LONG TERM ASSET GROWTH RATE

A P P E N D I X 9

FINANCIAL PERFORMANCE DATA FOR BUSINESSES WITH HIGH/LOW (DEFINITION NO. 1) AND HIGH/MEDIUM/LOW (DEFINITION NO. 2)
RELATIVE MARKET SHARE POSITIONS

PERFORMANCE MEASURE	POPULATION		RELATIVE MARKET SHARE (DEFINITION NO. 1)				'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'				RELATIVE MARKET SHARE (DEFINITION NO. 2)						'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'			
	MEAN	STANDARD DEVIATION	HIGH		LOW			0,05	0,10	0,25	>0,25	HIGH		MEDIUM		LOW			0,05	0,10	0,25	>0,25
			MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION						MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION					
CFOI (%)	27,12	16,49	30,05	9,83	25,43	19,31				X	33,23	11,87	32,02	12,77	20,63	18,67	3,0327		X			
ROI (%)	17,38	5,61	16,63	5,68	18,21	5,45				X	17,89	5,23	16,49	6,20	17,38	5,88	0,1736				X	
R P R	0,62	0,34	0,62	0,23	0,62	0,34				X	0,61	0,29	0,58	0,17	0,66	0,44	0,2856				X	
MSC (%)	6,36	69,52	0,60	33,02	9,56	83,70				X	- 1,63	36,77	33,73	100,37	-11,98	40,53	1,9578			X		
M S G R	146,77	222,70	164,15	242,04	134,67	220,13				X	74,38	49,65	215,17	270,22	127,63	240,21	1.1630				X	

K E Y :

- CFOI = CASH FLOW ON INVESTMENT
- ROI = RETURN ON INVESTMENT
- R P R = RETURN PER RISK (RETURN ON INVESTMENT VARIABILITY)
- MSC = MARKET SHARE CHANGE
- M S G R = MAXIMUM SUSTAINABLE LONG TERM ASSET GROWTH RATE

A P P E N D I X 10

FINANCIAL PERFORMANCE DATA FOR BUSINESSES WITHIN THE FOUR CELLS OF THE BOSTON CONSULTING GROUP GROWTH / SHARE MATRIX

PERFORMANCE MEASURE	POPULATION		STAR BUSINESSES		CASH COW BUSINESSES		WILDCAT BUSINESSES		DOG BUSINESSES		'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'			
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION		0,05	0,10	0,25	>0,25
CFOI (%)	27,12	16,48	31,29	9,88	33,18	10,27	28,62	11,00	19,75	22,31	1,7820			X	
ROI (%)	17,39	5,61	18,18	5,06	16,25	6,19	17,08	6,14	18,25	5,53	0,8466				X
R P R	0,62	0,33	0,54	0,20	0,70	0,23	0,47	0,21	0,73	0,45	1,9168			X	
MSC (%)	6,36	69,52	-12,14	31,81	11,75	31,76	45,91	113,92	-15,44	43,07	2,0355			X	
M S G R	146,77	226,71	173,57	306,97	154,74	176,34	177,91	280,06	95,05	148,42	0,3044				X

K E Y :

- CFOI = CASH FLOW ON INVESTMENT
- ROI = RETURN ON INVESTMENT
- R P R = RETURN PER RISK (RETURN ON INVESTMENT VARIABILITY)
- MSC = MARKET SHARE CHANGE
- M S G R = MAXIMUM SUSTAINABLE LONG TERM ASSET GROWTH RATE

APPENDIX 11

THE STRATEGIC ATTRIBUTES OF BUSINESSES COMPETING IN HIGH/LOW (DEFINITION NO. 1) AND HIGH/MEDIUM/LOW (DEFINITION NO. 2) GROWTH RATE MARKETS

STRATEGIC ATTRIBUTE	POPULATION		MARKET GROWTH RATE (DEFINITION NO. 1)				'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'				MARKET GROWTH RATE (DEFINITION NO. 2)						'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'			
	MEAN	STANDARD DEVIATION	HIGH		LOW			0,05	0,10	0,25	>0,25	MEAN	STANDARD DEVIATION	MEDIUM		LOW			0,05	0,10	0,25	>0,25
			MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION								MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION					
FA/TA	28,39	16,33	32,95	16,08	25,52	15,95	4,7591	X				31,15	15,51	32,83	18,66	24,44	14,51	2,7122		X		
S/TA	29,20	14,97	29,42	14,65	29,06	15,31	0,0127			X		29,93	11,95	26,62	16,73	30,47	15,26	0,5759				X
LTLA/TA	3,99	6,71	2,77	2,43	4,79	8,34	1,9910			X		2,50	2,81	2,85	1,40	5,57	9,27	2,7247		X		
STLA/TA	8,39	14,12	4,70	5,47	10,89	17,39	2,7979		X			5,61	7,05	6,61	13,60	11,12	16,62	0,8412				X
S/TCA	45,16	18,74	46,57	16,68	44,24	20,15	0,3321			X		47,51	14,36	44,10	21,99	44,68	18,86	0,2168				X
ATX12/TO	2,20	1,17	2,08	0,86	2,32	1,41	0,7322			X		2,29	0,71	1,83	0,86	2,50	1,59	2,0703			X	
D/TCA	43,39	18,24	42,60	15,54	43,90	19,92	0,1139			X		42,72	13,38	46,82	22,66	41,57	17,20	0,7284				X
ADX12/TO	2,26	1,76	2,04	1,28	2,47	2,11	0,9573			X		2,28	1,53	2,56	2,39	1,97	1,15	0,6657				X
TCA/TCL	2,13	1,20	1,88	0,67	2,30	1,43	2,7550		X			2,04	0,71	1,79	0,70	2,39	1,54	2,3758		X		
TCA-S/TCL	1,27	0,99	1,04	0,53	1,43	1,18	3,4711		X			1,08	0,56	1,12	0,78	1,46	1,22	1,5629			X	
TLTLC/TBF	21,41	13,80	22,51	13,14	20,68	14,29	0,3575			X		24,32	13,33	22,45	12,02	18,94	14,96	1,3058			X	
CFA	26,18	104,92	18,70	22,78	30,90	133,05	0,2958			X		15,08	11,88	17,47	26,12	36,58	149,44	0,4261				X
CCA	23,60	41,74	23,35	29,35	23,83	48,36	0,0042			X		15,78	7,58	26,10	33,03	25,69	54,30	0,4699				X
TO/TA	1,68	1,04	1,67	0,61	1,69	1,34	0,0057			X		1,47	0,40	1,72	0,68	1,80	1,54	0,5369				X
TO/TCL	4,89	2,00	5,15	1,67	4,64	2,28	1,0619			X		4,94	1,57	4,94	2,14	4,79	2,22	0,0522				X

K E Y :

FA/TA = FIXED ASSETS TO TOTAL ASSETS
 S/TA = STOCK TO TOTAL ASSETS
 LTLA/TA = LONG TERM LOANS ADVANCED TO TOTAL ASSETS
 STLA/TA = SHORT TERM LOANS ADVANCED TO TOTAL ASSETS
 S/TCA = STOCK TO TOTAL CURRENT ASSETS
 ATX12/TO = AVERAGE STOCK TURNOVER
 D/TCA = DEBTORS TO TOTAL CURRENT ASSETS
 ADX12/TO = AVERAGE DEBTORS TURNOVER
 TCA/TCL = TOTAL CURRENT ASSETS TO TOTAL CURRENT LIABILITIES (THE CURRENT RATIO)

TCA/TCL = TOTAL CURRENT ASSETS TO TOTAL CURRENT LIABILITIES
 TCA-S/TCL = TOTAL CURRENT ASSETS MINUS STOCK TO TOTAL CURRENT LIABILITIES (ACID TEST RATIO)
 TLTLC/TBF = TOTAL LONG TERM LOAN CAPITAL TO TOTAL BORROWED FUNDS
 CFA = CHANGE IN FIXED ASSETS
 CCA = CHANGE IN CURRENT ASSETS
 TO/TA = TURNOVER TO TOTAL ASSETS
 TO/TCL = TURNOVER TO TOTAL CURRENT LIABILITIES

APPENDIX 12

THE STRATEGIC ATTRIBUTES OF BUSINESSES WITH HIGH/LOW (DEFINITION NO. 1) AND HIGH/MEDIUM/LOW (DEFINITION NO. 2) RELATIVE MARKET SHARE POSITIONS

STRATEGIC ATTRIBUTE	POPULATION		RELATIVE MARKET SHARE (DEFINITION NO. 1)				'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'				RELATIVE MARKET SHARE (DEFINITION NO. 2)						'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'			
	MEAN	STANDARD DEVIATION	HIGH		LOW			0,05	0,10	0,25	>0,25	MEAN	STANDARD DEVIATION	MEDIUM		LOW			0,05	0,10	0,25	>0,25
			MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION								MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION					
FA/TA	29,95	17,13	34,33	17,96	27,54	16,47	1,6411			X		37,41	17,26	30,53	16,34	20,14	17,36	1,5830				X
LTLA/TA	5,17	9,21	2,50	1,87	6,81	11,39	2,2306			X		2,61	2,30	2,53	1,63	9,01	13,64	2,6837		X		
STLA/TA	9,49	14,68	2,35	1,85	13,07	16,93	4,3166	X				2,71	2,01	3,55	5,25	18,04	19,24	5,2177	X			
TCA/TCL	2,04	0,95	1,70	0,54	2,23	1,08	3,3502		X			1,49	0,45	2,05	0,79	2,28	1,14	2,2788			X	
TCA-S/TCL	1,34	1,08	0,93	0,44	1,57	1,25	3,8630		X			0,77	0,29	1,21	0,82	1,71	1,34	2,7988		X		
C/TCL	50,25	17,38	54,47	15,42	47,92	18,21	1,4778			X		55,66	18,38	52,63	18,50	44,87	18,27	1,8819			X	
TO/TA	1,64	0,98	1,78	0,84	1,57	1,05	0,4782				X	2,00	0,99	1,83	1,07	1,34	0,85	1,9045			X	
TO/TCL	4,87	2,00	5,09	2,29	4,75	1,86	0,2960				X	5,36	2,60	5,21	1,94	4,39	1,74	1,0895				X
TP/TO	15,44	7,29	16,36	7,18	13,78	7,31	1,3077			X		14,66	8,54	17,05	6,07	13,44	7,63	0,9048				X

KEY :

- FA/TA = FIXED ASSETS TO TOTAL ASSETS
- LTLA/TA = LONG TERM LOANS ADVANCED TO TOTAL ASSETS
- STLA/TA = SHORT TERM LOANS ADVANCED TO TOTAL ASSETS
- TCA/TCL = TOTAL CURRENT ASSETS TO TOTAL CURRENT LIABILITIES (THE CURRENT RATIO)
- TCA-S/TCL = TOTAL CURRENT ASSETS MINUS STOCK TO TOTAL CURRENT LIABILITIES (THE ACID TEST RATIO)
- C/TCL = CREDITORS TO TOTAL CURRENT LIABILITIES
- TO/TA = TURNOVER TO TOTAL ASSETS
- TO/TCL = TURNOVER TO TOTAL CURRENT LIABILITIES
- TP/TO = TRADING PROFIT TO TURNOVER (TRADING PROFIT MARGIN)

APPENDIX 13

THE STRATEGIC ATTRIBUTES OF BUSINESSES WITHIN THE FOUR CELLS OF THE BOSTON CONSULTING GROUP GROWTH / SHARE MATRIX

STRATEGIC ATTRIBUTE	POPULATION		STAR BUSINESSES		CASH COW BUSINESSES		WILDCAT BUSINESSES		DOG BUSINESSES		'F' STATISTIC	HIGHEST LEVEL OF SIGNIFICANCE OF 'F'			
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION		0,05	0,10	0,25	>0,25
FA/TA (%)	29,95	17,13	38,18	20,96	30,46	14,75	31,63	12,09	24,66	18,79	1,3160			X	
LTLA/TA (%)	5,17	9,21	2,84	2,21	2,16	1,54	2,29	1,50	10,12	14,22	2,5050		X		
STLA/TA (%)	9,49	14,68	2,86	2,43	1,92	1,28	5,96	5,14	18,99	21,00	3,3411	X			
D/TCA (%)	41,50	19,81	42,38	11,35	46,96	17,64	47,38	20,97	34,38	22,13	1,5203			X	
TCA/TCL	2,04	0,95	1,67	0,73	1,74	0,29	2,11	0,80	2,31	1,26	1,1931				X
TCA-S/TCL	1,34	1,08	0,95	0,49	0,91	0,42	1,30	0,75	1,76	1,50	1,7177			X	
TLTLC/TF (%)	9,33	6,64	12,50	7,39	7,63	4,44	12,41	8,16	6,68	5,02	2,6290		X		
STB/TF (%)	5,54	4,54	6,00	5,11	3,95	2,45	6,54	3,91	5,33	5,61	0,5410				X
CFA (%)	16,56	22,03	18,61	11,38	13,31	6,65	23,89	35,82	11,95	17,51	0,7591				X
CCA (%)	24,57	37,58	22,81	11,62	39,19	60,98	36,38	48,29	10,18	12,76	1,7145			X	
COA (%)	20,16	28,92	19,23	9,33	24,36	25,92	32,28	45,65	8,72	14,69	1,6116			X	
CTA (%)	19,83	22,79	19,15	8,77	22,45	19,55	29,63	37,82	11,99	10,14	1,4960			X	
TO/TA	1,64	0,98	1,66	1,02	1,90	0,67	1,76	0,44	1,44	1,33	0,4768				X
TO/TCL	4,87	2,00	4,73	1,56	5,46	2,90	5,69	1,97	4,09	1,50	1,8931			X	
CTCL	30,77	47,21	28,38	11,30	46,08	61,38	47,91	71,97	12,59	13,12	1,7376			X	
CTO	20,30	25,54	22,10	6,23	19,41	3,12	33,69	44,17	10,88	14,14	2,0327			X	

KEY :

FA/TA = FIXED ASSETS TO TOTAL ASSETS
 LTLA/TA = LONG TERM LOANS ADVANCED TO TOTAL ASSETS
 STLA/TA = SHORT TERM LOANS ADVANCED TO TOTAL ASSETS
 D/TCA = DEBTORS TO TOTAL CURRENT ASSETS
 TCA/TCL = TOTAL CURRENT ASSETS TO TOTAL CURRENT LIABILITIES (THE CURRENT RATIO)
 TCA-S/TCL = TOTAL CURRENT ASSETS MINUS STOCK TO TOTAL CURRENT LIABILITIES (THE ACID TEST RATIO)
 LTLA/TF = LONG TERM LOAN CAPITAL TO TOTAL FUNDS
 STB/TF = SHORT TERM BORROWINGS TO TOTAL FUNDS

CFA = CHANGE IN FIXED ASSETS
 CCA = CHANGE IN CURRENT ASSETS
 COA = CHANGE IN OPERATING ASSETS
 CTA = CHANGE IN TOTAL ASSETS
 TO/TA = TURNOVER TO TOTAL ASSETS
 TO/TCL = TURNOVER TO TOTAL CURRENT LIABILITIES
 CTCL = CHANGE IN TOTAL CURRENT LIABILITIES
 CTO = CHANGE IN TURNOVER

APPENDIX 14

THE CORRELATION BETWEEN STRATEGIC ATTRIBUTES AND FINANCIAL PERFORMANCE FOR BUSINESSES WITHIN THE FOUR CELLS OF THE BOSTON CONSULTING GROUP GROWTH / SHARE MATRIX

VARIATES	STAR BUSINESSES		CASH COW BUSINESSES		WILDCAT BUSINESSES		DOG BUSINESSES	
	CORRELATION COEFFICIENT	LEVEL OF SIGNIFICANCE	CORRELATION COEFFICIENT	LEVEL OF SIGNIFICANCE	CORRELATION COEFFICIENT	LEVEL OF SIGNIFICANCE	CORRELATION COEFFICIENT	LEVEL OF SIGNIFICANCE
FA/TA X ROI	0,2226	0,298	0,2168	0,303	- 0,5248	0,040	0,4020	0,055
FA/TA X CFOI	0,2282	0,311	- 0,4175	0,152	- 0,5379	0,044	0,2208	0,215
S/TA X ROI	- 0,6864	0,030	- 0,1899	0,326	0,3793	0,112	- 0,1954	0,243
LTLC/TF X ROI	0,2300	0,292	0,2018	0,316	- 0,4124	0,100	- 0,6398	0,004
S/TCA X ROI	- 0,8738	0,002	- 0,0610	0,4533	0,3928	0,178	- 0,2953	0,143
S/TCA X MSC	0,0297	0,475	- 0,3810	0,176	- 0,3131	0,174	0,7193	0,002
D/TCA X CFOI	0,7540	0,025	0,0319	0,470	- 0,2154	0,262	- 0,4906	0,032
D/TCA X MSGR	0,4405	0,137	0,7398	0,018	0,1825	0,296	- 0,1746	0,294
CTA X ROI	- 0,2595	0,353	0,0698	0,435	- 0,2297	0,344	0,2342	0,183
MSC X ROI	0,2616	0,285	- 0,6193	0,051	0,1550	0,325	- 0,1330	0,312
MSC X RPR	0,4995	0,127	- 0,4958	0,106	- 0,4987	0,059	- 0,2292	0,197
MSC X CFOI	- 0,4451	0,188	- 0,2896	0,243	0,5282	0,058	0,6194	0,009

KEY :

FA/TA = FIXED ASSETS TO TOTAL ASSETS
 S/TA = STOCK TO TOTAL ASSETS
 LTLC/TF = LONG TERM LOAN CAPITAL TO TOTAL FUNDS
 S/TCA = STOCK TO TOTAL CURRENT ASSETS
 D/TCA = DEBTORS TO TOTAL CURRENT ASSETS
 CTA = CHANGE IN TOTAL ASSETS

MSC = MARKET SHARE CHANGE
 ROI = RETURN ON INVESTMENT
 CFOI = CASH FLOW ON INVESTMENT
 MSGR = MAXIMUM SUSTAINABLE LONG TERM ASSET GROWTH RATE
 RPR = RETURN PER RISK (RETURN ON INVESTMENT VARIABILITY)

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