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Market share, profitability and implications for strategy formulation

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2.6 GAME THEORY

Game theory analyses games played by two or more players whose fortunes are interrelated and each of whom has a strategy. More specifically, we are concerned with dynamic non co-operative game theory which involves multi-person decision making; it is dynamic if the order in which the decisions are made is important, and it's non co-operative if each person involved pursues his or her own interests which are partly conflicting with others (Basar & Olsder, 1982,p1). A clear distinction exists between two-player zero sum games and the rest. In zero-sum games the sum of the cost functions of the two players are identically zero. A salient feature of two person zero-sum games that distinguishes them from other games is that they do not allow for any co-operation between players since what one player gains occurs as a loss to the other player. In non zero-sum games co-operation between players leads to their mutual advantage. Economic models are in general concerned with non zero-sum games.

The concepts of zero-sum and non zero-sum co-operative and non co-operative game theory are illustrated by Basar & Olsder (1982, p5) by using an example which is presented in a simplified form below.

Assume a mass is positioned at the origin of two perpendicular axes X and Y and that each player can move the mass one unit in any direction. In the first illustration, the objective of player 1 is to move the mass as far as possible in the positive X direction while the objective of player 2 is to move the mass in the negative X direction. The

"solution" to this zero-sum game follows immediately - each player pulls in his favourite direction and the point mass remains at the origin. Such a solution is known as a saddle-point solution.

In the next illustration the game is altered slightly. The objective of player 1 remains to move the mass in the positive X direction but the objective of player 2 now becomes to move the mass as far as possible in the positive Y direction. In the non co-operative form of the game each player pulls in his favourite direction and the point mass moves to the position X=1 and Y=1. (1;1) Note that once player 1 has chosen to pull in the X direction player 2 has no other better choice but to pull in the Y direction. Any other direction will yield a result worse than Y=1. Hence the pair exhibit an equilibrium behaviour, and this kind of solution where one player cannot improve his outcome by altering his decision unilaterally is called the Nash equilibrium solution (or Nash solution).

In the co-operative form of the game, the players can significantly improve their lots. Suppose each player pulls in a direction of 45° to the X axis. The result would be that the point mass moves 2 units in a direction of 45° to the X axis and end up in a position X = 2 cos 45° and Y = 2 sin 45°. Since sin 45° = cos 45° = 0,7 this yields the position X=1,41 and Y=1,41.

This is clearly significantly better for both players but requires co-operation between the players. Note that if player 1 knows that player 2 is moving in the 45° direction, player 1 could still improve his position by moving in the X direction

but this would result in player 2 being significantly worse off. Therefore the strategies of pulling in the 45° direction cannot be in equilibrium in the non co-operative game since it requires some kind of faith (or even negotiation), and thereby co-operation, on the part of the players. If this is allowed then the 45° strategies - known as the Parieto-optimal solution - is a reasonable solution for the game since no other joint decision of the players can improve the performance of at least one of them without degrading the performance of the other.

Over the last 45 years - since its development in 1947 by Von Neumann and Morgenstern (Basar and Olsder, 1982, p3) - the theory of games has been applied to a variety of fields including economics, business and international politics. In the process, game theory has become a specialized and highly mathematical field with a distinctive language and concepts of its own. What follows is a review of some of the game theory applications relating specifically to market share and profitability with the emphasis on the results obtained rather than a detailed, mathematical account of the method used. Interestingly, the Cournot oligopoly analyzed in the previous section fulfils the requirements for a Nash equilibrium solution (as do most other oligopoly models). In this sense game theory is a linear descendant of the classical oligopoly theories. However, the use of game theory has resulted in determinacy in complex and specialised cases which has far surpassed the classical theories (e.g Dixit 1979; Karnani, 1983; Wernerfelt, 1984).

Karnani (1983) used game theory to examine the minimum market share required by a firm to remain viable. Previously Henderson (1979) hypothecized that in a stable market a firm with less than one quarter the share of the largest firm could not be an effective competitor. Karnani (1983, p76) points out that economic theory, on the other hand, postulates a minimum firm size in terms of absolute size based on consideration of the firms cost structure. It can be argued that economic theory on minimum firm size does not accord well with one's intuition or with factual observation. Relative size and market share are often seen as more important than absolute size in determining a firm's viability. Neither the economic theory on firm size nor Henderson's hypothesis takes into account the nature of demand in the industry under analysis. The strategic planning literature suggests that a small firm can be successful if it exploits a market niche (e.g Hamermesh, *et al*, 1978). It is intuitively evident that firm size must be a function of not only the firm's cost structure and competitive interaction among the firms, but also of the demand structure of the market. Translated into economic language this means that minimum firm size decreases as scope for product differentiation increases.

Karnani's paper analyses a specific model of oligopolistic competition involving product differentiation, marketing activities, and economics of scale in production. It is shown that at a Nash equilibrium each firm must have market share equal to zero or greater than a threshold value.

$$\text{Minimum share} = \frac{1-d}{1-t} \text{ for } d \leq 1$$
$$= 0 \text{ for } d > 1$$

Where d and t are industry specific factors.

Karnani's model shows that different industries have different minimum sizes associated with them. Clearly, the lower the value of minimum market share the more feasible it is for a firm to pursue a low market share strategy. For the purpose of this study Karnani's work is important because it lays a firm theoretical foundation for the hypothesis that the effect of market share on profitability is different in different industries or environmental settings.

Wernerfelt (1986) used the logic of game theory to examine the theoretical relationships between market share and profitability. Wernerfelt argues two theoretical cases, one which results in unstable market shares and one which results in stable market shares. In the first case Wernerfelt assumes that there is no positive association between market share and profitability in the industry under consideration. Firms are assumed to be identical and, in a hypothetical auction, can buy small units of market share. Each buyer is assumed to buy market share until the marginal return (net present value of long term returns) from higher market share are lower than the price (marginal cost) of that market share. Since all buyers are identical this point is the same for all firms and the ultimate price will be such that each firm gets 1/N of the market. This is illustrated in figure 2.12.

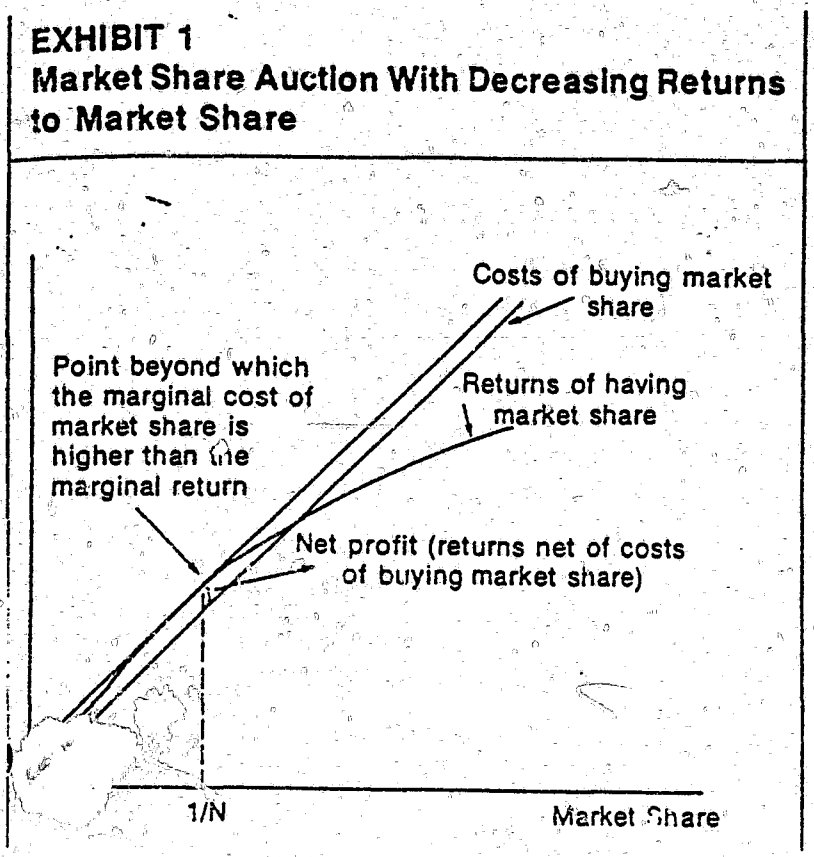


Fig 2.12 Market share auction with decreasing returns
(Source : Wernerfelt, 1986, p68)

In his second case Wernerfelt examines the more complex situation involving increasing static returns from market share. In a similar auction buyers maximise net profits by having either the whole market or nothing at all. This is clearly a major problem in the analysis as "prices" in the normal sense of the word do not exist.

There is either too much or too little demand and the market does not clear at any single price. Wernerfelt argues that, under these conditions the cost of buying market share will depend on a number of factors including the amount of market share already held by a particular firm, and the amount

held by other firms, the cost position of all firms, and the stage in the product life cycle. The price will also depend on the expectations in the market place by one firm regarding the response of the other firms. However equilibrium should have the property that all players attempting to gain market share would find that the benefits of a change are fewer than the negative consequences.

According to Wernerfelt (1986, p71) in the long run bigger and smaller firms face different cost and markup conditions as illustrated in Fig 2.13.

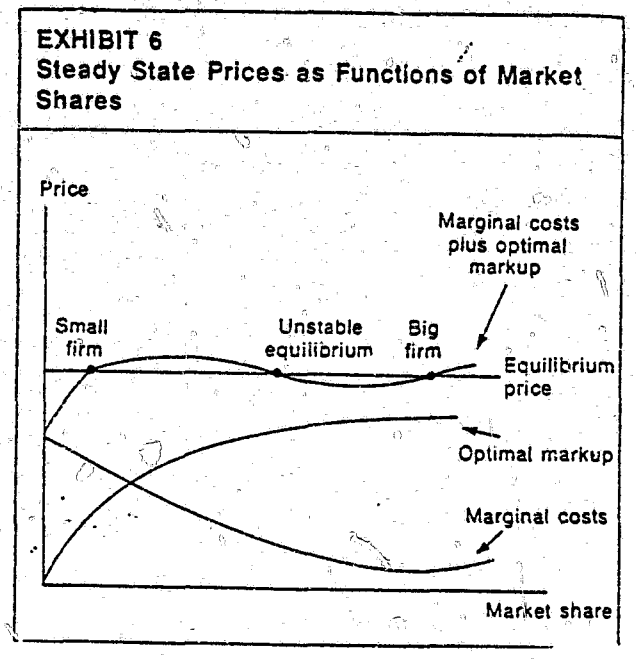


Fig 2.13 Markup as a function of market share.
(Source : Wernerfelt, 1986, p72)

The logic behind the relationship shown in fig 2.13 is given by Wernerfelt (p71) as follows :

> "The biggest firms will have low marginal costs (because of economics of scale) but be

> tempted to charge high markups (because of their relatively big customer base). The smaller firm, conversely, will have higher marginal costs and be less tempted to charge high markups. Both types of firms should price at the long run profit-maximizing level, which for stable markets will be equal to marginal costs plus a markup. And this depends on the size and price sensitivity of the customer base".

This logic - while compelling in its own right - is in direct conflict with the bulk of the marketing literature where "niche" markets have high markups and in contrast high volume cost leadership strategies require price leadership as well. However, if Wernerfelt logic is accepted then it points to a causal relationship between market share and profit.

> "Note that this explanation for a share profit cost relation in mature industries depicts the profit as a result of the share, which again is the result of some underlying information or resource asymmetry. This is different from the conception of profit and share as a result of the same underlying phenomena"
>
> (Wernerfelt, 1986, p72)

As authority for the above statement Wernerfelt draws on an earlier paper (Wernerfelt, 1985) in which the development of an industry is seen as the outcome of a differential game in which market shares flow in response to price differences. It is hypothesized that while all consumers eventually react to price differences, some are slower than

others. Thus a firm does not loose all of it sales by charging a higher price for a limited time. In the presence of scale advantages only skewed size distributions can be locally stable steady states. Also, the largest firm need not eventually monopolize the industry.

Wernerfelt also draws on another earlier paper (Wernerfelt, 1984) in which a duopoly is analyzed through a differential game in which players set prices as a function of time. The major conclusions from this model are summarized below.

1. The big firm (in a duopoly) can keep gaining market share in the growth maximisation game.
2. Prices decline in a growth maximisation game.
3. Late in the life cycle of the unconstrained game, the market share of the big firm goes down.
4. If the terminal value of market share is not excessively high then prices increase late in the profit maximising game.
5. If a firm is financially constrained, it should maximise growth early in the product life cycle and take profits home later.
6. Only the low price firm engages in awareness advertising to inform, and late in the life cycle it advertises more the smaller it is.
7. Late in the life cycle both firms spend the same amount on persuasive advertising and more the more similar they are.

Wernerfelt (1986) used this logic to predict the equilibrium profit for different market shares, as shown in fig 2.14.

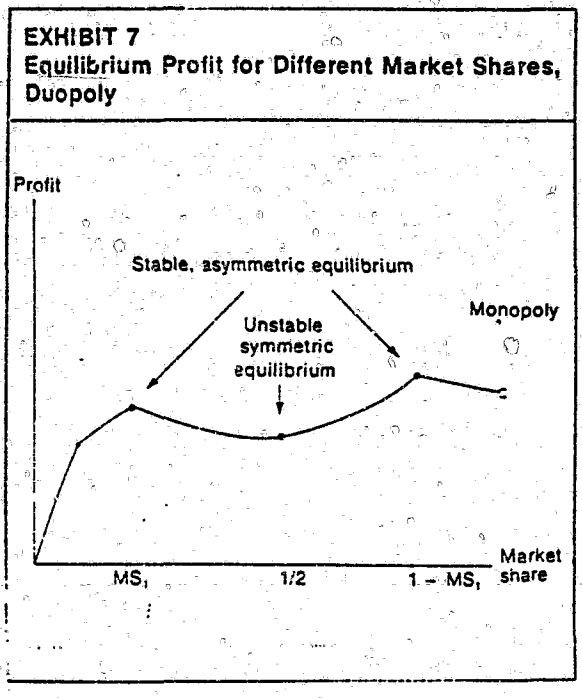


Fig 2.14 Equilibrium profit for different market shares.
(Source : Wernerfelt, 1986, p73)

This relationship is interesting in that

a) It is not linear, and

b) It exhibits increasing profit as share increases, and

c) Causality is implied (as discussed earlier).

The work by Wernerfelt and Karnani is fairly typical of most game theoretic papers which generally build in economies of scale and either derive or assume an increasing profit to market share curve (eg Dolan & Jeuland, 1981; Eaton & Ware, 1987; Karnani, 1984). However, the value of the contribution of game

theory to economics is seen as disappointing by some authors. McGee (1988, p95) quotes

> "One of the great promises of game theory was to fill the broad scientific territory between the models of perfect competition and those of perfect monopoly.... the lack of progress in this area is not due to the unavailability of mathematical tools or an opposition to their use. Rather,.... we simply do not understand how these markets function".

Some people may argue that we never could (or should) be able to understand and describe in mathematically precise terms the function of these markets because that would deny the existence of a basic human right : the freedom to act in an individualistic way. Schumacher (1973, p40) put it more strongly :

> "The great majority of economists are still pursuing the absurd ideal of making their "science" as scientific and precise as physics, as if there were no qualitative difference between mindless atoms and men made in the image of God".

Despite the obvious limitation implied in Schumachers comment, game theory does act as a mathematically rigourous foundation upon which broader theories can be based.

2.7 INDUSTRY STUDIES

The strategic planning literature has an abundance of reports on industry studies, case studies and anecdotal evidence which is used by authors to support a particular argument or theory. Perhaps

the most prolific writer in this mould is Tom Peters. In his chapter entitled "Rethinking Scale" (Peters, 1992) he draws on many examples from various industries to make his point for example:

> "Big Japanese companies, with Sony in the lead, are madly shuffling their decks, shifting their emphasis....moving production and clout out of Japan". (p11)
>
> ".....the Fortune 500.....are madly de-integrating, selling off bits, subbing anything and everything, marketing subsidiary units" (p9)
>
> "So 1960s-style conglomerates bombed in the US. (Nobody disagrees about that). So our big companies are splitting up". (p10)
>
> "Siemens, in response to the shabby performance of two thirds of its business units packed off 40 000 of its head office staff to front-line jobs in marketing and finance" (p10)
>
> "Philips has shed 100 000 jobs in the last 5 years, largely by selling off misfitting bits of its portfolio" (p10)

Some of these quotes are not based on fact or backed with any research but are generalizations made by the author. In other cases, the quote could be backed up by an in-

depth and extensive research project but sources, references and details of the program are left out on the basis that they would detract from the readability of the article. It is therefore very difficult for a serious scholar to judge the value of these works and therefore, reluctantly, one is forced to put most of this body of literature aside. However to neglect it completely would be an ommission and would detract from the colour and depth of the review. Therefore an attempt has been made to take some of the more credible examples of industry studies and case studies and classify them according to support or otherwise for the main themes of this research. Table 2.4 gives some examples of industry studies.

Author	Industry	Low Share-High Profit	Economics of Scale	Positive Relation between Market Share and Profit
Fruhan (1972)	Auto			✓
	Computer			✓
	Chain Stores			✓
Ghemawat (1984)	Titanium dioxide (1960's)		Support	✓
Hamermesh *et al* (1978)	Can manufacturer	✓		
	Computer	✓		
	Forest Products	✓		
Page (1979)	Gasoline			✓
Lieberman (1989)	Chemicals Industry		No Support	
Newton (1983)	Pharmaceuticals			✓
	Food distribution			✓
	Grain Milling			No Support
Shaw & Shaw (1984)	Synthetic Fibres		Support	
Smirlock (1985)	Banking		Superior Efficiency	✓
Schuster (1984)	Banking	✓		
Shepherd (1972)	Various			

TABLE 2.4 Examples of Industry Studies

2.8 CONCLUSION

A wide range of literature has been reviewed covering decades of research and based on many different paradigms. The research methodology and approach varies considerably even between authors within the same paradigm. With regard to the main thesis of this research - the causal effect of market share on profitability - no conclusion could be reached. There is a large body of literature supporting a causal relationship between market share and profitability and there is a large body of literature not supporting the relationship. Direct comparisons of the various studies are difficult

because of the differences in approach and methodology.

The conclusion reached is that the relationship between market share and profitability is context specific. The literature suggests that in certain contexts there is no causal relationship between market share and profitability while in other contexts a strong causal relationship exists. It is not clear from the literature what variables define these contexts, far less what values imply a context where a strong causal relationship exists and vice versa. Attempts have been made in some of the PIMS studies to define "environments" using environmental variables and cluster analysis. These studies have confirmed the context specific nature of the relationship between market share and profitability but the environmental settings are difficult to apply in a practical sense.

The next chapter gives an overview of the research methodology used which is designed to explore some of these issues. Firstly, different environmental settings are analyzed and, thereafter, a fine grained study into causality is undertaken.

CHAPTER 3 OVERVIEW OF RESEARCH METHODOLOGY

3.1 INTRODUCTION

In chapter 2 the literature relevant to market share and profitability was reviewed. The main conclusion reached was that the relationship between market share and profitability is context specific and that causality may not exist in all contexts. In this chapter the entire research process that was adopted in this study is previewed, and contrasted and compared to traditional research processes.

Traditionally, research follows a number of sequential stages, starting off with the definition of the research problem and ending with the interpretation of results. Many of the processes adopted in business research stem from social research where the process has been more formally stated. The stages of social research can be formally stated as follows:

1. Choosing the research problem and stating the hypothesis

2. Formulating the research design

3. Gathering the data

4. Coding and analysing the data

5. Interpreting the results so as to test

the hypothesis.

(Bailey, 1982, p9)

Each of the stages is dependent upon the others, and the process is best thought of as circular, as shown in fig 3.1.

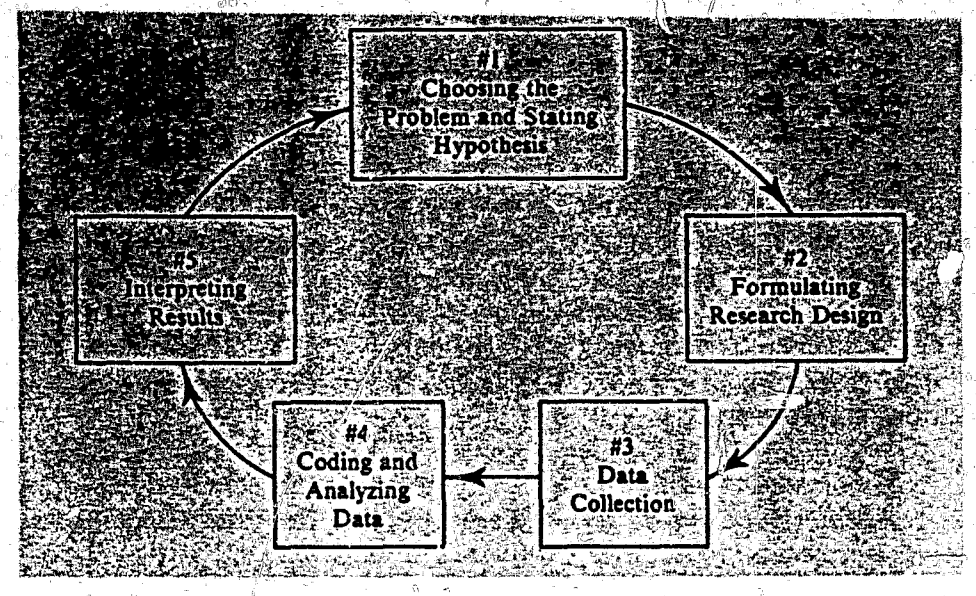


Fig 3.1 Stages in the Research Process (Source : Bailey, 1982, p10)

3.2 HYBRID METHODOLOGY

The process used in this research did not follow a single iteration of the traditional research process but employed a hybrid research methodology and at least two iterations of the research cycle.

The concept of a hybrid methodology was put forward by Harrigan (1983) as a recommended methodology for strategy research. The aim of this research is to explore the underlying cause behind the market share/profit relationship and therefore the methodology employed had to have sufficient resolution to bring out important details about specific mechanisms in different industries but also (ideally) had to be generalizable so as to be widely applicable. The problem, therefore, was to get an appropriate amount of detail without sacrificing too much generality. Harrigan (1983, p399) contrasts "fine-grained" methodologies (such as case studies and industry studies) with "coarse-grained" methodologies such as statistical studies using the PIMS data base. She points out that fine-grained methodologies benefit from the wealth of detail that is generated, which help researchers characterize the complexities of strategy formulation in a particular industry, but which lack generalizability and statistical rigour. The course-grained methodologies, on the other hand, benefit from the generalizability, but their value in strategy research may be limited if causal processes are not explored by other means.

Harrigan proposes a hybrid methodology which combines aspects of coarse and fine-grained methodologies as a means of obtaining an appropriate level of detail without sacrificing generalizability. That is the approach that was taken in this research as described below.

3.3 PHASES OF THE RESEARCH

The research can conceptually be divided up into 6 phases as shown in table 3.1 below.

No.	Phase	Chapter	*Stage of Research	Methodology
I	Literature Review	2	1	Theory
II	Statistical Analysis	4.5	1.4.5	Coarse-grained
III	Initial Study	6	1 2 3 4 5	Fine-grained
IV	Generalisation	7	1	Theory
V	Testing of theory	8.9	2 3 4	Medium-grained
VI	Discussion	10	5	Theory

*Stage refers to the stages defined by Bailey in fig 3.1

Table 3.1 Overview of Research Process

The phases of the research are briefly described below so as to give a holistic view of the research process.

Phase I

As can be seen in chapter 2 the literature survey draws from a wide range of disciplines in order to review the current state of knowledge concerning the relationship between market share and profitability. The main contributors are PIMS studies, industry and case studies, Industrial Organisation, Microeconomics and Game Theory. A number of different paradigms and definitions differ across disciplines. This makes comparisons difficult and no firm conclusions regarding the causal effect of market share on profitability could be reached. The conclusion that was reached was that the

relationship between market share and profitability is context specific and that in certain contexts or environments the effect of market share could be expected to be significant while in other environments, insignificant.

Phase II

The conclusion from phase I is used in phase II as the objective for the statistical analysis of an existing data base. First the data is described and the South African economy put in a global context (chapter 4), then the analysis of the data is reported on (chapter 5). This is a course-grained study which employs statistical techniques to analyze over 100 SBUs in order to determine

(i) whether there are environments within which the relation between market share and profitability is significantly different, and

(ii) if so, what defines the environment and which businesses fall into the category where market share has a significant impact on profitability.

In terms of Bailey's (1982) stages of research, phase II can be regarded as a complete cycle with the exception of the data collection and coding which had already been done. The basic paradigm underlying this part of the research is the "PIMS" paradigm (discussed in section 2.1.2) which holds that there are generalizable relationships which

can be obtained by analysing cross-sectional statistical data. The main conclusion obtained from phase II was that there exists in the data two fundamentally different environments; one in which the effect of market share on profitability is significant and the other where the effect is insignificant. The environments are defined by the 4 environmental variables in the PIMS LIM model.

Phase III

In phase III a fine-grained study was mounted into the businesses in the environment where market share was strongly correlated with profitability. The logic behind this was that this was the environment where market share was most important and therefore any market share effects would be amplified and thus easily detectable. This fine-grained study represents a complete cycle of Bailey's (1982) stages. (Alternatively, phase II and III could be regarded as a single cycle but using a hybrid methodology). Initially in the study a PIMS type paradigm was adopted and a detailed questionnaire designed for statistical analysis was prepared. Later, after immense difficulty had been experienced in administering the questionnaire, a more flexible approach was adopted. When the businesses were identified it was noted that they all fell into one industry and therefore the results obtained would not be directly generalizable.

Phase IV

In phase IV the results obtained in the previous 3 phases were used in conjunction with inductive reasoning to produce a generalized theory. Chapter 7 lays out the generalized theory in terms of propositions (based on stated assumptions) which lead to theorems stated in terms of hypotheses so as to be testable. The principle used is that the hypotheses are derived from the theory and therefore if the hypotheses are tested and proved to be true, then the theory is accepted. In order to state the theory succinctly the basic concepts are defined using terms from the PIMS and Industrial Organisation paradigms.

Phase V

Phase V represents the testing of the hypotheses generated in phase IV. A medium to fine-grained methodology was devised and applied to the businesses in the environment not used in the first study (phase III). This was risky because, in order to test the hypotheses, data was needed from a range of industries - some where market share was important and others where market share was not important. The businesses in question were in an environment where market share was found not to be important by the coarse-grained study, and therefore there was the possibility that the range of results obtained would not be sufficient to test the hypotheses. However this was the only

suitable data available and it was felt that the statistical analysis was too coarse to have picked up all the factors influencing market share and profitability. There was therefore a high probability that the range of results obtained would be adequate to test the hypotheses. In the event this proved to be the case and the hypotheses were tested and found to be true thus proving the theory.

Phase VI

In phase VI the results of the field work and testing in phase V are discussed and compared with the theory developed in phase IV. The results are viewed holistically and are also compared to some of the concepts covered in the literature review.

3.4 GENERALITY OF THE RESEARCH

Phase I of the research was a very broad and generalized review of the literature pertaining to market share and profitability. Phase II was less general and narrowed the study down to:

a) South African business
b) in specific industries
c) 103 SBUs

Phase III of the research was narrower still in that it focused on 10 SBUs in one industry.

In phase IV a generalized theory is proposed based on the findings of the previous phases.

The theory is formulated to be generally applicable to all businesses.

Phase V involves the testing of the theory using 59 SBUs from a limited number of different industries.

Phase VI discusses the results and puts them in a general framework.

Viewed graphically the research process can be summarised as shown in fig 3.2.

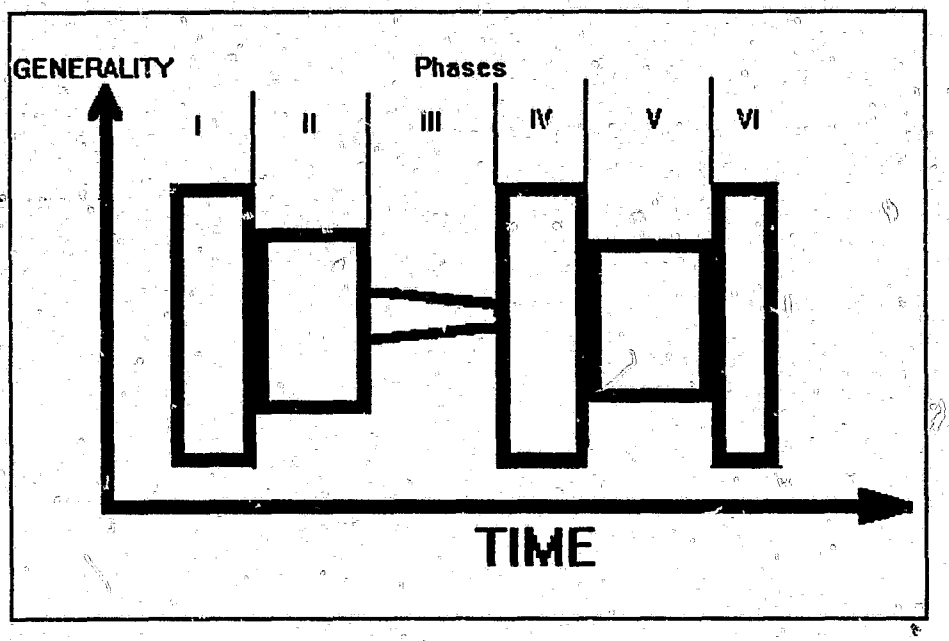


Fig 3.2 Generality of the research

3.5 PARADIGMS

As discussed in section 3.2 there is no single research paradigm which dominates this research process. In phase I literature from

various paradigms is reviewed. Phase II is dominated by the PIMS paradigm but in phases III and V a much more detailed, flexible approach is adopted similar to the business policy approach. The theory generalization and discussion (phases IV and VI) is based on concepts from Industrial Organisation, PIMS and business policy.

The fact that no single paradigm dominates the research is not unique to this research. Montgomery (1988, p3) summarises the position:

> "No doubt many of us have had discussions about the lack of a central research paradigm in the strategy area. Whether one believes the field should have a paradigm, or not have one, whether one believes such a paradigm is likely or not to develop, the observation remains that the field today does not have a dominant, unique research paradigm. Aside from efforts to build such a theory, or set of theories, what we can do is explore important strategy questions through paradigms from related disciplines".

CHAPTER 4 DESCRIPTION OF THE ENVIRONMENT AND DATA

4.1 INTRODUCTION

The research was conducted in the South African business environment and the data pertains to the early 1980s. Since it is our intention to contrast the results of this research against similar studies done elsewhere in the world (mostly in the USA), it is appropriate to give a brief description of the development of the South African economy and of some of the macro economic parameters pertaining to the time of data collection.

The first part of this chapter gives a brief review of the theory of developing economies and then the development of the South African economy is reviewed against this theoretical background. Thereafter the South African economy in the early 1980s is reviewed and the data base introduced with a description of the data collection process and a summary of its representation across industries. Finally, the data is compared against PIMS data.

4.2 DEVELOPING ECONOMIES

The stage of development of an economy has a significant impact on the macro-economic conditions within the country which in turn impacts on the business environment. According to the literature (Rostow, 1960; O'Dowd, 1978; Myint, 1965) there are stages of economic development which all 'normal' countries go through. The term 'normal' is used to

apply to all countries where there was a substantial peasant population before industrialisation and where the development of the country is based in industrialisation.

The first stage of development takes place before the point which is called "take-off" occurs, and is necessary in order to make "take-off" possible. This is a period of building infrastructure and creating the basic institutions necessary for a modern industrialised state. It is a period of great instability as it involves not only the establishment of new structures, but the breaking down of traditional patterns of society and authority. It is characterised by new and revolutionary ideas and by weak and unstable governments and wildly changing policies.

After an indeterminate period of time the country emerges from this twilight period and into the next phase with very different characteristics, called the "take-off". During this stage, the classes which are determined to pursue industrialisation are now in complete control and are strong enough to govern effectively and in the direction of industrialisation. This period is characterised by a strong, effective, pragmatic government and the disappearance of romantic enthusiasm. O'Dowd (1978, p30) points out that the government of the day is almost always a minority government ruling in the interests of a minority. The socio-political changes (and sometimes revolutions) of the previous era, do not liberate the masses but merely change the ruling class. The new ruling class imposes harsh conditions on the working classes and restricts consumption of the masses to allow for

investment. There is thus a very clear distinction between the rich ruling class and the poor working class, for whom there is no possibility at this stage for a decent standard of living. Rostow (1960) calls this the first stage of industrialisation.

The turning point from the first stage to the second stage comes when the influx of impoverished people from the rural areas ceases to be rapid enough to keep unskilled wages down to subsistence levels. Jobs start to expand faster than they can easily be filled and it becomes necessary to improve the use of unskilled labour by means of training and this in turn means keeping the labour turnover rate down. The expansion of education, improved health services and better housing for workers becomes desirable because workers are in short supply and need to be retained. This is a much more liberal stage.

The third and last stage of development is reached when industrialisation is virtually complete. There is no more room for economic development except based on new inventions, whereas up to that point it has been mainly a matter of more complete involvement of the population in the use of existing techniques, infrastructures and systems. During this stage, for the first time, economic progress required that consumption be increased. Thus the emphasis shifts from liberalism to socialism and tends to equalise the distribution of wealth and so increase consumption. This is the exact opposite of the position that existed in the first stage where unequal distribution of wealth served to reduce consumption so as to allow for investment. This fully developed, industrialised stage has its own

unique characteristics and problems which are still evolving and being subjected to analysis. For the purposes of this study we will regard this as the final stage and dispense with any further analysis or description. Britain, Sweden, Belgium, USA, West Germany and France are all in this stage of development.

In South Africa, industrialisation first started with the discovery of diamonds in 1866. This brought railways and large scale mechanised expertise to South Africa for the first time and initiated a period of social and political turbulence, covering the Boer War (1899-1902), and the general strikes of white mine workers of 1913, 1914 and 1922. During these strikes there was wide scale violence and at one stage police opened fire on the strikers killing fifty.

The start of the first stage of industrialisation proper can be dated back to 1933 when South Africa's National Income growth rate jumped from a low and erratic growth to a steady 4½% per annum, which it maintained for many years. During this period of sustained growth the conditions for the poor were not unusually harsh because South Africa had free access to foreign capital and therefore did not have to fund the growth in the economy by internal savings. There were however the "abnormal" characteristics of restrictive policies such as an undemocratic constitution, severe restrictions on trade union activities and few or no civil rights for the poor.

The change from the first stage to the second stage of industrialisation started in the late fifties

with rapid increases in non-white housing, education and health services. Unskilled and semi-skilled wages started rising rapidly and increasing effort was put into education and training, and improvements of social services. This process continued up to the present time with reform initiatives starting and stopping but generally making progress, under the critical eyes of the rest of the world. The major hurdle which must be crossed by South Africa for development to continue is the negotiation and acceptance of the radical constitutional reforms which are necessary. These constitutional reforms will have to be of a similar scale to the Second Reform Act in England and President Wilson's programme in the United States, which ushered in the period of sustained growth and liberalism of the 1920s in America.

4.3 THE SOUTH AFRICAN ECONOMY IN THE EARLY 80s

In March 1980 South Africa was classified by the International Monetary Fund as a "Non-oil, developing country" and within this classification as a "major exporter of manufactures". This puts it in the same category as Argentina, Brazil, Greece, Hong Kong, Israel, Korea, Portugal, Singapore and Yugoslavia.

Like all developing countries, the management of the inflation rate and the optimisation of the growth rate, are important elements in the South African economy. Compared to industrialised countries, South Africa has had a higher growth rate and a higher inflation

	Growth Rate (Real change in GDP)		Inflation Rate (CPI increase)	
Year	SA	Industrialised Countries	SA	Industrialised Countries
1973	3,9	6,2	9,4	8,3
1974	7,1	0,6	11,7	14,4
1975	2,2	-0,5	13,5	12,5
1976	1,5	4,9	11,1	9,3
1977	0	4,0	11,3	8,7
1978	2,9	4,0	10,9	6,3
1979	4,1	3,6	13,2	8,6
1980	7,8	1,3	13,8	11,7
1981	5,1	1,1	15,2	9,3
1982	-0,9	0,3	14,7	6,9
1983	-2,2	3,02	12,2	3,7
1984	5,23	3,92	11,7	3,9
1985	1,36	3,12	16,2	3,9
1986	1,07	2,17	18,6	1,7
Average	2,63	2,62	13,1	7,8

Table 4.1 - Comparison of Growth and Inflation Rates

(Sources : International Monetary Fund and SA Reserve Bank)

rate over the past 10 to 15 years. The table below shows growth and inflation rates for South Africa against the average of 5 industrialised countries.

Another feature of developing economies according to Myint (1967) is the financial dualism which exists. This dualism comes from a blending of the previous third world peasant economy based on agriculture with the first world industrialised sector of the economy. This leads to an uneven distribution of personal income and a concentration of wealth. In a study in South Africa in 1982, reported by de Wet (1987) more than 50 per cent of the total income was received by less than 20 per cent of households, and more than 30 per cent by less than 10 per cent of households, while the poorer 30 per cent of households received less than 10 per cent of the income. Also due to this financial dualism there exists substantial unemployment despite the

relatively high growth in the country. Maasdorp (1978, p144) reported unemployment in South Africa at 11,1% of the economically active population. The concentration of economic power in the hands of a small number of major economic players, leading in turn to reduced competition.

Clearly, there are structural differences between a developing economy like that of South Africa and an industrialised economy like that of the USA. Also, it is common cause that the environment effects strategy formulation and implementation. It is therefore likely that South African businesses will differ in both strategic posture and capital structure when compared to businesses in industrialised countries.

4.4 INTRODUCTION TO THE DATA BASE

The data that was used in the analysis was a data base consisting of 103 Business Units that had been collected by two researchers in 1983/84. The data was collected during extensive consulting assignments with the companies concerned and hence represented an in-depth analysis of the strategies of these companies.

The format of the data is approximately the same as that of the PIMS Limited Information Model with two exceptions which will be discussed later. Only cross-sectional data was available with each Business Unit having only a single year's data on record. The year that was covered is from the period 1982/83/84 depending on the company's year-end and the availability of the data.

All the companies that contributed to the data base were companies that were operating in South Africa during the 1982/83 period although could have been part of multi-national organisations. The rest of this chapter is devoted to a brief description of the data and some comparisons of the data with similar USA data. This is not meant to be a comprehensive statistical comparison to be used to justify generalisation of results across geographical boundaries, but merely a descriptive overview of some of the characteristics and features in the South African data which are different to what might be expected from work done in other countries.

4.5 INDUSTRY REPRESENTATION

There are 103 Business Units represented in the data base and they are drawn from different industries in the South African economy. The sample was not drawn using any specific sampling technique, but was determined by the "random" selection of companies for consulting work. The result is that some industries are more heavily represented than others. To give some dimension to this bias, a comparison was done against the percentage of listed operating companies on the Johannesburg Stock Exchange at approximately the same time. Table 4.2 represents the number of companies in each sector expressed as a percentage of the total number of industrial operating companies and is compared to similar figures for business units in the data base.

	Number of Listed Companies	Percentage Listed Companies	Percentage Business Units in this data base
Mining	85		
Mining Finance	28		
Financial Bank	13		
Cash Assets	7		
Insurance	12		
Investment Trusts	12		
Property	15		
Industrial Holdings	52		
Beverage & Hotel	7	2,8%	2,0%
Building & Construction	19	7,8%	-
Chemicals & Oil	14	5,7%	12,0%
Clothing, Footwear, Textile	25	10,2%	-
Electronics,Electrical, Battery	11	4,5%	4,0%
Engineering	34	13,9%	4,0%
Fishing	7	2,8%	-
Food	11	4,5%	26,0%
Furniture & Household Goods	17	6,96%	6,0%
Motor	22	9,01%	-
Paper & Packing	15	6,15%	34,0%
Pharmaceutical & Medical	6	2,4%	-
Printing & Publishing	7	2,8%	11,0%
Steel & Allied	5	2,05%	1,0%
Stores	30	12,2%	-
Sugar	3	1,2%	-
Tobacco & Match	6	2,45%	-
Transport	5	2,05%	-
Preference Shares	19		
Debentures	20		
	507	100%	100%

Table 4.2 Representation of the Data Base Compared to the Johannesburg Stock Exchange

4.6 THE FORMAT OF THE DATA

The data is presented in the same format as the PIMS Limited Information Model as described by, for example, Abell & Hammond (1979). The data was collected strictly in accordance with the requirements of the Strategic Planning Institute for the collection of PIMS Limited Information data. Appendix II gives the details of the data sheet used and the SPI worksheet used for detailed calculation. Definitions of all variables used in the PIMS LIM model are given in Abell and Hammond (1979, pp 271 - 346), and detailed definitions of market share and profitability are given in Appendix X. Appendix I gives a brief discussion of the validity of the PIMS approach. There are two differences in the format of the data presented in this report compared to PIMS, which are as follows:

1. Relative Price (item No. 4 has been left out completely)

2. Customer concentration. The standard PIMS (Limited Information Model) variable for measuring this is defined as <u>the percentage</u> of customers that account for 50% of sales. In the data presented in this report, the measure of customer concentration is defined as <u>the number</u> of customers that account for 50% of sales. (The full PIMS model has both measures).

The above changes were made by the Strategic Planning Institute as a refinement of the Limited Information Model after the date of

publication of Abell & Hammond. Appendix 2 gives the format of the data capture sheet for the PIMS Limited Information Model.

	PIMS		THIS DATA	
	Mean	Standard Deviation	Mean	Standard Deviation
Competitive Position & Action				
1. % Market Share	23,6	17,1	35,0	23,0
2. % Relative Market Share	61,7	62,1	101,9	106,3
3. Relative Product Quality	25,9	28,7	22,8	27,3
4. Relative Price	103,5	7,1	-	-
5. % Employees Unionised	48,3	32,9	38,2	33,4
6. % New Product Sales/Sales	11,9	17,5	16,2	29,0
7. % R&D Expenses/Sales	2,4	2,5	0,7	1,7
8. % Marketing Expenses/Sales	10,8	9,2	4,5	5,2
Capital & Production Structure				
9. % Investment/Sales	56,1	28,1	37,6	23,2
10. % Investment/Value Added	96,7	40,5	99,2	68,6
11. % Fixed Capital Intensity	52,3	34,7	25,9	20,4
12. % Vertical Integration	58,8	13,8	43,0	18,7
13. Value Added/Employees ($/R1000)	30,0	18,0	80,7	[illegible]
14. % Capacity Utilisation	79,6	16,0	73,7	20,0
Market Environment				
15. Real Market Growth Rate	8,2	9,9	4,95	6,85
16. % Share of 4 Largest Firms	56,5	26,2	83,7	17,4
17. % Of Customers = 50% Sales	12,2	10,3	-	-
18. Purchase Amount - Immed. Custs.	5,2	1,2	4,78	0,8
- No. of Customers = 50% Sales	337,2	-	34,38	60,4

Table 4.3 Comparison of the data with PIMS

As can be seen from the above table, there exists a number of differences and some similarities between the two sets of data. On average conditions in South Africa appear to be less competitive than in the USA. This manifests itself in higher average market shares and relative market shares for South African companies, implying fewer competitors on average in each sector. (This is also borne out by item 16, percentage share of 4 largest firms). Also, marketing expenses as a percentage of sales are lower in South African companies than in their US counterparts, again indicating a less competitive environment.

There appears to be differences between the two

countries in the way technology is used. R&D expenses in US companies are high compared to South Africa whereas the sales of new products are lower. This could perhaps be explained by the fact that South African companies largely import technology and do not conduct fundamental research on a large scale. The result is they are able to introduce a relatively high level of new products while spending relatively less on R&D (clearly South African companies would have to pay more royalties than US companies if this were true).

The capital structure of the companies in the different countries are predictably different. The difference in items 9 (Investment/Sales) and 11 (Fixed Capital Intensity) show that South African companies are less capital intensive (and therefore, presumably, more labour intensive) than US companies.

This difference was to be expected, considering the differences in socio-economic conditions between the two countries. It is interesting to note that South African firms appear to be less vertically integrated than US companies.

CHAPTER 5 STATISTICAL ANALYSIS OF THE DATA

5.1 INTRODUCTION

This chapter starts with a definition of what is meant by the 'importance of market share' and then goes on to describe the environmental variables included in the data base. Section 5.2 describes the initial cluster analysis that was done using 9 variables (4 environmental variables and 5 capital structure variables). The initial analysis was done in a fairly loose and unconstrained way, and capital structure variables were included initially to see whether they would add any colour or understanding to the analysis. The result of the cluster analysis showed that the importance of market share was distinctly different in each of the two main clusters (environments) created.

Section 5.3 describes the detailed analysis that was done, where the same 9 variables were used, except this time the variables were standardised and factor analysis applied before clustering , which is the correct (more rigorous) method of analysis. The result of this procedure was that the differences (in the importance of market share) that had been present in the previous clusters disappeared completely. Clearly, in the initial analysis, one particular variable (or a particular combination of variables) had been dominating the cluster analysis (probably by virtue of having a range much greater than the other variables). To identify which variable(s) was (were) dominating the analysis (so that the differences obtained in the initial analysis could be explored, which was the objective

of the exercise) a factorial design was adopted where each variable and each combination was tested separately. Only the 4 environment variables were used in the analysis because, strictly speaking, only the environmental variables should have been used in the previous analysis, but the statistical tools used could easily accommodate more variables and it was thought likely that the extra variables would give extra understanding. In the factorial design where each variable and combination of variables was tested separately (using cluster analysis) the number of variables was cut down to the minimum in order to limit the number of combinations. Using this procedure the variable causing the initial clustering was isolated and analyzed.

5.1.1 The Objectives of the Analysis

The objective of the statistical analysis of the data was to determine whether there are any environmental factors or conditions which affect the relationship between market share and profitability. Specifically, whether there are some environments where market share is highly correlated with profitability and other environments where there is no significant correlation between market share and profitability. Also, if this is the case, what are the factors which define these environments and which are the environments where market share is relatively most important?

Before proceeding with the analysis, the term "importance of market share" needs to be defined and quantified. Within the context of this study, market share is deemed to be important for strategy

formulation purposes if the following conditions are satisfied:

(a) Market share has a significant (positive) affect on profitability.

(b) The scatter of observations about the trend is not so large as to completely swamp the trend.

(c) There is a causal influence of market share on profitability, even if this is indirectly achieved via a third factor (e.g. advantages of scale) as long as the causal link is not broken. i.e. Higher market share implies larger advantages of scale which implies higher return on investment.

In conducting the statistical analysis of the data only the first two conditions were considered. Although there have been many innovative applications of path analysis and other methods to deduce causality in PIMS and other data, (e.g. Alwin and Hauser, 1975; Duncan, 1971; Oliva, Day and Desarbo, 1987) the limited number of data points available eliminated these methods. Therefore, at this stage no attempt was made to infer causality and this was left to a finer grained methodology in the next phase of the study. Also, for the remainder of this study, only linear analysis is used. The exclusive use of linear analysis to model the relationship between market share and profitability was justified on the following bases:

1. All serious previous studies that analyzed cross-sectional data used linear analysis. This includes Bain, 1951; Shepherd, 1972;

Buzzell *et al*, 1975; Buzzell and Wiersema, 1981; Phillips *et al*, 1993 and many others.

2. Some authors have proposed a non-linear relationship between market share and profitability. The most notable of these is Porter (1980) who claims a "U-shaped" curve exists. Porter does not burden his reader with any detailed proof (or in fact any detail) but merely states that this U-shaped relationship "appears to hold in the US fractional horsepower electric motor business" (Porter, 1980, p43). If this is the case, then the electric motor business in the US appears to be unique because no other researcher has reported evidence of U-shaped curves in other industries.

3. A visual inspection of the data was done (see page 292) and no obvious non-linear pattern emerged, and therefore, using the 'keep it simple' principle, only linear analysis was done.

For the purposes of the analysis the two conditions considered above are quantified as follows:

(a) <u>A significant positive affect on profitability</u>

As discussed above, a number of previous empirical studies of market share and profitability (Henderson, 1979; Jacobson & Aaker, 1985; McLagan, 1981; Newton, 1983; Zeithaml and Fry 1984; Buzzell et al 1975) all postulated that within certain ranges, there is a linear relationship between market share and

profitability. Therefore, for the purposes of this analysis, the relationship between market share and profitability will be assumed to be linear. The average value of the slope of the linear regression of market share and profitability was found to be 0,5 by Buzzell et al (1975). (i.e. a 10% increase in market share results in a 5% increase in ROI.) Thus for our purposes, market share is defined as "important" when the slope of the linear regression is greater than 0,5.

(b) The scatter must not swamp the trend

Statistically, this is interpreted to mean that there must be a strong correlation between market share and profitability, i.e. that there is a negligible chance of the trend being the result of random process. For the purposes of the analysis, this is measured by computing the sum of squares explained by the regression model and comparing that to the total sum of squares and applying an F-test to test for significance. In this regard, since we are in essence "combing" the data base for trends, a very high level of significance will be required, and 0,5% was taken to be an appropriate significance level, with 0,05% being regarded as highly significant.

5.1.2 The Environmental Variables

The PIMS Limited Information Model has 18 variables split up into 3 categories. These are:

- Competitive Position and Action

- Capital and Production Structure
- Market Environment

There are 4 market environment variables which are:

- Real Market Growth Rate
- Industry Concentration - defined as the share of the 4 largest participants in the market
- Customer Concentration - defined as the number of customers that equal 50% of sales.
- The typical purchase amount of individual sales to each customer

These 4 variables will be used in various combinations to define "environments" where businesses operate under similar external conditions.

5.2 INITIAL ANALYSIS

5.2.1 Introduction

The initial analysis was done in a fairly loose and unconstrained way with the primary objective of exploring the data to look for trends and characteristics that might be interesting or throw some new light on the problem. Although the first part of the analysis was not rigidly structured the following steps were done.

5.2.2 Graphs and Charts

The first step was to get a pictorial view of the data, and to facilitate this various graphs and charts were plotted (see Appendix III). It soon became obvious that the data included a number of outlying points which were far removed from the bulk of the data and which would make analysis very difficult. The decision was taken to remove outlyers on the following basis:

(a) removal of obvious errors (e.g. where a variable has a minimum value of zero by definition, but a particular observation has a negative value. In these cases every effort was made to go back to source and correct the observation but this was not always possible and the observation was deleted from the data base).

(b) removal of points that were greater than the mean plus 4 standard deviations (or less than the mean minus 4 standard deviations). Although this limit was set, only two points that were removed were closer than 8 standard deviations from the mean.

A total of 13 observations of the 116 in the original data base were removed by applying the two criteria above.

5.2.3 Initial Cluster Analysis

Cluster analysis has been used very effectively on the PIMS data first by Woo & Cooper (1981) to study effective and ineffective low share businesses and

later by many other authors, for example Hambrick (1983) used cluster analysis to define environmental settings for the study of strategic typologies. Cluster analysis consists of a family of algorithms designed to identify similarities in the data and classify the data into different groups depending on the value of the variables used in the cluster analysis. Essentially a cluster consists of observations that correlate highly with one another, and have comparatively low correlations with observations in other clusters. Clustering techniques can be used to separate data into two or more natural clusters, such that, within any one cluster the points are relatively "dense" or close together, while few points are found between the clusters.

In many ways cluster analysis is ideal for research on PIMS type data and has become increasingly popular amongst business analysts and researchers. Therefore the next step in the initial analysis was to apply cluster analysis on the data using all the environmental variables described in Section 5.1.2 and some selected structural variables. The SAS statistical package was available and the FASTCLUS Procedure was used. The variables used in the cluster procedure were:

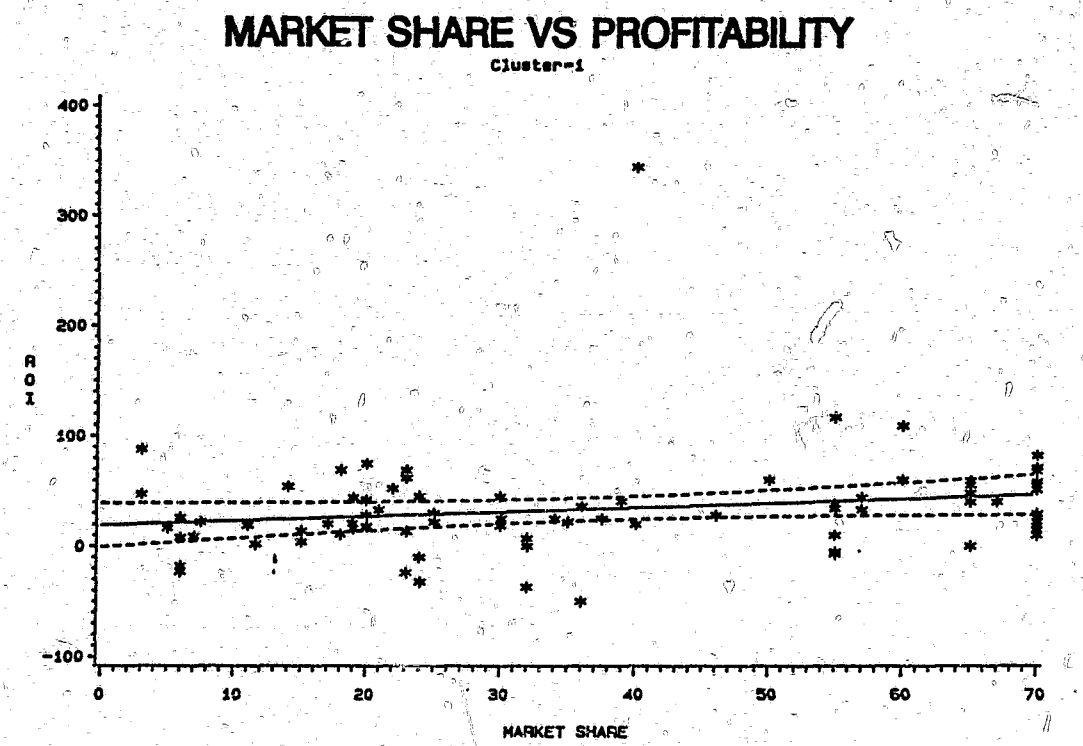
- Market Growth (MGR)
- Industry Concentration (ICO)
- Customer Concentration (ICU)
- Purchases Amount (PCU)
- Capacity Utilisation (CUT)
- Receivables to Sales Ratio (RSL)
- Fixed Capital Intensity (GVS)
- Vertical Integration (VAD)

- Investment to Sales Ratio (INS)

As a first analysis 5 clusters were used and graphs were plotted of market share against profitability for each of the clusters.

The result of this analysis was that only clusters 1 and 5 had more than two values, and the result of the graph plotting is shown in Figure 5.1 and 5.2 below. (See Appendix XI for a discussion of the other clusters.)

As can be seen the importance of market share is substantially different in the two environments. It was decided that a more refined analysis should be designed to explore which of the environmental variables was responsible for the differences in the importance of market share.



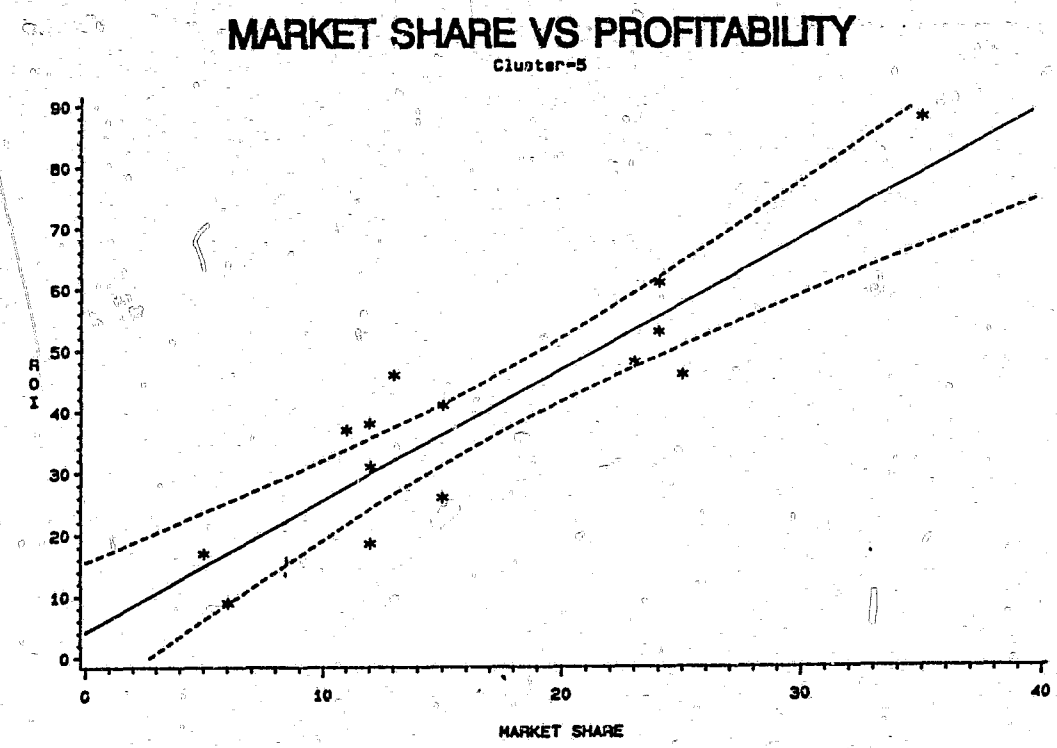


Fig 5.1&2 Initial Cluster Analysis : Clusters One & Five

5.3 DETAILED ANALYSIS

5.3.1 Factor Analysis and Standardised Data

As pointed out by Galbraith & Schendel (1983) when using cluster analysis on the PIMS data base to analyse strategy types, the data should first be standardised because PIMS variables are typically measured in non-compatible units. Then principal component analysis or factor analysis can be used to reduce the number of variables considered, and cluster analysis applied to the reduced number of variables. (See also Cooper and Weeks (1983, p267) for confirmation of this procedure).

Accordingly, the cluster analysis that was done initially was repeated but the following procedure adopted:

1. The data was standardised. The mean of each variable was left unaltered but the standard deviation was made equal to unity. This was done using the SAS procedure "PROC STANDARD".

2. Principal components were obtained by using the SAS "PROC FACTOR" routine and out of the original 9 variables, 3 principal components were retained.

3. Cluster analysis was done using "PROC FASTCLUS" on the principal components.

4. Regression analysis with market share as the independent variable and return on investment as the dependent variable was done using "PROC REG" for each cluster.

5. Market share vs ROI was plotted for each cluster.

The result of this was that the high correlation between market share and profitability that was present in cluster number 5 in the initial study was completely absent from all clusters produced by this procedure. The analysis was done using 3, 4 and 5 factors and it was found that 3 factors gave clusters that had the biggest difference in the strength of the relationship between market share and profitability, and hence this was chosen for inclusion in the report. The factors themselves have no special physical significance but a complete description of the factors in terms of the variables they represent is given in appendix IV p321. Briefly, factor 1 is dominated by "purchase amount" and "Customer Concentration; factor 2 is a combination of "Investment/sales", "Fixed Capital Intensity" and "Vertical Integration" and factor 3 is a combination of "Receivables/Sales", "Market Growth" and "Industry Concentration".

Three clusters had more than two observations assigned to them and the output from the regression analysis is given in Table 5.1 below:

Cluster	R. Square	Slope	T Value	F Value	Prob > F
1	0,1496	0,361	2,259	5,103	0,0316
3	0,1726	0,416	1,343	1,805	0,2060
4	0,0068	0,165	0,704	0,496	0,4834

TABLE 5.1 : Standardised Cluster Regressions

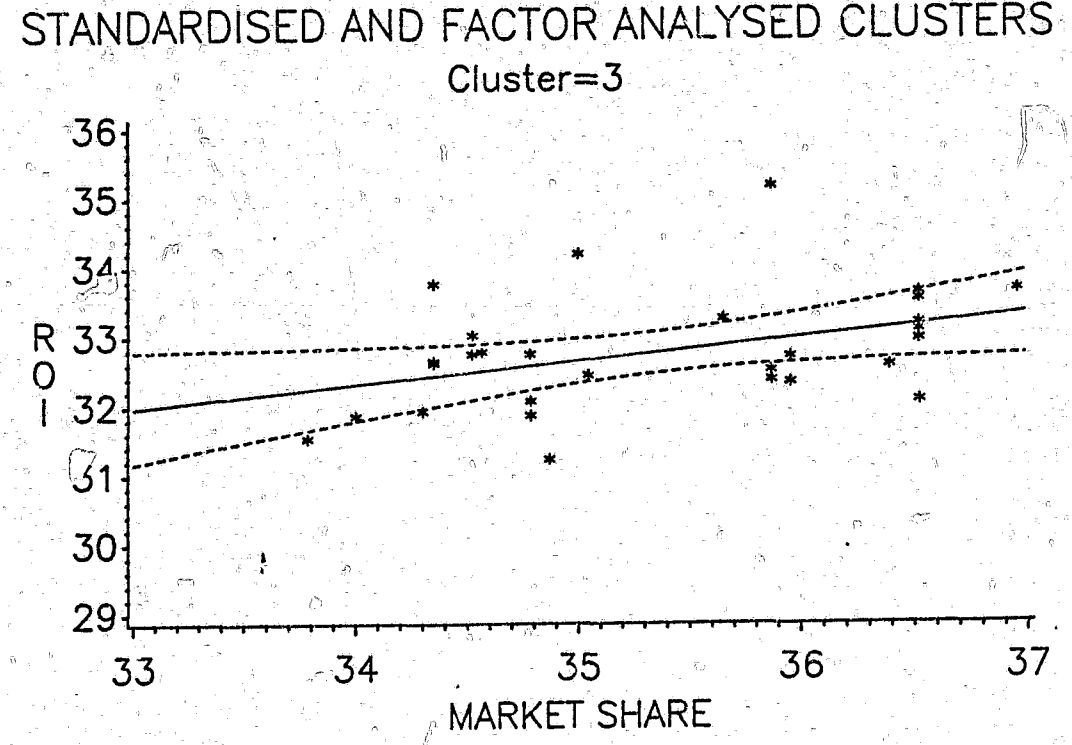
Note: The T value is for testing HO: Slope = 0

A plot of market share vs profitability for each of

the clusters is presented in Figures 5.3 to 5.5.

5.3.2 Re-design of the Analysis

At this point it became clear that the statistically correct method of analysing the data (i.e. standardising and factoring before clustering) was covering up the trend that was present when a crude cluster analysis was done on the raw data. Obviously to explore the underlying trend a new approach would have to be employed.



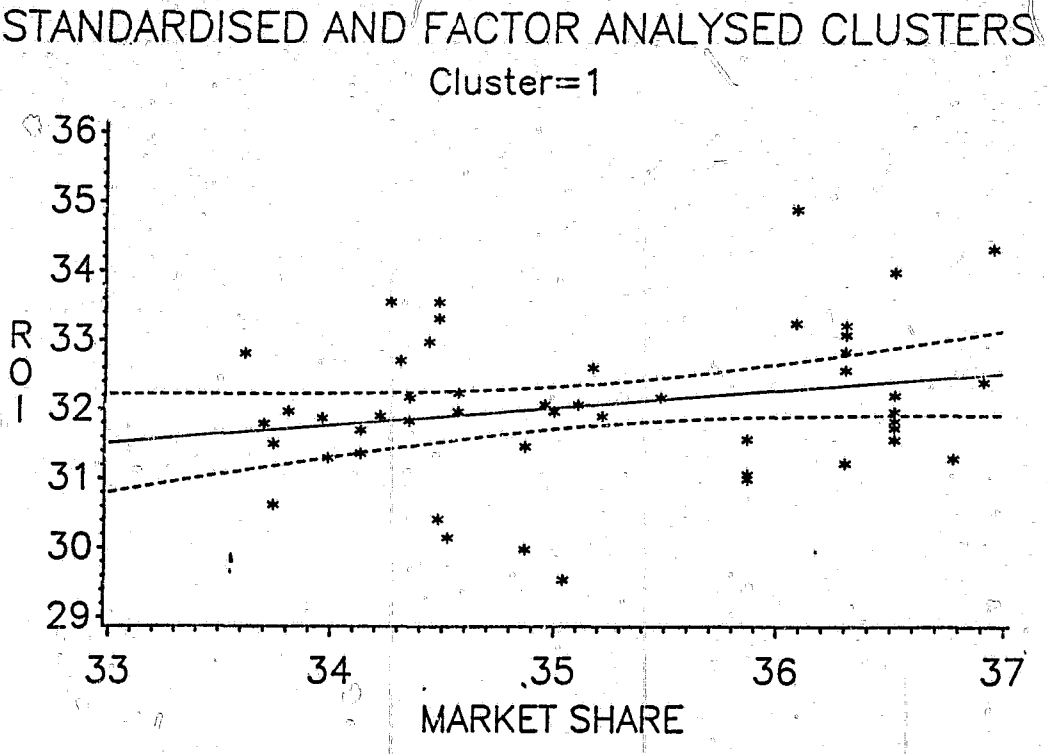


Fig 5.3&4 Standardised Cluster Analysis : Clusters One & Three

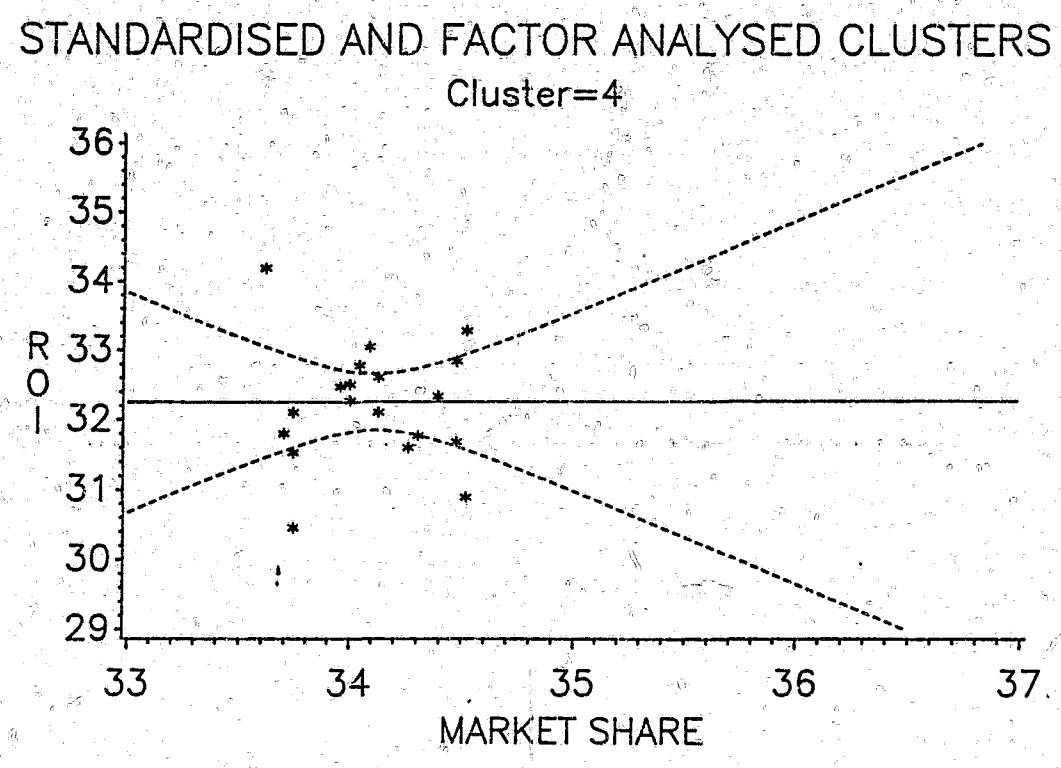


Fig 5.5 Standardised Cluster Analysis : Cluster Four

5.3.2.1 Factorial Design

As a way of addressing the above problem, it was decided to focus on the 4 environmental variables and to try to assess their affect on the relationship between market share and profitability by testing all possible combinations of the variables. Previous studies (Hambrick (1983)), had focused only on environmental variables and since the objective of the analysis was to define environmental settings, the structural variables were omitted.

The procedure that was adopted was then as follows:

1. Standardise the data.

2. Start with one single environmental variable.

3. Do a cluster analysis on this single variable.

4. Do a linear regression on each cluster with market share as the independent variable and return on investment as the dependent variable.

5. Print the observations in each cluster.

6. Plot market share vs ROI for each cluster.

7. Repeat steps 2 to 6 for all combinations

of the 4 environmental variables taking 1, 2, 3 and then 4 at a time.

8. Check the regression outputs for environments which meet the "importance of market share" criteria laid down in Section 1.

5.3.2.2 Number of Clusters

Before the above procedure could be implemented the appropriate number of clusters had to be decided. This always presents a problem to researchers as the number of clusters can substantially alter the results obtained. In the analysis of Section 5.3.1, five clusters had been used. This analysis was repeated using different numbers of clusters to see if any natural level could be found, which however, was not the case. Next, the cubic cluster criterion approach as described by SAS Statistics (1987) was used. The plot of the cubic cluster criterion for different numbers of clusters is presented in Figure 5.6. As can be seen, there is a peak at around 2 and 3 clusters and other peaks at much higher numbers.

Additional guidance regarding the appropriate number of clusters comes from Lehmann (quoted in Hambrick (1983)), who states that there is generally no way to get more than n/30 to n/50 reliable clusters from survey data. For this data, this results in 2 to 3 clusters maximum. After examination of the clusters using some of the environmental variables, it was decided

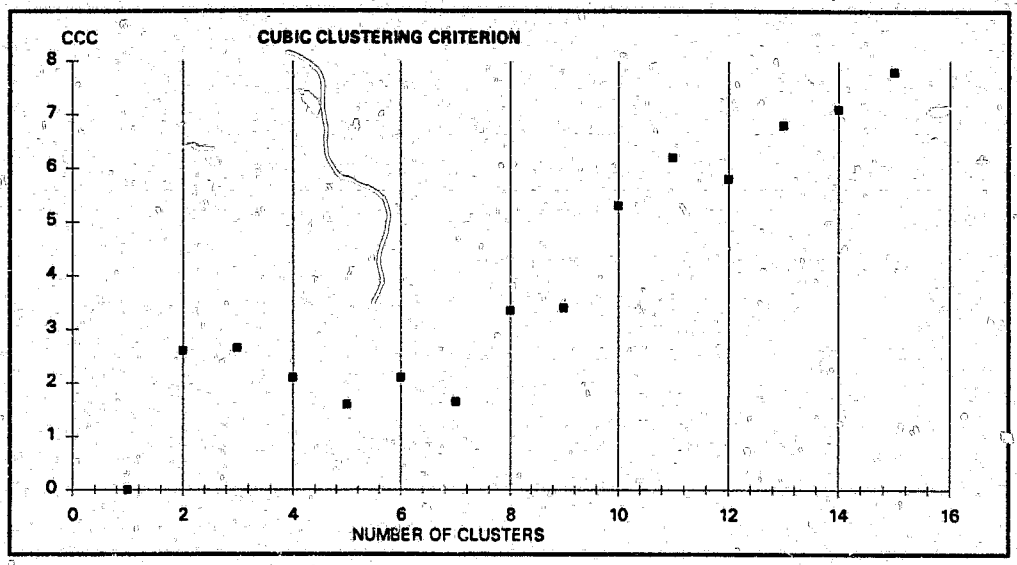


Fig 5.6 Cubic Cluster Criterion

to standardise on 3 clusters for the above procedure. This was largely because, despite the removal of outlyers, some clusters had only a single observation, thus to get at least 2 meaningful clusters in all the combinations of environmental variables considered above, 3 clusters were used.

5.3.2.3 Results

The results of the procedure are shown in Table 5.2.

An inspection of the table shows that there were 3 environmental settings where market share was "important" (i.e. met the "importance" criteria laid down in Section

5.1) with 3 other environments being significant at the 5% level. By far the most significant of the variables was the Customer Concentration ICU which is defined as the number of customers that equal 50% of sales. As shown by result number 38, this is highly significant and dominates the clusters in those environments where significance was obtained. When the points in cluster number 38 were plotted they showed exactly the same trend that was present in the initial analysis. This was checked by printing the identity numbers of the individual businesses in the cluster, and comparing them with the identities of the businesses in the original cluster analysis. In the case of cluster number 38, a perfect match was obtained.

It is therefore obvious that the customer concentration variable (ICU) was dominating the initial cluster analysis, and when standardised, this dominance was removed. It was purely as a result of good fortune that the variable that had the largest range was also the variable that had the most significant effect on the importance of market share. If this had not been the case, then the initial cluster analysis would not have shown any differences in market share's correlation with profitability. However, the above analysis has tested all possible combinations of environmental factors and, without relying on good fortune, has identified the most significant environmental variables according to the defined criteria.

Result No.	Cluster Variable	No.	Slope	T Value	Probability	Significance
1	MGR	1	-	-	-	
2		2	0,450	1,073	0,3113	
3		3	0,299	2,297	0,0241	
4	MGR ICO	1	0,084	0,262	0,7952	
5		2	0,391	2,196	0,0331	
6		3	0,450	1,073	0,3113	
7	MGR ICU	1	0,282	1,995	0,0522	
8		2	0,801	3,746	0,0024	*
9		3	0,508	1,631	0,1149	
10	MGR PCU	1	0,289	1,470	0,1514	
11		2	0,313	1,713	0,0928	
12		3	0,467	1,204	0,2563	
13	MGR ICO ICU	1	0,513	1,800	0,0839	
14		2	0,657	2,013	0,0559	
15		3	0,149	0,913	0,3664	
16	MGR ICO PCU	1	-0,043	-0,147	0,8843	
17		2	0,160	0,849	0,4008	
18		3	0,535	1,797	0,0849	
19	MGR ICU PCU	1	0,291	1,772	0,0814	
20		2	0,4204	1,702	0,1042	
21		3	0,799	3,600	0,0036	*
22	MGR ICU PCU ICO	1	0,728	3,134	0,0120	5%
23		2	0,405	2,474	0,0160	
24		3	-0,0217	-0,063	0,9507	
25	ICO	1	0,434	2,438	0,0181	
26		2	1,990	1,363	0,2662	
27		3	0,044	0,140	0,8395	
28	ICO ICU	1	0,349	1,997	0,0502	
29		2	0,647	2,706	0,0268	5%
30		3	0,218	0,840	0,4099	
31	ICO PCU	1	-0,009	-0,034	0,9728	
32		2	0,368	1,222	0,2374	
33		3	0,380	1,968	0,0546	
34	ICO PCU ICU	1	-0,006	-0,019	0,9850	
35		2	0,390	2,372	0,0207	
36		3	0,647	2,537	0,0389	5%
37	ICU	1	0,365	2,581	0,0117	
38		2	2,135	7,595	0,0001	**
39		3	-	-	-	
40	ICU PCU	1	0,309	2,013	0,0481	
41		2	0,368	1,222	0,2374	
42		3	0,552	3,589	0,0115	
43		1	0,368	1,222	0,2374	
44	PCU	2	0,353	2,520	0,0139	
45		3	-	-	-	

NOTE 1: MGR = Market Growth
ICO = Industry Concentration
ICU = Customer Concentration
PCU = Purchase Amount

NOTE 2: T Value is for testing Ho : Slope = 0

Table 5.2 Results of Factorial Regression

CHAPTER 6 INITIAL INVESTIGATION

6.1 INTRODUCTION

This chapter reports on the initial study that was done in which a small number of businesses were studied in order to understand the causal mechanism at work which underlies the market share/profitability relationship in particular industries. In Chapter 4 the analysis of the data resulted in two environmental settings (defined by environmental variables) which exhibited substantially different relationships between market share and profitability. Environment I showed no statistically significant relationship between market share and profitability while environment II (cluster 5) showed a highly significant relationship. The initial study focused on the businesses in environment II and employed a fine grained methodology to explore the relationship between market share and profitability and to understand the causal process at work.

6.1.1 Objective

The objective of the research was thus to explore the industries concerned and gain an understanding of:

a) the reason for the correlation between market share and profitability
b) the physical mechanism at work and
c) the implications for strategy

formulation.

6.1.2 Hypotheses

A study of the literature led to the formulation of the following hypotheses.

a) Size/scope/learning factors.
Much of the early research on market share ascribed the relationship of market share to profitability to one of the following factors, all relating to size/scope/learning.

- Learning curve/experience curve (Ghemewat, 1985; Hall, 1985)
- Advantages of scale (Hall and Howell 1985)
- Volume discounts and supplier leverage (Porter, 1984; Buzzell *et al* 1975)

All of the above lead to cost advantages for the largest competitor which translates directly into improved profitability.

Thus the following hypotheses were specified:

H1 : Experience curve effects are significant in industries where market share is important.

H2 : Advantages of scale are important in industries where market share is important.

H3 : Supplier leverage is significant in industries where market share

is important.

Price Premiums

The question of price was specifically separated from the other competitive position variables because of the importance that this is given in the literature. One school of thought (for example Weiss, 1989; Shepherd, 1983; Woo, 1983; Page, 1979) believes that high market share companies have higher prices than competitors, while the other school of thought (for example McGee, 1988; Buzzell *et al*, 1975; Buzzell and Gale, 1987; Phillips *et al* , 1983) believes that factors other than price are significant. Therefore it was thought to be desirable to test the following hypothesis:

H4 : The existence of price premiums for high market share companies is a significant factor in industries where market share is important.

Structural Barriers to Competition

The argument has been put forward (Hanan, 1981; Lieberman and Montgomery, 1988; Urban *et al*, 1986; Shaw and Shaw, 1984) that market leaders remain dominant because their rivals find it difficult to challenge the leader. The reason that this is difficult to do is because high share companies are entrenched in their existing position by isolating mechanisms and have to be

displaced from the status quo. This implies that there exists a structural barrier which shelters high share companies from competition. This led to the formulation of the following hypothesis.

H5 : There are significant structural barriers to competitors in industries where market share is important.

6.2 METHODOLOGY

The design of the research methodology was done with no indication of how receptive the chosen businesses would be to this type of research. The hypotheses developed in section 6.1.2 were aimed at understanding the reasons for the correlation between market share and profitability and the physical mechanism at work, but not the implications for strategy formulation. To understand the strategy implications it was necessary to design the research methodology so that management's view of the business was researched (and specifically management's view of the relationship between market share and profitability) so that this could be contrasted with other views and analyses from elsewhere in the industry.

A structured questionnaire was developed (see Appendix V) which was designed to test management's views on a number of strategic issues and then to test the hypotheses directly. The questionnaire consists of two

parts; part I consists of broad questions with non-quantifiable answers and part II much more specific questions with quantifiable answers. Part II is based on the PIMS format questionnaire with all of the PIMS LIM model questions (see Abell and Hammond, 1979, p355, for examples of the PIMS LIM model) and some additional questions designed to test the hypotheses.

The research procedure was planned as follows:

1. Identify the businesses to be researched.
2. Make contact with the business and conduct a structured interview in which all (or as many as possible) of the questions on the questionnaire would be answered.
3. Make contact with suppliers or customers of the chosen business and apply the relevant parts of the questionnaire.
4. Apply the questionnaire to industry analysts or industry experts (if appropriate).
5. Use secondary sources of data to help analyze specific issues.
6. Use steps 4 and 5 as a triangulation procedure for the results obtained in step 3. If necessary return to step 3 to clarify conflicting issues.

6.3 FIELDWORK

6.3.1 Identification of the business

The identification of the business proved to be a difficult task in its own

right because the data base had been specifically constructed to protect the confidentiality of participating businesses. The particulars of the research methodology was explained to the two researchers that originally compiled the data and their permission obtained to identify the companies concerned. To do this, the original input documents had to be located and matched to the data in the data base. This was a laborious and time consuming task but resulted in the identification of all of the businesses required for the initial study, and most of the other businesses. Care was taken to maintain confidentiality whereever possible and the link between the business' name and the code number was held in a separate data base and only used in agglomerated form.

After the businesses had been identified, an immediate problem became apparent; of the 13 businesses falling in environment II, 10 were in one particular industry i.e. the paper industry. Furthermore, a superficial investigation showed that the 3 businesses that fell outside the paper industry had all be sold by the original owners and no longer existed in their original form. Therefore the study was reduced to an industry study of the paper industry, thus simplifying the research procedure but making the

results obviously less generalizable.

6.3.2 Application of questionnaire

The next major problem encountered was the difficulty experienced in obtaining confidential information. Interviews were obtained (with some difficulty) with senior managers from the businesses concerned and answers obtained to the broader questions in part I of the questionnaire without major difficulties. However, without exception, it proved impossible to get the numerical answers required in part II of the questionnaire. Managers were prepared to give "ball-park" type answers but were not prepared to give exact figures, and were uncomfortable with any extensive probing in those areas. (Appendix V gives an example of the introductory material given to management in order to get an interview).

The appropriate parts of the questionnaire were applied to customers and suppliers to the industry without difficulty but this did not compensate for the lack of quantifiable information obtained from the businesses themselves. Other participants in the industry were approached as well as head office staff and industry observers and, as far as possible, were interviewed as shown in table 6.1. A number of managers were

responsible for two (or more) business units and therefore the 6 managers interviewed covered all 10 of the businesses in question.

Position of Interviewee	No of Interviewees
Business unit managers	6
Competitors	4
Head Offices	3
Customers/Suppliers	4
Industry Observers	1
Total	18

Table 6.1 Analysis of interviewees

6.4 RESULTS AND ANALYSIS

6.4.1 Introduction

The results obtained from the application of the questionnaire in structured interviews are given below. In reviewing the results of the questionnaire it became obvious that far too much information had been requested in the questionnaire making it unnecessarily long and difficult to apply. The original intention had been to conduct a detailed, fine grained

study into the businesses concerned so as to uncover the physical mechanism by which market share affects profitability. The formulation of the 5 hypotheses (discussed in section 6.1) was aimed at splitting the mechanisms into 5 broad categories, but the questionnaire and research methodology was designed to give much more detail and colour than merely to accept or reject the hypothesis. In the event, the wide range of detail required by the questionnaire proved impossible to obtain. However, answers to the questions concerning the hypotheses were obtained and are listed below. The approach was then modified to take into account the difficulties experienced in collecting reliable data; the results of the hypotheses were first obtained and then focused questions were applied at a later interview to probe specific issues in order to get the detailed understanding required.

6.4.2 Test of hypotheses

The results of the questions concerning the hypotheses are given below:

H1 : experience curve.
All respondents answered "No" to question 2.19 therefore H1 can be rejected.

H2 : advantages of scale.

There was a mixed reply to question 2.20 with some respondents claiming advantages of scale and others not. Therefore H2 could neither be accepted nor rejected and is examined further in section 6.4.3.

H3 : supplier leverage.
Of the 6 business managers interviewed 4 believed that there were volume discounts being applied in the industry but that these were typically small and were not significant. The remaining 2 business managers did not believe there were any differences in raw material pricing. All respondents believed that this was not an important factor. (question 2.21). This view was upheld by the major supplier that was interviewed and therefore H3 can be rejected.

H4 : price premiums.
All of the businesses interviewed regarded selling price as a highly sensitive issue and were not prepared to give details. (The same applied to competitors). However, customers were much more open in comparing prices. All stated that prices from all participants were very close with little or no variation between suppliers. From price comparisons made as a result of tenders received by a particular customer it was obvious that there was no correlation between market share and price premium,

therefore H4 can be rejected.

H5 : barriers to competition.

All respondents believed that the market was open and that there were no specific barriers to competition (question 1.9). In most cases entry barriers were thought to be low as well. Therefore H5 can be rejected.

6.4.3 Detailed analysis of advantages of scale

The above results showed that all the hypotheses could be rejected except for H2, where a mixed result was obtained. The question that was asked of the interviewees was (question 2.20, Appendix IV)

"Are advantages of scale important in this industry? (Yes/No).
(i.e. Would a business double the size of this business have a significantly better return on investment?)"

If respondents answered 'yes' they were asked what specific factor caused the advantage of scale.

There were 8 results obtained for this part of the questionnaire (only the interviews with the businesses (6) and the competitors (2) were used) and the results are given in table 6.2

Answer to Q2.20	Reason
Y	Better, lower cost system
Y	Personal selling
Y	Lower inventory costs
Y	Lower running costs
Y	Lower invoicing costs
Y	Small effect on costs in general
N	-
N	-

Table 6.2 Results of Advantages to Scale Question

Of the respondents, six believed there were advantages of scale to be obtained in their industry although one of the six thought this effect was small. All six thought costs would be affected, although they were all vague as to how this would actually happen. Clearly a more detailed analysis was needed in this area to uncover the underlying physical mechanism.

More detailed discussions were undertaken with some of the businesses and later with two of their customers and the following explanation for the correlation between market share and profitability was derived:

Firstly, it must be noted that the marketing key success factors for the business in this industry were well known by the relevant managers because most of the businesses in the industry

participated in a formal market research programme which was professionally done and updated regularly. The research was called a "market reputation audit" and part of the procedure was to get customers to rank 14 service factors in order of importance. The four most important factors at the time of the research were:

1. Reliability of delivery
2. Speed of delivery
3. Pricing policy
4. Stock levels

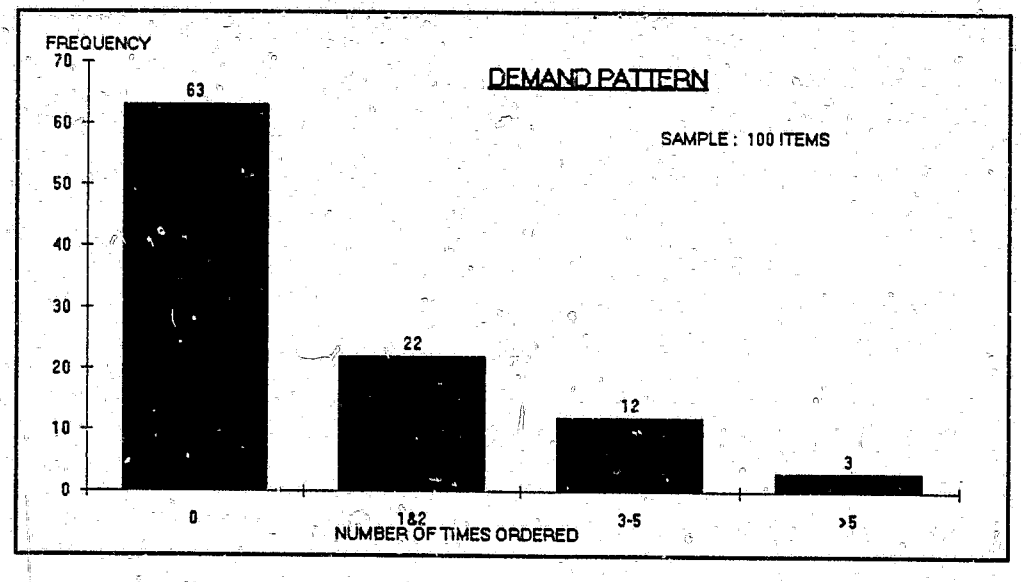


Fig 6.1 Customer demand (sample of 100 items)

Secondly an analysis of customer ordering patterns showed that a large portion of a merchant's inventory would be slow moving with long periods of low or zero demand punctuated with erratic peaks of high demand.

This corresponded to the nature of the printing "jobbing" business where specific jobs require a special paper which is chosen from a vast range of thicknesses, textures and colours.

Typically a merchant would have over a thousand product lines for which stock levels, speed of delivery and reliability of delivery were critical factors. Fig 6.1 shows an analysis of one customer's ordering pattern over a 7 month period. A sample of 100 items were analyzed and 63% were not ordered once in the period under analysis.

Of the 63 items that were not ordered in the 7 month time period 10 were taken at random and further analyzed over a five year period and found to have inter-order periods ranging from 8 months to 36 months. This erratic demand patterns was seen as a direct result of the unpredictable "one-off" nature of the printing business.

Using the above information and typical average cost information obtained from the

businesses a simulation was done to test whether safety stock and inventory levels could account for the market share/profitability correlation observed in the original data.

To do the simulation the following was assumed:

a) Two similar companies compete in the same market with similar strategies.
b) Each company carries a full range of products for the market in which they compete.
c) The cost of holding stock (per unit of stock) is identical for both companies.
d) The purchase price paid for raw materials is the same for both companies.
e) All other costs are the same (per unit of revenue) for each company.
f) Market shares are assumed to be different :
company A has 30% market share; and,
company B has 3% market share.

In summary, two companies with no obvious advantages of scale (or disadvantages of scale) are assumed to compete in the same market.

The demand pattern for both businesses are assumed to be the same and the demand pattern shown in fig 6.1 is assumed to be typical for customers of both businesses. The simulation starts by focusing on a

single product line and the average stock level required by the businesses in order to have the same level of service is calculated. (See Appendix VI for more detail on the calculation method). These results are then used to derive the return on investment for each of the businesses. A summary of the results are given in tables 6.3 and 6.4.

	Company A	Company B	Remarks
Average demand (units)	30	3	In line with assumed market share
Standard deviation	19	6	Calculated assuming demand pattern the same
Order quantity	5	2	Calculated
Safety stock (for same service level)	33	9	Calculated
Average Stock	32,9	10	Calculated
Ratio : Average stock/Average demand	110%	333%	Calculated

Table 6.3 Simulation of two companies : average stock holding (see Appendix VI for detailed calculation)

	Company A	Company B	Remarks
Purchase (units)	30	3	In line with assumed market shares
Price	10	10	Assumed the same (no advantages of scale)
Purchase amount (price x volume)	300	30	
Stock Holding Costs (30% p.a.)			Calculation based on results shown in table 6.3
50% fast moving	13,5	4,3	
50% slow moving	50	15	
Other expenses	200	20	Assumed to be the same (proportional to revenue with no advantages of scale assumed)
Total costs	563	69	
Sales	730	73	Selling prices assumed identical
Profit	167	4	
Return on investment	61%	13%	

Table 6.4 Simulation of two companies : ROI

The ROI's for the two companies calculated in table 6.3 are plotted on the same scale as the original data and shown in fig 6.2

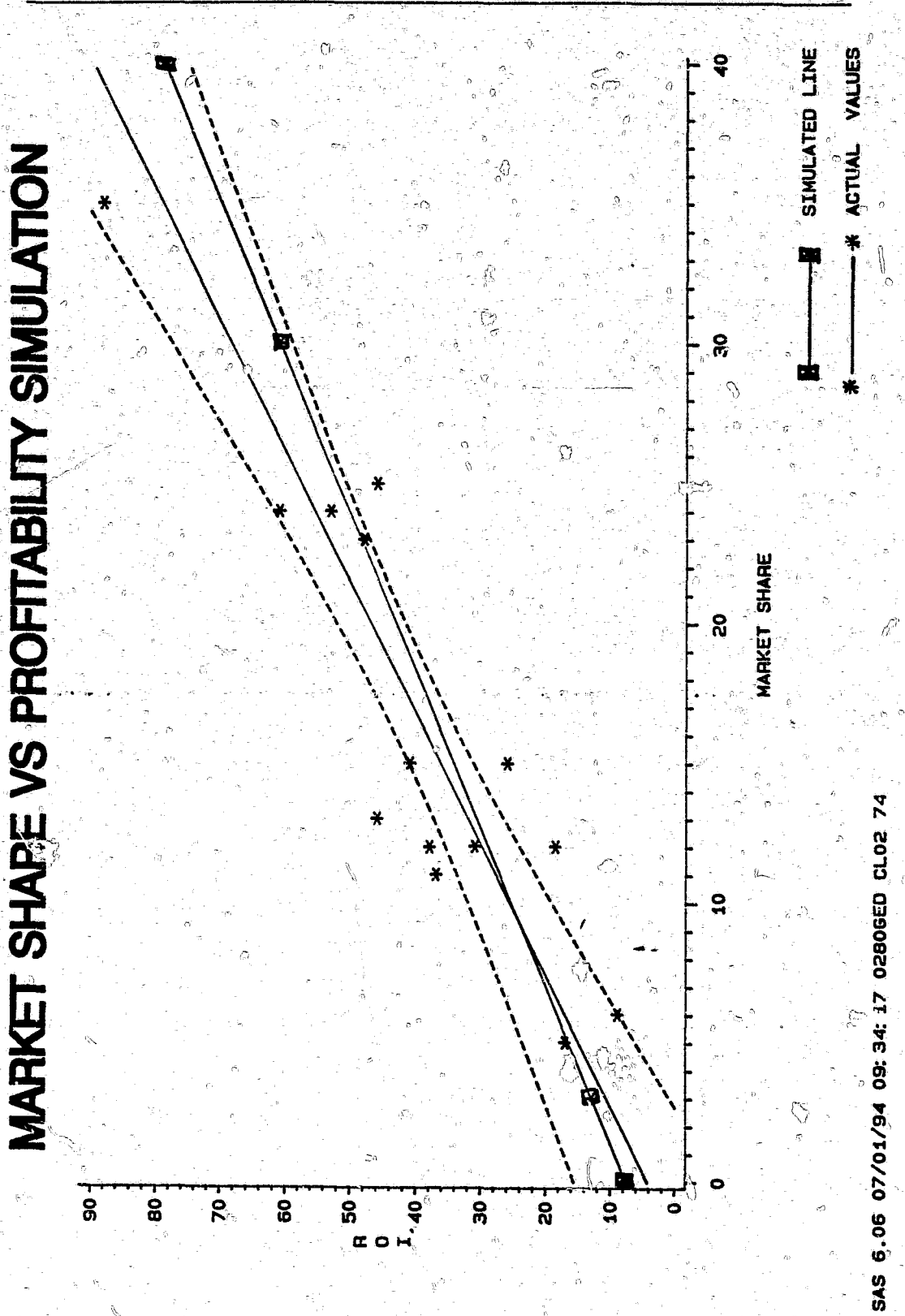


Fig 6.2 Comparison of actual ROI with simulated ROI.

As can be seen in fig 6.2 the results obtained in the simulation closely track the actual ROI's in the original data.

6.5 DISCUSSION

Within the limitations of the accuracy of the data the simulated mechanism for the effect of market share on profitability totally accounts for the correlation observed in the original data. The result is interesting from two points of view.

(i) There were no obvious advantages of scale apparent and (in the narrow sense) no advantages of scale were assumed in the simulation.

(ii) Managers in the businesses concerned realized that there were advantages in being bigger (six out of eight : see table 6.2) but did not fully understand the exact mechanism at work.

After the results of the simulation were known, 3 of the SBU managers were questioned regarding this effect. All agreed that higher market share resulted in higher average demand and a "smoother" demand pattern, which required proportionately less safety stock to provide the same level of service. Some of the companies had recognised this and were endeavouring to segment the market and focus on a narrower customer base with a more limited product range and higher average demand per product line. All agreed that this was a likely explanation for the correlation

between market share and profitability.

In terms of a strategic analysis it is of particular interest to scrutinise the key success factors required by the market and to link them to the appropriate capability in the firms value chain. For example to meet customers needs in terms of speed of delivery, firstly stock must be available, and secondly there must be an efficient system for taking the order, drawing the stock and delivering it to the customer. Therefore the capabilities required in the firm in order to meet customers requirements for speed of delivery lie in the "storage and distribution" function and in the "sale and delivery" function. Fig 6.3 gives a graphic representation of the marketing service factors and the corresponding capability in the value chain.

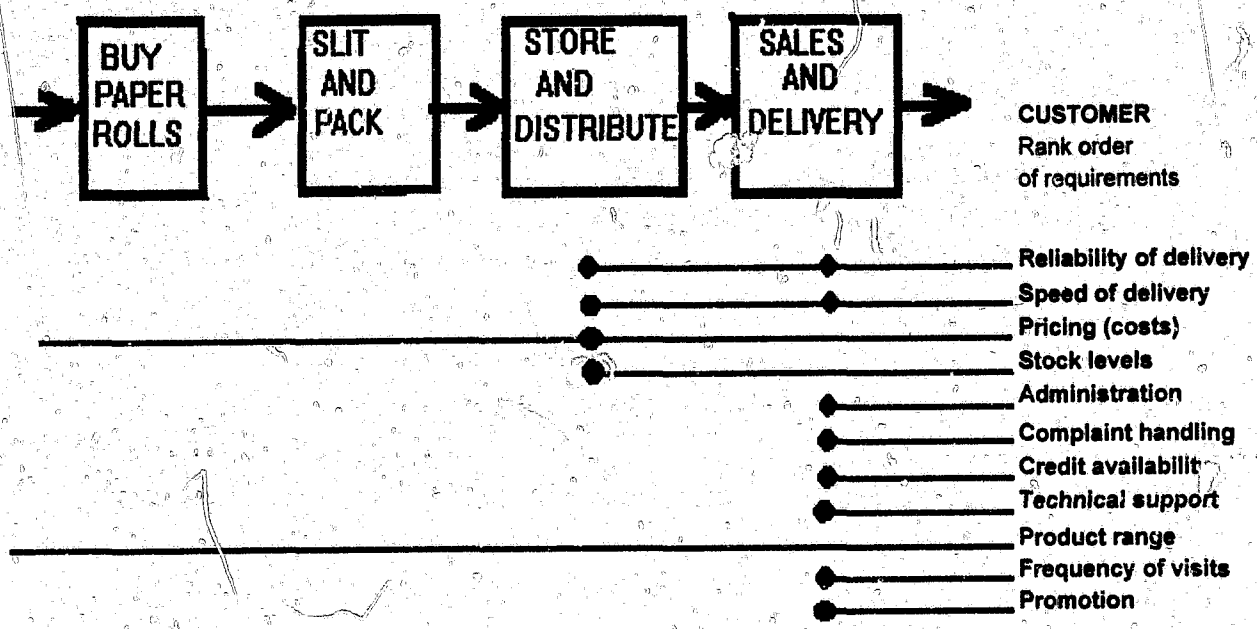


Fig 6.3 Market requirements and corresponding firm capabilities

The market requirements are given in ranked order and it can clearly be seen that the top 4 factors depend on the storage and distribution capability. As shown by the simulation, cost and service level are linked to market share in this particular case and therefore this becomes a critical factor for these businesses.

6.6 CONCLUSION

The simulation cannot be regarded as conclusive proof that the mechanism simulated is solely responsible for the correlation between market share and profitability in the industry concerned. However, two factors make this the most likely mechanism:

1) All other likely mechanisms were investigated and eliminated; and,
2) Managers agreed that the simulated mechanism is a plausible explanation for the correlation.

For the purposes of this research this evidence was accepted as sufficient and the next phase of the research was undertaken, based on the results obtained above.

CHAPTER 7 GENERALIZATION OF THEORY

7.1 INTRODUCTION

In this chapter the results obtained in Chapter 6 are used as a basis to formulate a more general theory. First the central concepts are precisely defined. Although some of the concepts have been used previously in this research, a precise definition is critical at this stage in order for the theory to be formally stated.

Next the theory is formally stated in the form of assumptions, postulates and derived theorems (stated in the form of hypotheses). The validity of the theory rests on the testing of the hypotheses which is reported on in Chapters 8 and 9.

A brief logical justification for the theory is given and the results from Chapter 6 are put into the new theoretical framework. This is not in any way meant to be taken as a "proof" of the theory but is merely put forward to illustrate that the theory is logically consistent.

7.2 DEFINITION OF CONCEPTS

> "The code of Humpty Dumpty - which allows one to use a word with any meaning one wishes - is much too often invoked as a supreme authority on terminological prerogative".
>
> Georgescu - Roegen (1970, p9)

Before the generalization of the theory can commence some of the central concepts require precise

definition.

7.2.1 Key Success Factors

Throughout the literature on strategic planning the concept has been put forward that in each industry there exists a small number of critical factors which have a substantial influence on a firm's profitability (e.g. Boynton and Zmud, 1984; Mauleon and Willingston, 1984; Ferguson and Dickinson, 1982). These factors are known as key success factors (KSFs) (or critical success factors) and have been defined as follows:

"Key success factors consist of the three or four really major determinants of financial and competitive success in an industry. KSFs have to do with the things all firms in the industry must concentrate on doing well, the specific kinds of skills and competencies needed to compete successfully, and which functional-area aspects (for example, technical expertise, manufacturing efficiency, advertising cleverness and product innovation skills) are the most crucial and why".

(Thompson & Strickland, 1989, p101).

Ansoff (1984) describes a process for getting to a key issue list (as part of impact analysis) which ranks issues according to their impact and urgency. Other writers (Yavitz & Newman, 1982,

p210) describe a process for monitoring only "the factors crucial for the success of the plan" and for monitoring external variables that have a similar impact.

Other definitions of KFSs are:

"Those things that must be done if a company is to be successful"

(Freund, 1988, p20)

"Critical success factors thus are, for any business, the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organisation. They are the few key areas where 'things must go right' for the business to flourish. If the results in these areas are not adequate, the organisation's efforts for the period will be less than defined".

(Leidecker & Bruno, 1984, p23)

Perhaps the most simple definition explaining the concept is:

"Key success factors are those variables which management can influence through its decisions that can affect significantly the overall competitive position of the various firms in an industry".

(Hofer & Schendel, 1978, p77)

However, one crucial, extra point is made

by de Vasconcellos & Hambrick (1989, p376):

"Key success factors are those tasks or attributes which are particularly mandated by the task environment".

All of the above definitions seem to describe essentially the same concept except there is a range of opinion on what exactly a KFS is.

".....3 or 4 really major **determinants**....."
(Thompson & Strickland)

"**issues**" (Ansoff)

"**factors**" (Yavitz & Newman)

"...the limited number of **areas**...."
(Leidecker & Bruno)

"Those **things**...." (Freund)

"...those **variables** which management can influence....(Hofer & Schendel)

"...those **tasks** or **attributes**..."
(de Vasconcellos & Hambrick)

Interestingly, of the 7 definitions reviewed, no two authors use the same noun to describe a key success factor. The view taken in this research is that key success factors are:

- a limited number of tasks, attributes or variables which management can influence
- which are specific to a particular industry and are mandated by the task environment, and
- which affect significantly the overall success of the organisation.

7.2.2 Core Competencies

The concept of core competencies was introduced by Prahalad & Hamel (1990) and refers to the underlying capabilities that a corporation must have in order to be successful.

> "The corporation, like a tree, grows from its roots. Core products are nourished by competencies and engender business units, whose fruits are end products".
>
> (Prahalad & Hamel, 1990, p81)

This concept will be used more extensively later but at this stage it is worth drawing a comparison between core competencies and KSFs. KSFs are the requirements dictated by the task environment; core competencies are the capabilities in the organisation which enable it to achieve outstanding performance in those areas. Clearly, for the organisation to be successful there

must be a fit between competencies and KSFs.

For the purposes of this research KSFs are regarded essentially as static at any particular period in time. However, the point has been made (Hamel & Prahalad, 1991) that expeditionary marketing can create a new competitive space where the competencies of an organisation can be applied to change the KSFs of an industry. (e.g. Yamaha's use of digital sound encoding to change the piano market - Hamel & Prahalad, 1991, p84). However, these changes are relatively uncommon and, for the purposes of this research, KSFs are regarded as fixed and static at any one point in time.

7.2.3 Advantages of scale (AOS)

The term advantage of scale is used from here on to describe, in the broadest possible sense, any advantage that may be obtained or accrue to an organisation as a result of being bigger than another organisation. The term includes, but is not limited to, the following:

- economies of scale as classically defined (e.g. McGee, 1988; Shepherd, 1983; Weiss, 1989)
- learning curve effects (e.g. as discussed by Ghemawat & Spence, 1985, Gluck, 1985)

- experience curve effects (e.g. as discussed by Hall & Howell, 1985; Newton, 1983; Jacobson & Aaker, 1985; Ghemawat, 1985; Dolan and Jeuland 1981; Bhattacharya, 1985).

In short, AOS is used to describe any situation where "bigger is better".

7.2.4 Industry/Business Definition

The Industrial Organisation paradigm can be summarised as follows:

basic conditions dictate market structure which dictates conduct which in turn dictates performance (Scherer, 1980, p4). Inherent in this concept is the assumption that industries can be isolated and analyzed independently of other industries. The borders of an industry (i.e. what forms part of the industry and what falls outside of an industry) are not clearly defined in the literature. Since the Industrial Organisation paradigm has "market structure" as a basic building block one may assume that a market definition could serve as an industry definition without contradicting the IO paradigm.

This concept also fits in well with the PIMS concept of served market and their definition of a business unit i.e. "An SBU

- sells a distinct set of products and

services

- to an identified group of customers
- in competition with a well-defined set of competitors";

(Abell & Hammond, 1979, p273)

and,

"The market includes all of the products or services, customer types, and geographic areas that are directly related to the activities of the business. For example, it includes all products and services that are competitive with those sold by the business".

(Schoeffler, Buzzell & Heany, 1974, p140)

The question of business definition is not trivial and is in fact one of the most important strategic decisions that managers make (see for example Hamel & Prahalad (1989) or Abell (1980) for a discussion on how business definition effects future strategic performance).

In this research the view is taken that the served market, defined by management, forms the basis for the definition of the business (see "value chains" below). Industries are defined in a similar way.

7.2.5 Value Chains

The concept of a value chain for a specific industry was popularised by Porter (1984) and has been widely used in industry analysis ever since. According to Porter the activities needed to compete in a particular industry can be grouped into categories as shown in fig 7.1.

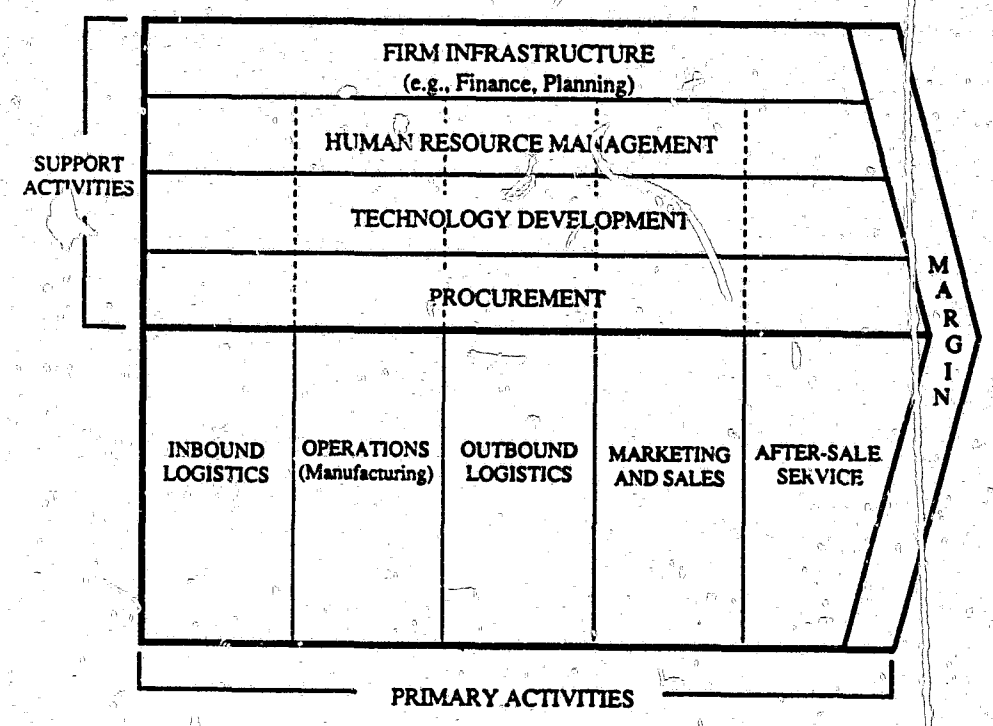


Fig 7.1 The Value Chain (Source :Porter, 1990, p41)

All the activities in the value chain contribute to buyer value.

"Activities can be divided broadly into those involved in the ongoing production, marketing, delivering and servicing of the product (primary activities), and those providing purchased inputs, technology, human resources or overall infrastructure functions to support the other activities (support activities). Every activity employs purchased inputs, human resources, some combination of technologies and draws on firm infrastructure such as general management and finance".

(Porter, 1990a,p40)

For the purposes of this research Porter's definition of the value chain concept will be used although it will be represented in a simplified form by showing only the primary activities.

For an example of a simplified value chain, see fig 7.2.

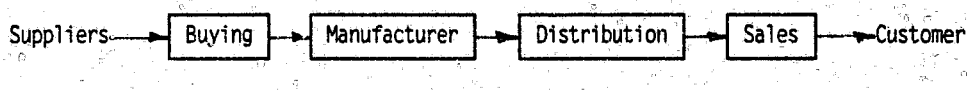


Fig 7.2 Simple value chain

7.2.6 Industry Specificity

All industries require some inputs which are generally available and not specific to the particular industry under

consideration e.g. labour, finance, electricity etc. However, the extent to which these inputs are KSFs, defines the level of what is called industry "specificity" (SPEC) in this research. If the KSFs in an industry depend on factors which are specific to the industry then specificity is taken to be high. If the KSFs depend on factors which are not specific to an industry then specificity is taken as low.

7.3 FORMULATION OF GENERALIZED THEORY

The proposed theory can be simply and concisely stated as follows:

Assumption I : Market share is a measure of the relative size of a business with respect to other participants in the served market, but is not necessarily a measure of relative size elsewhere in the value chain.

Assumption II :
a) The success and profitability of an organisation is dictated by a relatively small number of key success factors.
b) Key success factors may occur anywhere in the value chain.

Postulate I : Some KSFs are subject to

advantages of scale and some are not subject to advantages of scale.

Postulate II : Some KSFs depend on factors which are specific to an industry and some KSFs depend on factors which are not specific to the industry.

Postulate III :

a) In industries where AOS is significant and SPEC is high there will be a strong causal relationship between market share and profitability.

b) In industries where AOS is significant and SPEC is low the relationship between market share and profitability will be weaker than III (a) above.

c) In industries where AOS is not significant there will be no causal relationship between market share and profitability irrespective of whether SPEC is high or low.

To facilitate the testing of the above theory, derived theorems stated as hypotheses are given below.

Hypothesis

(i) In industries where AOS is significant and SPEC is high there is a strong positive correlation between market share and profitability.

(ii) In industries where AOS is significant and SPEC is low the correlation between market share and profitability will be weaker than (1) above.

(iii) In industries where AOS is not significant there will be no correlation between profitability and market share.

7.4 JUSTIFICATION

The above theory was derived by a process of induction and therefore the derivation cannot be completely explained by logic alone. The theory is a generalization of the results obtained in the initial field study reported on in Chapter 6. What follows below is a justification of the theory to show that it is logically consistent. This is not in any way meant to be a proof of the theory as the proof rests on the empirical testing of the hypotheses, not on a logical process.

The reasoning behind the theory is as follows:

(i) If the KSFs in an industry were subject

to AOS to a significant extent, this would imply that, in the critical areas that affect the business' profitability, there are significant advantages associated with being big compared to other participants in the industry. Therefore bigger companies would be expected to perform better than smaller companies. Also, if the KSFs were specific to the industry under consideration then, in the areas which are critical, the industry could be regarded as being isolated and able to stand alone from other industries. Graphically this is shown in fig. 7.3. If this is the case then the relative size of the participants in the industry is measured by market share, and the same

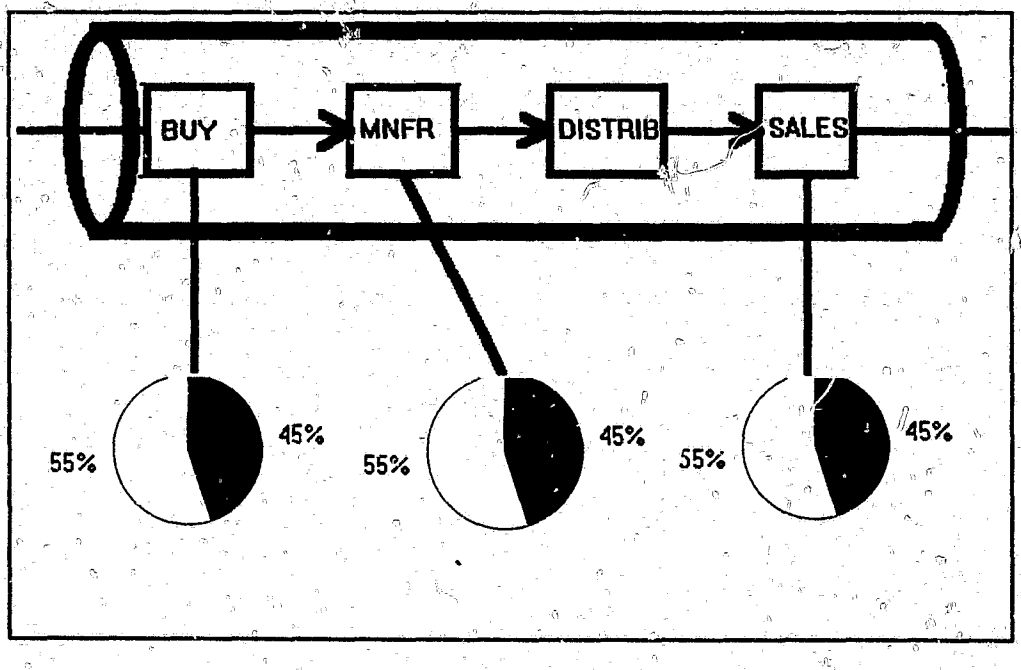


Fig 7.3 Relative size in isolated industries

measure (market share) applies at all points in the value chain. If this is the case then high market share companies will be bigger than other companies at the point in the value chain where the KSFs apply and will clearly then enjoy the benefits of scale. Under these conditions, therefore, one can expect that higher market share will imply

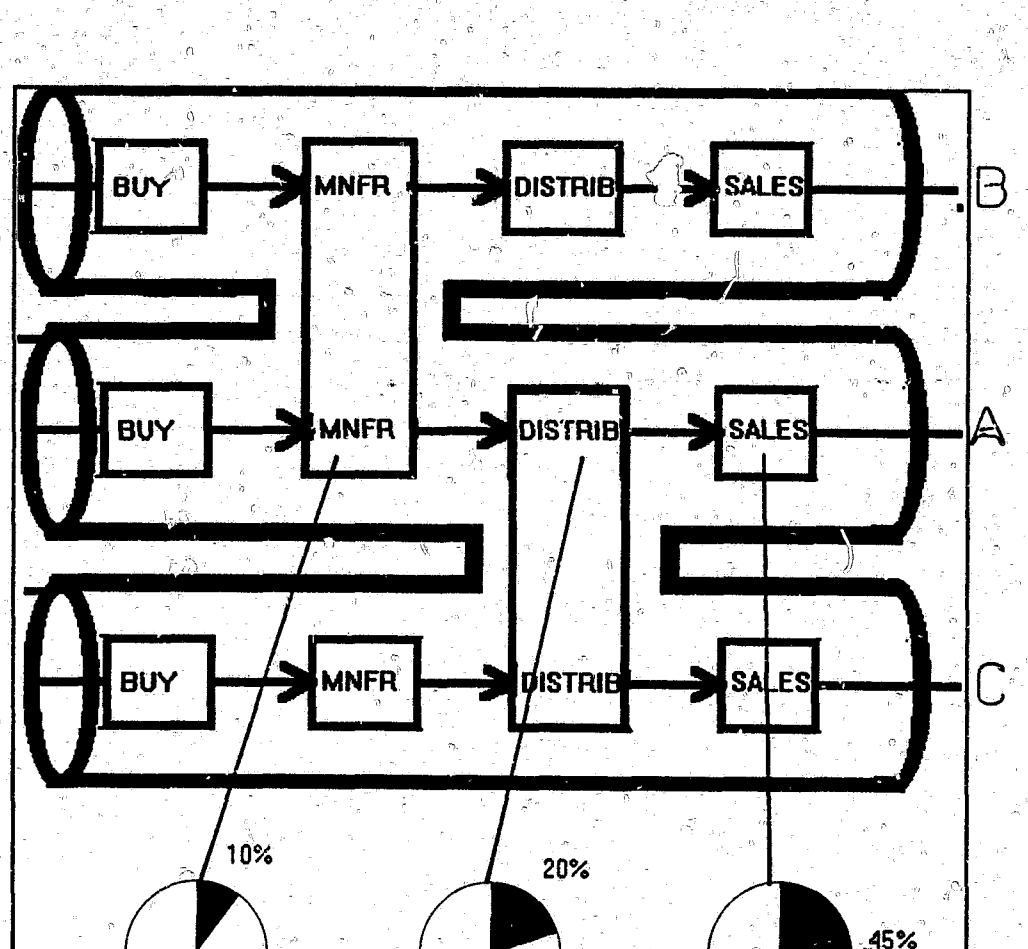


Fig 7.4 Relative size in an open industry

higher profitability i.e. a strong causal relationship between market share and profitability.

(ii) If, in a different industry, the KSFs were subject to advantages of scale to a significant degree but the KSFs were not specific to the industry then market share would not be an accurate measure of size at the critical points in the value chain. (This is shown graphically in fig 7.4)

Fig 7.4 shows a hypothetical example of a business in an industry which has two KSFs; one in manufacturing and the other in distribution. The KSFs are assumed to be not specific to the industry but are shared with (at least) one other industry. The pie charts show the relative size of the business at the critical positions in the value chain. These are hypothetically assumed values but depending on the size of other industries involved could be any value less than the original market share. If the KSFs are subject to advantages of scale to a significant extent it is by no means clear how this will effect the firms in industry A. For example firm A1 may only be active in industry A and may have the largest market share in market A with 45% (say) as shown in fig 7.4. However there may be another firm A2 which has only 25% of market A but also

has 25% of market B and C. Now by the same argument as was put forward in (i) above firm A2 could be expected to be significantly more profitable than A1.

In general it could be expected that market share would be a good measure of relative size close to the customer end of the value chain and get progressively worse nearer the supplier end. If this is the case one could still expect some correlation between market share and profitability but it clearly would not be as strong as (i) above because of the confounding effect of the other industries.

(iii) If the KSFs were not subject to advantages of scale it would not matter if they were specific or not specific, one would not expect there to be any significant correlation between market share and profitability.

7.5 DISCUSSION OF RESULTS FROM CHAPTER 6

In chapter 6 a single industry was researched (the paper merchants industry) and it was found that the key requirements from the market could be traced to one key success factor - stock holding. It was shown that the ability to hold stock cost effectively yet with a high service level is dependent on size i.e. subject to advantages of scale. It was also shown that the parameters affecting the stock holding ability were specific to the paper industry i.e. there was no way that a

merchant could increase his average demand by, for example, selling paper to another industry/market. The stock holding effectiveness depends on average demand and the variation in demand, both of which are specific to the paper industry. (It is interesting to note that in general a stock holding capability would depend on good inventory management skills which are universally available and not specific to a particular industry. However this was not the nature of the KSF discussed in chapter 6).

Therefore, in the particular industry under consideration, the major KSF was both specific to the industry and subject to advantages of scale. As stated in section 7.3 under these conditions the theory predicts that a strong causal relationship between market share and profitability will exist. This was, in fact, the case as shown in chapter 6.

7.6 CONCLUSION

The theory as stated in section 7.3 rests on the testing of the hypotheses. This is done in the next two chapters.

The question on industry specificity, raised in this chapter and defined in section 7.1, is of critical importance to the main theses of this research. The concept of (KSFs) not being specific to a particular industry cuts across the Industrial Organisation paradigm. It would possibly be argued (by IO practitioners) that if the industry is properly defined then all KSFs will be specific to the industry i.e. non-specificity is a result of a too narrow definition of the industry. This view is not shared by Prahalad and Hamel (1990) who point out

that the development of core competencies allows a corporation to compete in a number of different industries. For example, they show that 3 core competencies - precision mechanics, fine optics and micro-electronics - allows Cannon to compete in many industries ranging from cameras to printers to copiers to calculators. (Prahalad & Hamel, 1990, p90). This topic is discussed in more detail in chapter 10 but at this stage it is sufficient to note that the view is rejected that correct industry definition results in industry specificity for all KSFs.

In summary the theory may be represented graphically as shown in fig 7.5.

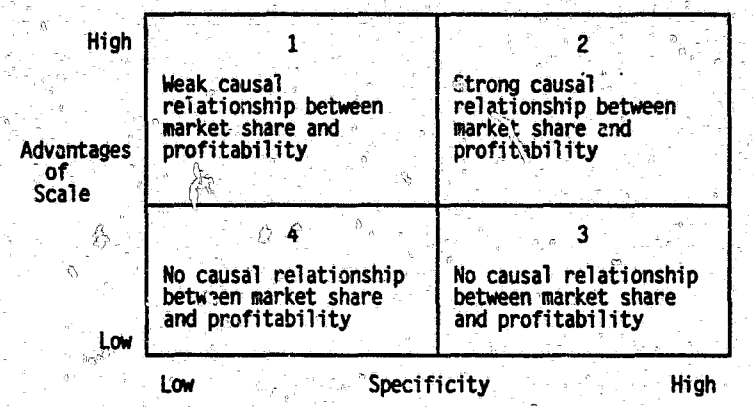


Fig 7.5 Summary of Theory

CHAPTER 8 RESEARCH METHODOLOGY

8.1 INTRODUCTION

Chapter 7 dealt with the formulation of a generalized theory and proposed certain hypothetical relationships between market share and profitability (depending on industry specificity and advantages of scale). The purpose of this phase of the research was to test the hypotheses. Chapter 8 deals with the design of the research methodology and chapter 9 with the application of the methodology and the results obtained.

The major challenges in designing the methodology were as follows:

(i) to overcome the confidentiality problem related to getting figures of market share and especially profitability.

(ii) To quantify the concepts such as specificity and advantages of scale and obtain an objective measurement system (for those concepts).

(iii) To have an appropriate level of detail so as to have enough data points to obtain statistical significance while at the same time have enough information to enable the hypotheses to be evaluated properly.

This chapter sets out the approach adopted starting with a discussion of the key variables and working through to the proposed analysis of results.

8.2 DISCUSSION OF KEY VARIABLES

Central to the theory developed in Chapter 7 are the concepts of advantages of scale and whether or not factors effecting performance are industry specific. The application of both these concepts require that a business be broken down and viewed from the stand point of the key success factors which affect performance. The various definitions of key success factors were reviewed in detail in section 7.2 and a specific definition chosen. However, for the purpose of applying the concept in a field study, the Hofer and Schendel definition has been used because it is clear, concise and essentially the same as the definition used in section 7.2. The definition is "those variables which management can influence through its decisions that can affect significantly the overall competitive positions of the various firms in an industry" (Hofer & Schendel, 1978, p77). In summary, the approach adopted was to identify the most significant KSFs and then to examine them to ascertain whether they were specific to the particular industry, and whether they were subject to advantages of scale.

In adopting this approach there is an inherent assumption that there are a relatively small

number of critical factors which dictate the performance of a business. A counter argument may be that there are many (or infinitely many) different factors which influence a business to a greater or lesser extent at any one point in time. If this is true, then focusing on a small number of the most significant factors would only result in taking into account a small percentage of the factors influencing performance. In the literature, although the concept of key success factors has been widely recognised (as discussed in section 7.2) the number of factors recommended varies considerably or is not specified at all. Robinson (1986, p177) points out that "most industries have only a few key success factors that have a substantial impact on competitive position and it is better to spend time getting a good weighting on a limited list of factors than to get a comprehensive list of 15 factors*".

The view taken in this research is that there are a few factors which are fundamental to success in an industry. These factors differ from industry to industry and are sometimes extremely subtle, but are normally well understood by managers in the industry. For this reason, the research questionnaire aims to identify (at most) the 3 most important success factors and to investigate these with regard to being specific to an industry or subject to advantages of scale. It is believed that adopting this approach will lead

* Referring to Abell & Hammond's (1979, p214) list of 15 factors.

to an objective view being taken of the business and will facilitate the quantification of the concepts concerned.

It has also been pointed out in the literature that each factor is likely to impact on profitability and competitive position to a different degree. Therefore a weighting of the factors is required in order to have an accurate reflection of the dynamics of the business. Again, the view is taken in this research that the management understands the business and can rate the critical factors with a suitable degree of accuracy.

Once the KSFs have been identified and weighted each KSF can be examined for its dependence on scale advantages and classified as to whether it is specific to the industry or not. For both these variables this would require a mixture of logical deduction as well as managerial judgement. For example if having a low cost production base was identified as being a KSF certain requirements would have to be met for advantages of scale to be significant. In this case, questions like stability of demand, number of product lines, smallest economic unit, effect of experience curve, effect of changes of process technology, etc., would have to be explored to ascertain to what extent scale produces an advantage. Once the mechanism is understood it would be possible to come to an understanding as to whether the factor is specific to the industry or not specific. As another example, if being able to produce

creative designs (advertising agency, fashion designer) was a KSF then different questions would have to be answered in order to ascertain how AOS and SPEC should be rated.

In all cases it is necessary to understand the causal mechanism which is at work which makes scale important. This, on a fine grained level, is the essence of what the research is endeavouring to explain. On a more macro level it is the causal effect of market share on profitability; on a micro level it is explaining how scale influences KSFs.

8.3 METHODOLOGY

In order to test the hypotheses developed in chapter 7 the following variables are required:

a) the significance of advantages of scale (AOS)

b) industry specificity (SPEC)

c) market share (MKTSH), and,

d) profitability (ROI)

The first two variables, AOS and SPEC, while difficult to quantify are not of a confidential or sensitive nature. However the second two variables, MKTSH and ROI, are extremely confidential and difficult to get accurate quantified information made available for research purposes. (This was one of the

major difficulties encountered when doing the field research for the initial study reported on in chapter 6). Overcoming this confidentiality problem was seen as a major challenge in designing the research methodology.

One possibility considered was to use companies listed on the stock exchange that were not diversified and operated in essentially one industry only. Being listed companies, information on ROI would be freely available. Information on market share would be more difficult to obtain but if enough of the companies in an industry were listed on the stock exchange, industry sales could be estimated by adding up the sales of participating companies. Unfortunately, after an initial study of the companies listed on the Johannesburg Stock Exchange, it became clear that this approach would not be practical as most of the industries in the South African economy are dominated by a few, very large conglomerate corporations. There are very few companies which are individually listed which could be regarded as a single SBU and almost no industries (with the possible exception of the mining industry that are made up of separately listed non-diversified companies.

Therefore, the decision was taken to use the remaining data in the original data base used for the statistical analysis (discussed in chapter 5). In the statistical analysis a data base consisting of 103 SBUs was split

into two groups (depending on environmental factors). The second group, consisting of 13 SBUs, was used in the initial study discussed in chapter 6. The first group, consisting of 90 SBUs, exhibited no discernable correlation between market share and profitability when subjected to the coarse-grained analytical methodology employed in chapter 5. It was decided to use these SBUs as the subject for the research.

The advantages of the above approach were that firstly, the confidential variables (MKTSH & ROI) were already known for these businesses and secondly, each data point represented a single SBU and not a diversified conglomerate. The disadvantages were that

(i) the original data was collected in 1983/84 and the follow-up research was due to be done after 1989. Therefore there was a risk that some SBUs would have changed completely or even have disappeared over the intervening time period. This was judged to be a minor disadvantage because even if some SBUs had to be disregarded completely the number of SBUs available (90) meant that there would still be a reasonable number left for testing hypotheses.

(ii) the original data had been split, using coarse-grained statistical analysis, into two groups. As stated above the group consisting of

90 SBUs had exhibited no discernable relationship between profitability and market share. This in itself was a disadvantage for using the data because, to test the hypotheses, data was needed from a range of industries - some where market share was important and others where market share was not important. The businesses in question were in an environment where market share was found not to be important by the coarse-grained analysis. Therefore there was the possibility that the range of results obtained using this data would not be sufficient to test the hypotheses. However it was thought that the statistical analysis had been too coarse to have picked up all the factors influencing profitability and market share and therefore the range of results obtained would be adequate for testing the hypotheses. It was therefore decided that the risk was worth taking and that the range of results obtained would be assessed during the analysis.

The validity of the methodology that involves taking data that was collected in 1982/84 and adding to it in 1988/89 is justified as follows:

The nature of the research done in 1988/89 was

to examine the structure of the industry with regard to advantage of scale and specificity and to apply that information to the market share/profitability information that had been collected in 1982/84. The base assumption was that these are structural variables which are unlikely to vary significantly over 5 to 7 years. It was accepted that some of the SBU's would have gone through major technical or other discontinuities and caused structural changes in the industry. This was accounted for by:

a) some of the SBUs did not exist in their original form and therefore could not be used, and

b) under the "probe" section of the questionnaire the question was asked whether there had been major structural changes over the past 5 years.

A study of the literature shows that major structural changes in industries can be expected to happen in "5 to 15 years" (Foster, 1986, p199). Ward and Stasch (1986, p43) reviewed 21 companies where major changes had taken place and reported that only one major change took place in each of the industries over the 20 years of their review. Shaw and Shaw (1984, p75) reviewed the Nylon industry in the USA and found that all firms that had dominant market position in 1980, already had major position in the market in 1953. Ghamawat (1984, p154) reviews the history of the titanium dioxide market in the USA and reports

that only two major technology changes took place over the period from 1918 to 1970. Finally, the stability of the market share vs profitability relationship over time can be assessed by comparing the early PIMS findings with PIMS findings from many years later. In 1975 Buzzell *et al* reported on the relationship between market share and profitability and this was repeated in 1987 by Buzzell and Gale. The table below gives an extract of approximate figures from the graphs presented in the papers.

Market Share	ROI 1	ROI 2
10	9	11
40	25	28

1. **Buzzell *et al* (1975, p98)**
2. **Buzzell & Gale (1987, p94)**

As can be seen from the above the relationship between market share and profitability did not change significantly (on average) over the 12 year period reviewed. (Although the profitabilities in 1987 are slightly higher than in 1975, the slope of the line has not changed significantly).

The above arguments lead to the conclusion that structural changes in industries typically take place over long periods (10 to 15 years) and that this should therefore not present a major problem in using the proposed research

methodology.

The approach adopted was to interview a senior operational manager (General Manager, Managing Director or Business Manager, depending on the structure) from each SBU, and ask a structured set of questions. The questionnaire was designed for face-to-face or telephonic interviews. Also, the questionnaire was designed to focus on only the relevant issues and to be as short as possible consistent with getting quality answers to the issues raised.

As can be seen (Appendix VII) the questionnaire follows the logic outlined in section 8.2 in that the KSFs are first identified and then weighted. Thereafter the relevance of advantages of scale is explored and whether or not the factor is specific to the industry is rated for each KSF. In both these latter steps there is a semi-structured section to the questionnaire which serves a dual purpose. Firstly, it adds more colour and a finer texture to the research and, secondly, it forces the respondent to think through the logic of the various questions before answering the important questions needed for the research. However, the questionnaire is designed so as to minimise the effect of interviewer bias by having the important questions structured with quantifiable responses.

8.4 ANALYTICAL STRATEGY

8.4.1 Requirements

The objective of the research methodology was to classify the SBUs in the data base into quadrants depending on whether they were subject to advantages of scale and whether the factors influencing the business were specific to the industry or not specific. Once classified the hypotheses regarding the correlation between market share and profitability could be tested directly. The requirement in designing the analytic method was to be able to test the hypotheses with a rigorous statistical significance test. To achieve this, a number of different analytical methods could be used.

8.4.2 Analytical Method

The questionnaire described in the previous section measures the following:

1. The three most important key success factors (KSFs) and their relative significance weighting.

2. A rating on the extent to which

each KSF is influenced by advantages of scale (using a scale ranging from 1 to 5).

3. Whether the KSF's are specific to the industry or not is obtained (also using a scale ranging from 1 to 5).

A number of analytical methods could be used to classify the data into quadrants. Perhaps the most appropriate is discriminant function analysis which is described in detail below. This method is used in the analysis (described in chapter 9) and for completeness other methods of analysis are also executed. The method of discriminant function analysis is as follows:

The analytical procedure proposed is as follows:

a) The weighted average for each SBU is calculated (using the relative significance ratings) for advantages of scale (AOS) and industry specific (SPEC) ratings. This therefore yields one weighted average value per SBU for AOS and SPEC.

b) All SBUs are then plotted as points on a two dimensional

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