AN OUTPUT-BASED VIEW OF BUSINESS PERFORMANCE

by

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The PhD process is much like a difficult voyage of discovery into unknown lands, made possible only through the generous help, advice and encouragement of others.

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One of the delights of this voyage is that I met my wife. She has been a constant source of encouragement. I pray that I can be a true fellow traveler on your voyage of discovery!
The problem investigated by this research is why certain firms outperform others. This problem has real effects on cost of capital, personal rewards and organisational climate. A number of approaches have been adopted in explaining the differences in firm performance. These include a range of contingency factors such as organisational type, ownership structure, competency, environmental type and congruency. The resource-based view is a major explanatory theme. The weaknesses of these theoretical approaches are described. The criticisms focus on the use of a wide variety of variables that are not grouped in ways that provide cohesive tools for managers. The resource-based view of the firm can result in managers making investments in resources without sufficient consideration of their revenue earning potential.

In proposing a more cohesive model of business performance the research examines the strength of the relationship between firm outputs and efficiency factors with various measures of business performance. The study also examines the relationships between the effectiveness of functions and how the firm performs on output and efficiency factors. In this way the study attempts to build an explanatory framework of business performance based on market related firm outputs, productivity factors and resource effectiveness.

The research approach is positivist, using a cross sectional survey design. As a result no claims on prediction or causality can be made. The industries studied are the UK electronic components manufacturing, automotive components manufacturing, the financial services and logistic services industries. Hence two manufacturing and two services industries were available for within and between industry comparisons. The data was randomly split into analysis and validation groups. The analysis sample data was found to fit the regression models and the validation sample confirmed the fit of the analysis sample.

The findings suggest that managers could potentially benefit from a cohesive understanding of the relationships between resources and cost and market advantages and business performance. These insights may be useful in formulating investment policies.
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1.0 Introduction to the research

In a liberal competitive economy comprised of a number of industries and industry clusters (Harrigan, 1985) understanding why companies either succeed or fail is important to managers for a number of reasons. For example the cost of capital of a quoted firm is linked to its market share price (Copeland, Koller and Murrin, 1994). Companies who have lower relative returns are likely to pay more for their funds. Having high costs of capital could place lower limits on total investment through higher hurdle rates. As a result managers in these firms may have to forego business opportunities. Another example of why the differences in firm performance are a real problem for managers is that lower performing firms could be the subjects of hostile takeovers (Prentice-and Holland, 1993). This threat could affect job security and personal rewards. The ability of a firm to compete successfully in its industry can result in higher rewards for shareholders and employees (Hunt and Morgan, 1995). For these reasons the search for knowledge on which factors contribute to competitive performance makes the study of differences in business performance an enduring topic in management literature. Take for example the Strategic Management Journal where eleven out fifty-four papers published from January 2000 to August 2000 were direct investigations of variances in business performance. These papers covered themes such as the business environment (Simerly and Li, 2000, Chang and Singh, 2000), portfolio management (Palich, Cardinal and Miller, 2000), ownership structure, (Thomsen and Pedersen, 2000), leadership, (Davis, Schoorman, Mayer and Tan, 2000, Pegels, Song and Yang, 2000), free cash flows, (Brush, Bromiley and Hendrickx, 2000), strategy types, (Slater and Olsen, 2000), strategic alliances, (Merchant and Schendel, 2000, Baum, Calabrese and Silverman, 2000, Stuart, 2000). The evidence suggests that the study of differences in business performance is important to managers.

1.1 Themes from the literature

A number of themes in the field of strategic management have been developed to answer the question of why certain firms outperform others in the same industry. Analyses of these differences in business performance are couched in terms of the contingency and resource approaches. In turn each of these approaches draws on a number of contributory explanatory themes. Within the contingency approach this project is related to sub-themes such as positioning based theory and internal configuration theories. Positioning theory examines how firms focus their outputs on certain market related factors. These factors may derive from a segmentation of the market on criterion, which could be recognisable to marketeers and economists, namely customer preferences (Hunt and Morgan, 1995). These preferences can vary considerably in type, strength and durability and are the basis for developing a unique strategic position. Internal configuration theories, on the other hand, suggest that differences in firm performance can be explained by differences in factors such as organisation structure or resource base. This investigation attempts to develop a model, which combines the two approaches.

The positioning based approach is used as the starting point to argue that the internal configurations of the firm need to be focused on customer preferences. Consequently the
proposition derived from the literature suggests that firms, which achieve a closer alignment between customers' preferences and the firm's output, are going to be more successful. It is further suggested that since importance of firm outputs to business performance is not equal, some of the differences in business performance (market share, ROI, ROS) between firms can be explained by differences in firm performance on output values (value is defined here in terms of value to customers). Superior revenue performance may therefore be conceived of as a function of the right customer values being produced more efficiently and effectively than low revenue performing firms.

Differences in firm performance may be a function of the efficiency with which inputs are utilised. This relates to cost performance. Profits – a primary measure of firm performance – are a function of both revenues and costs. The market-based approach deals with the former and the efficiency based view with the latter. Consequently the proposition derived from the literature incorporates both in explaining differences in firm performance. This investigation measures firm performance on both the revenue based market factors and the cost based efficiency factors. In essence it suggests that a firm's competitive advantage (its ability to generate sustainable above average industry returns) is predicated upon by two underlying performances – one is superior market performance and the other is superior cost performance. This is hardly surprising. However, simultaneously investigating which underlying cost and market factors play the most important part in this superior performance and which resources are important to this performance is new. Porter's (1985) generic strategy theory would suggest that there could be a bias in favour of either the market-based approach or the efficiency based view in explaining higher business performance by certain firms in an industry.

The proposition argues that superior cost and market performances arise from their effective relationships with functions. Consequently it is possible that certain functions are more important to the effective creation of superior market and cost performances than others. This introduces the resource-based view of the firm. The proposition suggests that functional areas are collections of related tangible and intangible resources out of which arise superior cost and market performances. Additionally it is suggesting that not all functional areas and by implication the underlying resources, have the same impact on superior market and cost performance.

"...Certain functional areas, or combinations of these areas, must be emphasised appropriately in order for a company to implement strategy successfully and by so doing, achieve its objectives." (Hitt et al, 1982, p316)

The question therefore arises as to what are the relationships between various types of resources and superior market and cost advantages and do they vary by industry?

This suggests that by focussing on a limited number of resources on the right market and on the right cost priorities a firm will, over time, gain competitive advantage. In addition these relationships are industry specific. A cross sectional investigation of these relationships is made here on the basis that these relationships, within industries, could be non-random and durable (Porter, 1996).
1.2 Why this research is important

A benefit of single-issue studies is that insights and theory can be developed on particular aspects of strategic management. This approach can expose itself to the risk that large bodies of theory can appear to be unconnected. For example, the area of resource-based strategy can appear disconnected from contingency approaches. This investigation aims to link a number of well-established approaches by showing how relationships between functional areas, cost efficiency and market performance change as industry settings change. Some studies in the contingency approach cover these issues, and the resource-based approach is developing a body of empirical evidence in support of its theory (Wernerfelt, 1986). This investigation attempts to build a model, which integrates the contingency and resource-based views in explaining differences in firm performance. If it can explain a substantial proportion of the difference between high and low performing firms, then future research may use it in describing how this performance is achieved.

The investigation contributes by exploring four UK industries, which have not been extensively used in directly testing strategic management theory.

1.3 Why this research is methodologically important

The investigation is primarily confirmatory in nature as it builds on a base (mainly US) of existing theory and empirical evidence. The methodology attempts to make the findings more generalisable by testing the theory across a number of industries.

A contribution comes from the development of methodology by combining a range of procedures to crosscheck the data. These include methods internal to the survey instrument and the use of external independent sources to confirm the reliability of respondents' replies. Additionally, collecting data across industries poses some particular methodological problems and these are discussed.

1.4 Thesis Outline

Chapter two is a review of the literature. It discusses what other authors have had to say about the problem of differences in firm performance. Two explanatory frameworks are the contingency approach and resource-based views. These two streams of theory and empirical evidence are critically reviewed. The emphasis in this study is on a contingency well known in the marketing and economics literature but somewhat neglected in the strategy literature, namely customer preferences. The presupposition behind the output-based view of the firm is that customers' varied preferences are the final contingent variable driving the output, efficiency and resource priorities of the firm in a liberal economy.

Chapter three details the development of two complementary models, which combine business performance, market and efficiency factors to resources. This leads to the principle hypothesis that business performance varies as a function of efficiency, market and resource effectiveness and that this combination varies by industry.
Chapter four introduces the methodology. The cross sectional approach used is compared and contrasted with other approaches. The data are drawn from the electronic components manufacturing industry, the automotive components manufacturing industry, the financial services industry and the logistic services industry – two manufacturing and two service industries. The chapter describes the development of the survey instrument both from the literature and through a number of pilot tests and pre-survey interviews with industry executives. Sample selection is discussed. An important part of the methodology is investigating the reliability and validity of the instrument. The analytical process starts with descriptive statistical analysis to establish the characteristics of the data. Multiple regressions are used to examine how well the theoretical model fits the data and explain the variability of certain dependent variables in the model. Holdout samples are used to validate the regressions. Discriminant analyses are used for inter-industry comparisons. These statistical tests are discussed in terms of the aims of the study. Finally the case for the use of post survey validation interviews is made.

Chapter five presents the data description. It begins with the sampling results and goes on to discuss the issues of normality, bias, reliability and validity. Reliability was measured by comparing data from internal and external sources. Paired t-tests were used to compare the differences in mean scores from two separate sources on the same dimension. For example, testing the responses of suppliers with the responses of customers.

Chapter six is the hypothesis-testing chapter using discriminant analysis and multiple regressions.

The seventh chapter reports the results of the confirmatory focus group used to evaluate the findings from an executive perspective.

The eighth and final chapter is a discussion of the findings of the study. It was found that the model had good fit properties with the data and explained a high proportion of business performance. In addition it was found that the relationships as theorised did vary by industry setting. These findings were compared to prior studies. For example, where possible, the adjusted $R^2$ values from prior studies that were attempting to explain business performance variability were compared. The implications for business and suggestions for future research are discussed. The business implications related to using certain output and efficiency factors as central to the development of underlying firm resources at a SBU level. The findings imply that managers need to recognise differences in these relationships between industries. For example at a corporate level in mergers and acquisitions. Future research is discussed in terms of understanding how and why certain resources impact the performance of firms more than others.

Figure 1 summarises the logic of this investigation.
FIGURE 1: TO SHOW THE LOGICAL FLOW OF THIS STUDY

JUSTIFICATION OF THE RESEARCH OBJECTIVE
Why differences in firm performance is a real problem for managers

PRIMARY RESEARCH OBJECTIVE:
To develop and test an explanatory model of business performance

ROOTS IN THE LITERATURE
- Contingency theory
- Resource-based theory
The weaknesses in existing explanations of differences in business performance. Impact of weaknesses on managers

DEVELOPMENT OF A MODEL
- The output based view of the firm
- Hypotheses
How the model improves the explanation of business performance

HYPOTHESIS TESTING
- Instruments
- Data collection
- Data analysis
- Model fit
Justification of methodology

DATA COLLECTION
- Survey based
- 4 industries
- Pre-survey
- Pilot test
- Main survey
Limitations of the data

CONCLUSIONS/FUTURE RESEARCH

DISCUSSION IN TERMS OF THE LITERATURE

DISCUSSION IN TERMS OF THE MODEL

VALIDATION
- Triangulation
- Post survey validation interviews

DATA ANALYSIS
- Descriptive statistics
- Discriminant analysis
- Regressions

HYPOTHESIS
1) The relationships between, output values, efficiency, price, resources and business performance, vary positively.
2) These relationships will vary by industry setting.
CHAPTER 2 – LITERATURE REVIEW

2.0 Introduction

A recurring area for investigation is the explanation of why some firms succeed and others fail. Failure may be defined as an economic performance, which is below the industry average and success as a sustained economic performance above industry average (Mason, 1939, Bain, 1959, Scherer, 1970, Porter, 1985). This definition of firm success or failure is widely used in the literature. Knowing why certain firms outperform others has real implications for managers of firms in competitive industries. For example lower performing firms may find it costly to raise capital (Copeland, Koller and Murrin, 1994) and may be subject to acquisition (Prentice and Holland, 1993). Performance below industry average could bring criticism from shareholders with increased risks to personal job security. These are some of the direct economic reasons why understanding how certain companies outperform others appears to be of enduring importance to managers. Poor competitive performance reflects management’s relative inability to generate levels of economic returns from the asset base for which they are responsible. This poor performance could be a result of excess levels of assets (for example inventories, plant and equipment), excessive operating costs, and lower unit selling prices or a combination of these factors.

In addition poor relative economic performance may have negative effects on the internal functioning of the firm. For example poor economic performance may result in difficulties in recruiting the right level of employees. It may cause poor morale with attendant motivational problems. These factors may combine to result in high employee turnover with knock on effects on direct and indirect costs. These factors could also explain differences in performance and poor economic performance in turn could cause these internal problems.

2.1 Prior explanations of differences in firm performance

A number of themes endeavour to explain why some firms succeed and others fail. These themes fall into two categories. They are not necessarily treated as mutually exclusive by their authors and so there is overlap in the way they are used. Some authors do not explicitly claim to be developing theory in one domain or the other, but it is clear from their approach that their presuppositions arise from one or the other.

The first may be described as the contingency approach (Lenz, 1981, Hambrick and Lei, 1985, Venkatraman and Prescott, 1990). Within the contingency approach lie a number of sub-themes, such as the congruency (Venkatraman, 1993, Fiegenbaum et al, 1996), and competency approaches (Hitt and Ireland, 1986, McGrath et al, 1995), as well as the environmental (Ansoff, 1987, Miller, 1987, Dess et al, 1990, Rumelt, 1991, Kim and Campbell, 1995, Kotha and Nair, 1995) approach. The second may be described as the resource approach (Wernefelt, 1984, Barney, 1991).

The following nomenological tree provides an overview of the development of the contingency and resource-based theories.
FIGURE 2: THE DEVELOPMENT OF CONTINGENCY AND RESOURCE THEORY

INDUSTRIAL ECONOMICS
- Mason, E (1939)
- Bain, J (1959)
- Scherer, F (1970)

ORGANISATIONAL STRUCTURE AS A CONTINGENCY
- Chandler, A (1962)
- Hofer, C (1975)
- Miles, R., Snow, C (1978)

CONGRUENCY AS A CONTINGENCY
- Porter, M., (1982)
- Miller, D., (1986)

COMPETENCY AS A CONTINGENCY
- Selznick, P., (1952)
- Hitt, M., Ireland, R., (1985)

THE ENVIRONMENT AS A CONTINGENCY
- Lawrence, P., Lorsch, J., (1967)
- Prescott, J., (1986)

THE RESOURCE BASED VIEW OF THE FIRM
- Barney, J., (1986)
- Peteraf, M., (1993)
The study of differences in firm performance draws on a wide range of disciplines, but possibly none is more important than that of industrial economics. The works of Mason (1939), Bain (1959) and Scherer (1970), provide the basis of some of the work of later strategists. The underpinnings of both the contingency and resource views of the sources of economic rent were already contained within these earlier works. These earlier works recognised the importance of the relationships between contingencies and resources as possible explanations of differences in firm performance. As previously noted,

"A paramount task of industrial organisation theory is to identify links running from market structure to such aspects of conduct as pricing behaviour, decisions concerning product variety and quality, and innovation; and from there to economic performance". (Scherer, 1970, p131)

In similar vein, Urwick and Brech (1957) linked the importance of customer preferences on the structure, activities and competencies of the firm.

"This change of customers was of great significance...this meant that in the main they wished to purchase ready built steam engines outright rather than pay royalties for a design and meet their own costs of erection. In consequence there had to be a change not only in the form of the business and in its policy, but also in its manufacturing activities" (pp26-27)

Prior to this Weber (1927) discussed the relationship of various labour structures to market types as explanations of business performance.

Other writers included Woodward (1970), who in seeking for explanatory frameworks for differences in firm performance stated,

"A manager ought to be able to compare his own firm with the firms described and understand how and why it is different" (p235)

These explanatory frameworks of business performance were comprised of variables that reflected different environments and organisational structures.

Organisational structure, as a contingency variable to explain differences in firm performance, was derived from industrial economics (Mason, 1939, Bain, 1959, Scherer, 1970) and other writers (Weber, 1927, Urwick and Brech, 1957, Woodward, 1970) and brought to the fore in the field of strategy by Chandler, (1962), Hofer, (1975) and Miles and Snow, (1978). This research emphasis spawned the recent focus on congruency, competence and the environment as contingencies that explain differences in business performance.

The development of the resource based view of the firm as introduced in the field of strategy and elaborated on by Wernerfelt (1984), Barney (1986) and Peteraf (1993) has emphasised the industrial economic background of strategy research. It is related to the contingency approach by using underlying customer preferences as a contingency in determining which tangible and intangible product and service features produced by the firm have value and effect business performance. This approach has microeconomic roots and has been called the "market system" in the literature (Scherer, 1970). The market facing approach is the basis by which the underlying resources are prioritised (Hunt and Morgan, 1995). The literature review therefore
embraces both contingency and resource theory into an exploratory model that investigates patterns of relationships between resource effectiveness, cost/market advantages and differences in firm performance.

2.2 Contingency theories as an explanation of differences in business performance

This section will examine contingency theories as an explanation of why differences in business performance occur and where these explanations are limited and how these limitations can adversely affect managers’ ability to perform competitively.

Hambrick and Lei (1985), define contingency as follows,

"Contingency theories state that the appropriateness of different strategies depends on the competitive settings of businesses. Such theories differ from the universal view by stressing that “it all depends”. They differ from the situation specific view by arguing that there are classes of settings for which strategic generalisations can be made" (p765)

To build contingency theory under this definition requires that the researcher develop variables, which demarcate the classes from which strategic generalisations can be made. It is the range of variables used in developing the theoretical classes, which has given rise to the large number of “sub-categories” of contingency theory. Hambrick and Lei (1985) identify three views of business strategy: “the extreme view, the universal view and the contingency view”. The extreme view holds that each firm is situation specific and that the contingencies, which the firm faces, are not generalisable. Researchers who hold this view tend to use qualitative research in the form of case studies on the basis that the unit of analysis must be the single firm. At the other end of the spectrum is the universal view which holds that a number of,

"Universal laws of strategy exist and hold to some extent in all settings. For example, the Boston Consulting Group popularised the “law” of cumulative experience...the Profit Impact of Market Strategies (PIMS) program popularised the “law of market share” (Hambrick and Lei, 1985, p764)

On the other hand, the issue with the contingency view is in justifying the variables to be used in explaining differences in firm performance. There have been a number of different variables selected but as Hambrick and Lei noted in relation to Porter’s model,

"Porter (1980) similarly identified what he took to be three crucial contingency variables: degree of industry concentration, stage of product life cycle, and exposure to international competition. He described how these factors can affect the appropriateness of different strategies, but made no compelling argument as to why these factors deserve more attention than others” (Hambrick and Lei, 1985, p765)

Hambrick and Lei (1985) then suggest how to identify if a contingency variable is significant,

"A contingency variable is significant to the degree that businesses that differ on that variable also exhibit major differences in how strategic attributes or actions are associated with performance" (p765).
They describe the underlying logic as follows,

"Major differences in the associations between strategic attributes and performance in differing circumstances indicate the presence of a significant contingency variable" (p 766).

Hambrick and Lei (1985) have argued for the need to prioritise contingency variables relative to business performance as a basis for justifying their significance. They criticise prior studies for this lack of justification. In their study they used data from the PIMS database in a preliminary attempt to prioritise contingency variables for the field of business strategy. They used Chow tests to examine the relative significance of ten widely cited contingency variables. Industrial type (customer or industrial) was found to be significant in discriminating between business performances. Their study was limited in finding a comprehensive set of significant contingency variables as a result of the constraints placed upon it by the PIMS database. The study excluded what the authors called "positioning" variables such as market share, vertical integration and product quality. The Hambrick and Lei (1985) study has given the literature a definition of the contingency view of strategy and has provided an initial basis for prioritising contingency variables in relation to business performance. What is missing from the Hambrick and Lei study is the ability to group contingencies into categories which have a high impact on business performance. For example revenue related variables, cost related variables and resource related variables. Managers may find the knowledge of these discriminating variables of limited value because how they interact on the components of business performance (cost and market advantage and resources) is not known. As a result the investment, productivity and marketing priorities are less well understood.

The following is a discussion of the sub themes of the contingency theory highlighting the theoretical limitations of each in explaining differences in business performance.

2.2.1 Congruency theory as an explanation of differences in business performance

The concept of strategic fit (interchangeable with strategic congruency) suggests that the greater the degree of alignment between certain internal characteristics of the firm with certain characteristics of the external environment, the more successful could be the firm’s business performance.

Strategic fit claims that business performance is related to the degree of alignment of certain factors (Coven 1991, Hoffman, Cullen, Carter and Hofacker 1992, Randolph, Sapienza and Watson 1991). These factors have included technology, organisational structure, the environment, and industry and strategy type. These factors have been arranged to form a variety of models. Hatton and Raymond (1994) extend this list to include individual and task variables in testing a concentric congruency model. Their study concludes, in agreement with others (Drazen and Van de Ven, 1985, Johns 1981, Venkatraman 1989), that fit is important to performance.

Venkatraman and Prescott (1990) viewed congruency as.
"...The proposition is that the "fit" between strategy and its context – whether it is the external environment...or organisational characteristics, such as structure... administrative systems... and managerial characteristics... has significant positive implications for performance" (p 1)

In their study they limit the development of variables to that between specific strategic resources and "the specific requirements of its environmental context". The better the fit the better the business performance. In this conceptualisation of fit Venkatraman and Prescott recognise an “external” and “internal” dimension to the concept of congruency. These broad dimensions form the dividing line in the type of variables to be used. In their study they use 17 environmental variables and 17 resource deployment variables. They test their proposition in eight distinct environments, in two time periods using two samples drawn from the PIMS database. They concluded that,

"The results of the tests carried out here strongly support the thesis that the attainment of the appropriate match between environment and strategy has systematic implications for performance" (p 18).

The Venkatraman and Prescott (1990) study has confirmed the theoretical possibility of using an internal and external approach to explaining differences in performance. They recognised that,

"A major limitation in operationalisation of strategy as a vector of scores is the assumption of equal importance, which is difficult to justify. Given that strategy involves a deployment of resources that is consistent with the strategic choice of management, it is unlikely that all the variables could be equally important" (p 7).

If the importance of variables is unequal, which are the most important and what is the pattern of relationships between them? Without this knowledge management could be less able to make resource allocation decisions. Pugh and Hickson (1976) recognised the complexity of measuring the environment and in its contexts, understanding significant influences and finding discriminating variables that were valid across all firm types.

A further question is whether the variables used in the Venkatraman and Prescott (1990) study can be improved upon. Venkatraman and Prescott used PIMS database variables for defining environmental types and strategy types. Operationalising the external variables in relation to the market place rather than limits placed by the PIMS environmental types could possibly result in a theory transportable across management disciplines e.g. marketing and manufacturing and not be industry specific. The difficulty for managers in the Venkatraman and Prescott (1990) study is that the variables are not operationalised to a level that can result in specific managerial action. For example market variables relate to market share performance rather than items that are sold on the market.

Using market related variables is looked at in the positioning approach to congruency. For example, Ramaswami et al (1993) carried out an empirical study on 148 firms in the US banking industry. Using a congruency/ structure/performance model, they attempted to relate the degree of congruency between product market strategies to structure and to performance. The hypotheses, in the Ramaswami et al (1993) study, were based on the Miles and Snow (1978) prior model of strategy and structure fit and Chandler's (1962) earlier study of organisational fit. The study provided support for Channon’s (1973) observation that structure
follows strategy. The marketing orientation was operationalised through a number of high-level variables. E.g. breadth of target market and resources for environmental monitoring were included with stability of product offering and innovation strategy. From a managers perspective it is difficult to understand what particular products create the highest levels of business performance or what response is considered important in speed of response. In addition the Ramaswami et al (1993) model does not identify how their variables impact on the components of business performance e.g. efficiency, selling price, and resource effectiveness. The strategy-structure fit results of the Ramaswami et al (1993) study give rise to mixed support for their model. The study follows the tradition, now well established, of using structure as a determinant of performance. It is possible that the effect that structure has on performance is contingent on environment dynamics. Which function in the value chain has the greatest impact on output could depend on the particular characteristics of the environment. The structure of this prime function could conceivably have an impact on performance. If this is true then the approach of Ramaswami et al (1993) and its prior tradition is likely to miss the appropriate contingent variables.

Where is the debate on strategic coalignment currently in literature? Miller and Friesen (1978, pp921-933) have previously described strategic “fit” as a “simultaneous relationship” between variables. Van de Ven and Drazen (1985, pp333-365) describe strategic linkage as “sets of contingencies”. The direction of the debate has changed. Veliyath and Srinivasan (1995) give a good example of this where they discuss a “gestalt approach to assessing strategic coalignment”. In their discussion they develop a dichotomy between the traditional and largely exogenous approach to strategic coalignment (Meyer et. al., 1993; Miller 1981,1990) and the endogenous approach (Hambrick, 1984; Van de Ven and Drazen, 1985) to strategic coalignment. They conclude that,

“As the relative degree of either voluntarism or determinism of each of the three elements constituting the configuration of strategic fit, (External Environment, Organisational Effectiveness and Internal Organisational Arrangements) is subject to interpretation, it behoves firms to target particular effectiveness profiles that may be more realistic and appropriate given the configuration or unique gestalts obtaining to them” (p205).

This conclusion recognises the concept of prior strategic commitment as a possible constraint on future choice as suggested by Ghemawat (1991). To define organisational effectiveness as a construct derived from these constraints possibly carries the risk of the firm comparing itself with itself rather than against its competitive environment.

What are the underlying theoretical weaknesses of a substantially inward looking approach? Could it be that to describe an organisation’s effectiveness in terms of its own internal configuration leads to limited conclusions about the sources of organisational effectiveness? Would it not be appropriate to describe organisational effectiveness against criteria derived from external sources, such as customer expectations, external shareholder expectations or industry best practice (Hunt and Morgan, 1995)? What are the ramifications for research if a substantially inward looking approach is taken? What are the ramifications for practising managers? Does a combined endogenous (having no obvious external cause) and exogenous (having an external origin) approach to strategic fit provide the way forward? How levels of fit are achieved is a further question. Knowing what a good fit is, is the preliminary question. The
importance of the current debate is that it is focussing attention on the issues of the measurement of fit.

The language of strategic fit or coalignment seems to presuppose an “ideal”. If there was no “ideal” then there could be no distinction between fit and non-fit. The concept of strategic coalignment as a result could be meaningless. The question of what could comprise the “ideal” profile is therefore the prime question. There appear to be developing two lines of thought in terms of how to measure this “ideal”.

The first is that the ideal profile be constructed from exogenous independent proxies. These proxies define the three basic concepts of strategic fit, namely the business environment, internal functional arrangements and business performance. The original approach views the three concepts as related to each other in such a way that the business environment and internal functional arrangements are independent variables with business performance being a dependent outcome. Certain internal arrangements are considered to constitute an improved fit with a given business environment, measured by its superior business performance outcome.

Veliyath and Srinivasan’s (1995) observation that managers may be constrained in numerous ways in their ability to configure their internal organisational arrangements, does not invalidate the measurement of the realised fit to the business environment and performance outcome. Managers may have a number of justifiable reasons why a productive fit to the environment has not taken place and these make interesting research questions themselves, but a productive fit may well have existed, as demonstrated by other firms achieving a higher business performance. A model that explains business performance based on strategic fit (coalignment) could examine the alignment of both internal and external variables, with external (e.g. output values) providing the alignment priorities.

What is possibly as equally important as the degree of freedom that managers may have in determining their internal arrangements, are the research findings (Rumelt, 1991; Schmalensee, 1989), that industry structure (environment) explains less of the variance in business performance than does differences in internal arrangements. This gives rise to the possibility that functional distinctive competency and their internal alignment are more important to the debate on strategic fit than the firm’s external alignment with the business environment. This is a change in emphasis in research measurement not a reason for the abandonment of an exogenous approach to strategic coalignment.

Venkatraman, Henderson and Oldach (1993) discuss the weaknesses of an internally orientated view of functional competence in a discussion of information technology strategy. This they claim is “restrictive, myopic, and potentially dysfunctional” (p141). They contend that an IT strategy must be placed within an external orientation, before consideration is given to the internal orientation.

The need to view alignment as a continuous process, “a journey rather than a destination” (p147) is contained in the Venkatraman, Henderson and Oldach (1993) model of “Continuous Strategic Alignment”. While they applied this to I.T. it is clear from their approach that they are suggesting principles that could be applied to other value chain activities. The presupposition behind this model is that strategic fit can be achieved in a top down process of planning (Chandler, 1962) i.e. external environment to internal environment, rather than a bottom up
process (Mintzberg and Waters, 1985). The question of which process delivers superior results in differing environments is an important question (Buckley, et al 1988). It could be argued that knowing the relative importance of outputs and the functions, which create those outputs, comes before analysis of process, structure and resources, tasks, etc. Knowing what to produce comes before knowing how to produce it.

Venkatraman et al (1994), implicitly suggest that continuous strategic alignment is facilitated by a management approach, which treats the strategic process as a journey. To evaluate the continuous nature of the Venkatraman, et al (1994) model could require a longitudinal study. This is an important consideration as strategic alignment in the longer term is possibly going to be the outcome of management’s ability to correctly and continuously assess and implement the necessary strategic change to maintain alignment - a component in sustainable competitive advantage. What management attributes give rise to this ability, is another research question.

2.2.1.1 Weaknesses in the congruency approach and implications for managers

In conclusion the literature on the congruency approach has moved from the structure/strategy approach (Miles and Snow, 1978; Donaldson, 1987; Miller, 1987; Zahra and Pearce, 1990; Parthasarthy and Sethi, 1993; Powell, 1992), to the point where a number of studies include the following features:

- An explicit demarcation between internal and external variables
- An inclusion of functions and capabilities among the internal variables
- The acknowledgement that there exists strategic priorities among the variables

The limitations of these approaches are:

- The continued use of financial performance variables as strategic outputs in the first instance. It may be useful to use variables that are market-orientated to measure external strategic capabilities (Schroeder et al, 1995). Firms are likely to compete for customers on these variables, rather than financial performance variables. These financial variables are important in measuring the overall economic success of the firm but are not dimensions on which companies compete directly. Research that operationalises market advantage variables as strategic outputs is possibly going to be useful to managers as a basis of future action.

- The internal variables have not yet been constructed into a “cause and effect” model. For example functions and process outcomes are treated in a simultaneous way. It is probable that there could be some sequencing of the internal variables. For example outputs of the value chain (Porter, 1985) are preceded by functions and within functions, resources precede processes. Within this largely sequential structure, some value chain outputs could be more important than others to the firm’s economic performance, some functions will have a greater impact on the important outputs than others, some processes could be more important to functions, and some resources could be more important to those processes. In other words the relative importance of the variables in this sequence is not equal (McGrath, Venkatraman, MacMillan, 1995). The prioritised sequencing of these variables is implied but not tested, in the Fiegenbaum, Hart and Schendel, (1996) strategic reference point theory. Theory that recognises the
diversity of the internal and external relationships in the process of creating value and competing in an industry is possibly going to provide improved insights and explanatory power of the differences in firm economic performance (Hunt and Morgan, 1995).

The weaknesses of the congruency models may result in management not knowing how to configure internal resources to create specific cost and market advantages. In recognising the limitations of prior studies the development of a new model could take a narrower view and develop a series of value chain output variables. This model could treat these internally generated output variables as independent and test for a correlation with the related dependent financial performance variables. This approach is not common within the congruency literature in that it uses contingency variables, which are customer orientated, rather than contingency variables that are internal firm characteristics. The advantage of this approach is that it can justify the inclusion of variables with reference to independent customer preferences. This may give rise to improved objectivity in their selection. The disadvantage of using market related variables is that it assumes a high degree of customer choice in the market.

Knowing which internal characteristics create the highest level of customer value in a given environment is important. The reason for measuring the value of outputs of the internal variables as mentioned in the literature (such as structure, tasks, technology etc.) is to confirm their relationship to financial performance before examining the issue of fit with the external environmental variables. It has been argued (Mealiea and Lee, 1979) that a model that does not connect the internal and external variables is incomplete and hinders a systems perspective of congruency.

The development of the structure to strategy to environment fit literature started with Chandler (1962), Lawrence and Lorsch (1967) with recent studies undertaken by Ghoshal and Nohria (1993) and Kim and Campbell, (1995). These studies confirm the contingency view that the environment has an important determining influence. Kim and Campbell’s longitudinal study showed that similar change to strategy and structure does not necessarily lead to similar performance. The difference they suggest is attributable to differences in the strategic control processes.

Whilst the Kim and Campbell, (1995) study raises some doubt on the importance of structure to business performance they suggest other internal variables (strategic control processes) as possibly better in explaining differences in performance. The literature seems to suggest that it could be the degree of competitive achievement on the output variables, which is measured. Understanding the relative importance of these variables, their relationship to specific value chain functions is seen as a fresh approach to classifying and positioning companies strategically within their industries. The literature suggests that future studies take a backward step from prior studies of fit in attempting to measure which functional competencies are important to financial performance. Once the market performance dimensions have been identified, it may be possible to reveal what structures, strategic processes, and resources have created those distinctive competencies, which have given, rise to superior functional and business performance. Consequently contingency theory suggests that future strategy studies analyse and categorise outputs first, in the belief that it will give improved focus to any later
analysis of inputs. This form of analysis could have improved practical use for managers, as it is closer to the factors that directly influence costs, revenues and investment.

2.2.2 Functional importance as an explanation of differences in business performance

Functions can be viewed as groupings of assets, personnel and processes that generate particular kinds of outputs. They can have specific organisational structures and management responsibility. Take for example operations, finance, marketing, R&D, and purchasing functions (Porter, 1985, Vickery, Droge and Markland, 1993). Functions contribute to a firm’s economic performance in three ways. They contribute through levels of cost efficiency, creation of output value and through levels of asset utilisation. Prior research has been conducted as to which functions explain differences in business performance.

If functional variables are included in assessing firm performance, the question of why would one function be selected over another, is raised. Could not all functions be treated as independent variables so that their relative importance is established? This functional approach could be adopted in a comprehensive manner to include all the primary value chain functions in its assessment of costs and output value. A broader analysis of the relative importance of functions could improve understanding of functional strategies and assist future research to select functions that might contribute to competitive advantage. No studies have yet suggested that the ranking of functions is sturdy across location and time. Hitt, Ireland and Stadter (1982) carried out a study, which explores the moderating effects of industry type and grand strategy type on the relationship of functional importance to business performance. Their study examined 93 industrial firms and found evidence to support the idea that both industry and grand strategy types moderate functional importance. Their data indicated that the importance of functions varied when analysed at specific industry level i.e. the importance of functions varied by industry.

Other studies on functional importance to business performance examine only one function at a time (Wheelwright, 1984, Leong, Snyder and Ward, 1990, Kim and Arnold, 1992). Consequently understanding the relative importance of each function to differences in business performance is not possible in these studies.

2.2.2.1 Weaknesses in the functional importance approach and implications for managers

The Hitt, Ireland and Stadter (1982) model links functional importance directly to business performance. As a result managers may find the model unhelpful in identifying which cost and market advantages these functions are linked to. In other words the Hitt, Ireland and Stadter (1982) model has missed a step in relating functional importance to business performance. It has not linked functions first to cost and market performance, which in turn create business performance. Consequently the practical use of the model is limited. The Hitt, Ireland and Stadter (1982) model does not answer questions such as which functions are important to efficiency or customer service. The implication for managers is that there may be a lack of clarity as to which functions produce an improved return for the company through cost, market or asset productivity gains.
2.2.3 Marketplace effectiveness as an explanation of differences in business performance

This view suggests that business performance is contingent on the effectiveness in producing the right products for sale. Managers need to align the resources and outputs of their firms with what customers want to buy. It is important to define the concept “output value” in this discussion as it by reference to this concept that the importance of functions could be measured. Value is the utility sum of the entire non-price, product and service attributes offered by the firm, that the customer is willing to pay for. Firms attempt to increase their competitiveness by “adding value” (Wood, 1996). On a larger scale the company’s outputs are not only in competition with competitors’ offerings but also in competition with substitute products. Customers could be making their choice against a “preference schedule” which implies that a trade-off of costs and benefits with other non-substitute products is being made. There is therefore an opportunity cost in the choices that customers make. The firm’s output value will need to exceed the opportunity cost to justify the purchase.

Output values; for the purposes of this investigation, are those product and service attributes that can be “seen” in the market place and have value to the customer. The commonly cited output values in previous studies have been customer responsiveness, (Siguaw and Diamantopoulos, 1995, Golden, Johnson and Smith, 1995, Veliyath and Srinivasan, 1995) innovation, (Ramaswami, Flynn and Nilakanta, 1993, Parker and Helms, 1992, Atuahene-Gima, 1996) and quality (De Man, 1994, Dess and Davis, 1984, Corsten and Will, 1995).

Greenley (1995) carried out a study on the marketing orientation to performance relationship. His results, based on a questionnaire survey of 240 UK firms, from a cross section of industries, indicated that a market orientation might have a smaller impact on performance, than environmental factors. Others have tested the same basic proposition, using US data, with mixed results, (Jaworski and Kohl, 1992, Slater and Narver, 1994, Reukert, 1992, Hart and Diamantopoulos 1993). These studies seem to indicate that there may be benefits from narrower definitions of output values as the independent variables rather than broader generic external variables such as market scope, breadth of product offering, extent of environmental monitoring, etc. of Ramaswami et al (1993). This narrower definition could be important to refining the explanation of differences in performance. The assumption could not be made that value is created uniformly across all functions. It could recognise that some functions are could be more important than others in the creation of output value. It is by recognising such variability of functional impact that greater levels of business performance variance may be accounted for. This proposition could be tested for moderating variables. For example could different geographic locations moderate functional importance profiles within the same industries? Could the passage of time moderate functional importance?

2.2.3.1 Weaknesses in the marketplace effectiveness approach and implications for managers

The market orientation models are generally specified at a mid-range conceptual level. For example breadth of product offering or responsiveness to market change. These models can include non-market orientation variables such as organisational structure. These models suggest that certain configurations of these variables can explain differences in business performance. These models lack explanation of both the underlying assets required to create output value and cost effectiveness. In addition the level of operationalisation of market orientation provides
limited guidance for managers on which factors actually cause customers to buy products and services. Without understanding the relative importance of cost to market advantage, managers may be less able to judge which functional investments could best improve the overall competitiveness of the firm.

2.2.4 Generic strategies as an explanation of differences in business performance

The application of generic strategies within certain environments has been suggested as an explanatory model for differences in business performance (Porter, 1980). This model has been applied in a range of different studies. For example, generic strategies have been used to test performance in business service firms (O'Farrell, Hitchens and Moffat, 1992), organisational types (Parnell, Wright, 1993), the machine tool industry, (Wright, Kroll, Tu and Helms, 1991) in declining industries, (Parker and Helms, 1992), industry analysis (Karnani, 1988), product life cycle, (Anderson and Zeithaml, 1984), organisational context, (Wright, 1986) and strategic group membership (Dess and Davis, 1984).

A frequently referenced study is that of Dess and Davis (1984). Dess and Davis surveyed 78 executives from 22 non-diversified firms from the US paints and allied products industry. Their factor analysis derived three competitive dimensions similar to Porter’s generic strategies of cost leadership, broad differentiation and focus. These structures, when related to business performance indicated that low cost and differentiation strategies outperformed focus strategies, as suggested by Porter’s framework.

Faulkner and Bowman (1992) modified the generic strategy model in their idea of external success criteria. They develop their position by first suggesting certain weaknesses with Porter’s (1985) generic strategy concepts of cost leadership and differentiation. They cite research by Dess and Davis (1984) and Miller and Friesen (1986) in support of their criticism of cost leadership strategies. Faulkner and Bowman (1992) consider sustainable competitive advantage to arise from customer perceived benefits. These benefits are called “External Success Criteria” and are achieved by internal competencies, which they call “Internal Success Criteria”. From these definitions they restate Porter’s generic strategies in an “Extended Generic Strategy Matrix” of which the low price and high-perceived value is the superior position. They suggest that to implement the most favourable sustainable strategy requires the development of competencies at the value chain activity level, rather than at the Strategic Business Unit level. They do not provide empirical evidence that tests this model.

A similar position to Faulkner and Bowman (1992) could be adopted to measure the output of the value chain to determine strategic competitiveness. This is similar to their theoretical “External Success Criteria”. The Faulkner and Bowman (1992) approach could show that it is important to understand competitive capability from a functional perspective, as well as at a generic strategic business unit level. They implicitly treat each function as equal in importance. As suggested by Porter (1985) it is probable that the contribution to the distinctive competence and hence competitiveness of the output value is not equally distributed across the value chain.

This suggests that theory should not only assesses the relationship between relative output values but also assesses the relative importance of the primary value chain function’s contribution to that output. The assumption being that higher business performance accrues to those companies that have developed the right distinctive competencies and resources in the
right value chain functions. This is another facet of strategic congruency. Knowing which functions have “value adding leverage” is important to future research in that it focusses study on those functions’ organisational structure, processes, tasks, resources, technology, etc. Without this focus explanatory power may be lost.

2.2.4.1 Weaknesses in the generic strategy approach and implications for managers

The weakness of the generic strategy approach is in the operationalisation of the concepts of low cost and differentiation. These variables tend to be at a high conceptual level. Take for example “customer service”, “procurement of raw materials” and “experienced/trained personnel” (Dess and Davis, 1984). Some of these variables may not be discriminating as they could apply to most types of generic strategy in different business environments. In addition the generic strategy approach to explaining differences in business performance could lead managers to over-emphasise either cost or differentiation factors and thereby sub-optimise business performance which is a combination of both cost and revenue.

Improved explanation of performance may require a different approach than broad positioning types such as cost and differentiation. For example the creation of output value as the primary proxies on which to determine performance – these output values are the “new” contingencies – they reflect customer preferences. These proxies may be an accurate reflection of the underlying generic strategies of firms. Performance variables could also be re-considered. For example the performance variables in the Kotha and Nair (1995) study were limited to return on sales and sales growth. New explanations could look at a comprehensive set of dependent financial performance variables. In this way financial performance and the relative importance of output values could be connected to the relative importance of primary functions. This may result in a cohesive analysis of the generic nature of superior performance. The detailed operationalisation of cost and market advantage factors could provide managers specific “order winning” criteria (Hill, 1993) on which to focus resources and capabilities.

2.2.5 Organisational factors as an explanation of differences in business performance

Hansen and Wernerfelt (1989) examined the relative importance of both internal and external contingencies in a study of 60 firms from the Fortune 1000. Their purpose was to determine which set of contingency variables explains variation in business performance. They used three categories of variables to capture the external contingencies, namely, industry (e.g. growth, capital intensity), competition (e.g. relative market share) and firm characteristics (e.g. size). The internal contingencies were derived from organisational, people and economic factors, which combined to create a dependent contingency called “organisational climate”. This organisation climate acted on an intermediate factor called individual behaviour, upon which business performance was contingent. The researchers concluded that organisation factors explained about twice as much variance in firm profit rates as economic factors, but the combined models (multiple regression) provided the highest level of explanation of performance variation ($r^2 = .503$). The authors concluded that,

“Top management teams that can demonstrate excellence in both arenas – competitive positioning in the market place and building organisational context – will do significantly better than those that strive for unidimensional concepts of excellence” (p 409).
A possible weakness of the Hansen and Wernerfelt (1989) study is that it has a limited operationalisation of market positioning and thereby does not consider positioning as a matter of delivered value to the customer, rather it sees it in relation to relative market share. It limits organisational context to one of climate and does not fully discuss the role of functions and resources to competitive advantage.

Fiegenbaum, Hart and Schendel, (1996) develop the “Strategic Reference Point Theory”, which they view as,

“By signalling organisational priorities and overall direction, top managers, whether knowingly or not, focus the attention of organisational members on particular goals and objectives; in so doing, they define the strategic reference point of the firm (p 220)... Takes the position that understanding a firm’s choice of reference points is one way to achieve strategic alignment (p 220)... Three dimensions, (1) conditions internal to the firm; (2) conditions external to the firm; and (3) time (i.e., past and future orientation)” (p 220).

The conditions internal to the organisation in their study included, “Functions or value added activities” (p 224), and importantly, they add,

“While firms may establish reference points around particular functions or value added activities, most emphasise one or more organisation-wide capabilities which serve as a backdrop to functional operations; these “cross-cutting” capabilities include an emphasis upon cost reduction, quality, speed, and innovation” (p 228).

The external dimension of the model includes competitors (benchmarking), customers (market orientation) and stakeholders (various levels). The strategic output of these dimensions they list as targets such as ROA, ROE and ROS.

The theoretical model that these authors therefore propose, but do not test, develops the congruency approach to the point where it includes:

- An internal and external perspective
- An orientation perspective
- The notion of functional priorities set against particular capabilities

The strategic reference point theory could possibly be improved by considering the strategic outputs of the firm not to be financial measures of performance, in the first instance, but rather the outputs as perceived by the customer. If the preferences of the customer are treated as strategic reference points (Greenley, 1995), then the capabilities and functions of the firm can in turn be prioritised and aligned accordingly. Understanding the resource and competency requirements to achieve competitive capacity is not likely to come directly from financial performance indicators.

Miller and Chen (1996) in a similar way to Fiegenbaum, Hart and Schendel, describe the concept of competitive simplicity, which they define as,
"The tendency of firms to concentrate on fewer competitive activities than do their direct rivals" (p 419).

Like Venkatraman and Prescott (1990), they use broad internal and external variables to test firm performance. Their study has highlighted the need for an internal and external division of variables and the varied nature of the impact of those variables.

Company culture has been attributed as an organisational characteristic that can influence business performance.

Lorsch (1986) has described culture as:

"By culture I mean the shared beliefs top managers in a company have about how they should manage themselves and other employees, and how they should conduct business" (p95)

This description would suggest that the shared (and presumably non-shared values) of managers could have an effect on corporate performance through the formulation and implementation of strategy. Higher levels of shared beliefs would presumably result in strategic choices being made which had higher levels of support between top managers. The absence of shared beliefs would conversely result in lower business performance. Hofstede, (1993) has suggested that culture is comprised of 4 ascending layers. The deepest level is "values" the second and third are "rituals" and "heroes" and the outer layer is "symbols". Schein (1984) has developed a similar model of culture. Geletkanycz, (1997) carried out a study of top managers in 20 countries and concluded that culture has an impact on top managers mindsets and that values are important to top managers' strategic and leadership orientations. Williams, (1999) studied the effect of cultural types on aspects of organisational performance and concluded that there was a difference in cultural types and organisational performance.

2.2.5.1 Weaknesses in the organisational approach and implications for managers

A weakness in the organisational approach to explaining differences in business performance is that organisations first produce both costs and market outputs that result in business performance. Like the functional approach to business performance, organisational types could be linked to both cost and market advantages as intervening variables before business performance. In addition which is the appropriate organisational type could be contingent on market and cost requirements rather than the other way around. These weaknesses may lead managers to focus on organisational design before consideration of what are the appropriate market and cost objectives of the firm. As a result an organisation may be designed which is relatively ineffectual in producing the goods and services that are required by customers.

2.2.6 Competency as an explanation of differences in business performance

Competency, as an explanation of differences in firm performance, is a theme in the literature. Hitt and Ireland (1985) investigated the relationship of distinctive competencies at a corporate level on performance and grand strategy type. They state:
"Corporate-wide distinctive competencies...can result in relatedness across most or all of a firm's separate business units. These competencies occur through development of specific activities associated with each function" (p274).

Hitt and Ireland (1985) demonstrate that distinctive competencies arise on a differential basis from within functions (Hitt, Ireland and Palia, 1982; Hitt and Ireland, 1986, Hitt, Ireland and Stadter, 1982,). They elaborate this point as follows:

"Firms would develop distinctive competencies in activities important for implementation of their grand strategy. Distinctive competencies, in the form of critical functional activities, yield either a formal or informal structure through which the grand strategy is implemented. The relative importance of these critical activities seems to vary by grand strategy type" (p275).

Hitt and Ireland's (1985) theoretical model suggests that, not only do distinctive competencies arise from within functions, but that these competencies vary in importance. The importance of a competency, to these authors, is a function of the grand strategy type (corporate level), which they label as:

(1) Stability (2) internal growth (3) external acquisitive growth and (4) retrenchment (p275)

The classification of grand strategy type could possibly (initially) arise from the strategic business unit level rather than from the corporate level. As the authors state:

"a number of large, diversified firms segment their operations into "strategic business units" (SBU's) to enhance marketplace competitiveness" (p274)

In their study the authors' are suggesting that superior economic performance is contingent on an alignment of competencies on grand strategy type. This is consistent with the later development of the strategic reference point theory (Fiegenbaum, Hart, Schendel, 1996) as described previously.

McGrath, MacMillan and Venkatraman, (1995) define competency as follows:

"If one accepts that increasing convergence on objectives is an indicator of emerging competence (and thus a necessary precursor to future competitive advantage), the degree of competence in an initiative can be assessed by the extent to which ex ante objectives are being realised in ex post results, and the level of competence of an organisational subunit can thus be defined as its ability to reliably and consistently meet or exceed its objectives" (p254).

They develop a theoretical model in which comprehension and deftness are a priori conditions to competence.

"To be able to reliably and consistently meet or exceed objectives presupposes that those responsible understand which combinations of resources, assembled in which sequences and applied to which situations, will lead to this desirable result" (p255).
The McGrath, MacMillan and Venkatraman, (1995) study examines the “internal” components of competency. The presupposition to McGrath, MacMillan and Venkatraman, (1995) study is that the competencies that group deftness and comprehension generate are the appropriate strategic outcomes for the firm. This is not commented on in their study. Their study does indicate that the creation of competencies occurs as a result of a sequence of activities and that these activities are idiosyncratic. The McGrath, MacMillan and Venkatraman, (1995) study is therefore searching for causes of competencies below the environmental, output, functional and resource levels.

The points from the McGrath, MacMillan and Venkatraman, (1995) study are therefore:

- That competencies are the result of a sequence of processes
- That the importance of the processes is idiosyncratic

The competency literature can be categorised by where it focuses in its treatment of competency. This is summarised in the table below:

<table>
<thead>
<tr>
<th>Competency Literature</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example 1</td>
<td></td>
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<tr>
<td>Example 2</td>
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<tr>
<td>Example 3</td>
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</tbody>
</table>

32
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Table 1: A categorisation of competency according to strategy type

<table>
<thead>
<tr>
<th>Type</th>
<th>Authors</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate level competence</td>
<td>Hitt, M and Ireland, R</td>
<td>1985</td>
</tr>
<tr>
<td></td>
<td>Hitt, M and Ireland, R</td>
<td>1986</td>
</tr>
<tr>
<td>SBU level competence</td>
<td>Snow, C and Hrebiniak, L</td>
<td>1980</td>
</tr>
<tr>
<td></td>
<td>Hitt, M, Ireland, R and Stadter, G</td>
<td>1982</td>
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<tr>
<td></td>
<td>Venkatraman, N and Prescott, J.,</td>
<td>1990</td>
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<td></td>
<td>Parker, B and Helms, M</td>
<td>1992</td>
</tr>
<tr>
<td></td>
<td>Rovizzi, L and Thompson, D</td>
<td>1992</td>
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<td></td>
<td>Jutner, U and Wehrli, H</td>
<td>1992</td>
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<tr>
<td></td>
<td>Lewis, A</td>
<td>1992</td>
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<tr>
<td></td>
<td>Kay, J</td>
<td>1993</td>
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<tr>
<td></td>
<td>Nath, D and Sudharshan, D</td>
<td>1994</td>
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<td></td>
<td>Covin, J., Slevin, D and Schultz, R</td>
<td>1994</td>
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<td></td>
<td>Band, D and Scanlan, G</td>
<td>1995</td>
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<tr>
<td></td>
<td>Veliyath, R and Srinivasan, T</td>
<td>1995</td>
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<tr>
<td></td>
<td>Porter, M</td>
<td>1996</td>
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<tr>
<td></td>
<td>Fiegenbaum, A Hart, S and Schendel, D</td>
<td>1996</td>
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<tr>
<td>Functional level competence</td>
<td>Cleveland, G, Schroeder, R and Anderson, J</td>
<td>1989</td>
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<tr>
<td></td>
<td>Kotha, S and Orne, D</td>
<td>1989</td>
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<td></td>
<td>Corsten, H and Will, T</td>
<td>1990</td>
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<td></td>
<td>Garvin, D</td>
<td>1993</td>
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<tr>
<td></td>
<td>Ferdows, K and De Meyer, A.</td>
<td>1992</td>
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<td></td>
<td>Kim, J and Arnold, P</td>
<td>1992</td>
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<tr>
<td></td>
<td>Venkatraman, N, Henderson, J and Oldach, S</td>
<td>1993</td>
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<td></td>
<td>Corbett, C and Van Wassenhove, L</td>
<td>1993</td>
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<td></td>
<td>Vickery, S, Droge, C and Markland, R</td>
<td>1993</td>
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<tr>
<td>Process level competence</td>
<td>Powell, T</td>
<td>1992</td>
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<tr>
<td></td>
<td>Parthasarthy, R. and Sethi, S</td>
<td>1993</td>
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<tr>
<td></td>
<td>Schroeder, D, Congden, S, and Gopinath, C</td>
<td>1995</td>
</tr>
<tr>
<td></td>
<td>McGrath, R, MacMillan, I and Venkatraman, S</td>
<td>1995</td>
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</table>

The development of theory on the competency approach to strategy has been mainly at the SBU level. The functional level development of theory has frequently been with reference to a single function, with manufacturing having a high count. A comprehensive use of the competency approach is possibly required, which links external (market) and internal (multi-functional and process) competencies in greater depth. This (vertical and lateral) approach has begun to emerge (McGrath, MacMillan and Venkatraman, 1995; Fiegenbaum, Hart and Schendel, 1996). These developments could possibly generate new insights into the sources of distinctive competencies and explain a larger proportion of the difference in economic performance between firms.
In a functional level study of production competence, Vickery, Droge and Markland, (1993), defined competence in the following way,

"Production competence is the degree to which manufacturing performance supports the strategic objectives of the firm. We argue that it's meaning is dependent upon three critical factors:

1. A comprehensive assessment of what is important to the firm's strategic profile, so that performance in an area can be weighted by the strategic importance of that area;
2. A method of weighting to reflect manufacturing responsibility for areas in the firm's strategic profile; and

The Vickery, Droge and Markland, (1993) study focussed on 65 strategic business units in the US furniture manufacturing industry and attempted to measure the amount of business performance explained by production competence. Production competence and strategy type explained 40.9% of the variance of return on sales. The underlying operations competency contingency in this study is constructed from importance to strategy, level of responsibility for performance, actual performance and the strategic objectives of the firm. This study has shown that competence can be an unobservable exogenous variable, resulting in a range of observable endogenous output variables. The Vickery, Droge and Markland, (1993) study confirms that functional importance to a range of "output" variables is varied.

Kay (1993) has argued that successful strategies could be a combination of recognising what current distinctive competencies are and maximising their effect in selected markets, together with building the right kind of internal and external relationships. This view is based on contingency theory (Burns and Stalker, 1966, Woodward, 1965, Steiner, 1979, Grinyer, et al 1986.), which suggests that organisational success rests on matching the organisation to the environment. He concludes that there can be

"No universal prescriptions for success, since if there were, their general adoption could reduce their value to everyone...it is the creation and maintenance of distinctive capabilities which is at the heart of successful strategy"(p17)

These distinctive capabilities need to have an irreproducibility characteristic to create competitive advantage, (Teece, 1986, Prahalad and Hamel, 1990, Oster, 1990, Lippman and Rumelt, 1982, Snow and Hrebiak, 1980, Reed and De Filippi, 1990, Barney, 1991, Grant, 1991) when they are applied in an industry and brought to a market. If not the advantage they provide could be imitated. The economic view is that competitive advantage arises from the possession of strategic assets, which arise from the structure of the market (Schumpeter, 1934).

Explanations for differences in business performance could develop from these theoretical underpinnings. Rather than searching for specific distinctive competencies, (as with the above authors) these explanations could look at the relative value of the outputs of those distinctive competencies as a precursor to examining which specific functional tasks, structures, and processes, create the necessary distinctive competencies. It could do this in relation to the industry average and relative competitor (market) performance. The explanation of how
superior performance is achieved i.e. the source of competitive distinctive competencies (e.g. structure, task, and process) is not provided in existing studies.

Such an explanation should not be a benchmarking exercise as it not trying to answer the question of best industrial practice as the basis to competitive advantage. As Kay (1991) noted competitive advantages arise from uniqueness rather than conformity, a limitation of the microeconomic view of the firm (Ansoff, 1969, Hunt and Morgan, 1995), which assumes the "average firm". In this way a new explanation could differ from other approaches such as the balanced score card (Kaplan and Norton, 1993) where benchmarking is central to performance measurement. Instead a new explanation could be looking for patterns of output values, efficiency and resources that are unique.

Distinctive competencies can result in processes, which produce reliable and repeatable desired outcomes (McGrath et. al, 1995). The most valuable of these distinctive advantages, due to difficulty in inimitability, are suggested to be intangible (Prahalad and Hamel, 1990, Itami, 1987, Nelson and Winter, 1982, Hall, 1993). It could appear that the search for explanations of different levels of business performance between firms in the same industry could take account of two dimensions. The types of distinctive competencies required and the processes by which those competencies develop (Vasconcellos and Hambrick, 1989, Burgelman, 1983, Van de Ven, 1986, Miller, 1993) The role of management, it is suggested, is to continually seek out ways of renewing competitive advantage as it is eroded by the competition (McGrath et al, 1995, Rumelt, 1984, Daft and Weick, 1984, Block and MacMillan, 1985, Kanter, 1983, Maidique and Zirger, 1985).

Explanations of the type of distinctive competencies required for superior performance could be sought at the output level of the individual firm. It can be argued that output competencies are themselves supported by a hierarchy of internal competencies (Teece et. al, 1991, Amit and Schoemaker, 1993, Prahalad and Hamel, 1990). The route into discovering what those internal competencies are could start with understanding the nature and priority of the output competencies that interact with the market place.

McGrath et al, (1995), developed and tested a model which suggests that there are two antecedents to emerging competence namely comprehension and deftness. The purpose of the McGrath et al, (1995) model is to suggest a framework, which could indicate whether an emerging competence could result in a distinctive competence. The nature of understanding is described as only substantially effective in firms through the linking processes that occur in groups. They quote Weick and Roberts, (1993), Kahneman et al, (1982), in support of this. Deftness is based on the "heedfulness" characteristics of the group. Unless individual information can be shared its capacity to generate competence is limited. The authors concede that operationalisation of these concepts is difficult.

Miller and Chen (1996) have researched the concept of competitive simplicity - the tendency of some firms to concentrate intensely on just a few central activities. They label this "competitive simplicity". They conclude that the repertoire of competitive action is largely a function of organisational and environment variables which limit the scope of management's competitive activity and knowledge. This is different from the approach, which suggests that organisations become multifaceted and elaborate (Starbuck, 1965, Thompson, 1967, Chandler, 1992). Miller
and Chen (1996) are suggesting that competitive performance is attained through a combination of output values, which are not uniform in their contribution to that performance. Future explanations could search for the functions, which are responsible for that output. The assumption being that functions are not equally important in their impact on output values. The Miller and Chen (1996) study used internal measures to ascertain the degree of simplicity. As argued previously it may be useful to use external output value variables. Such an approach could be a focused way into an effective prioritisation of internal measures of competitive simplicity.


The results of these studies show that manufacturing functional competence is measurable and related to performance (Cleveland, et al 1993, De Meyer and Ferdows, 1989) and the importance of business level and manufacturing level strategic process. This could suggest that a comprehensive analysis of functional competence is needed. Functions are linked to each other (Porter, 1985) and each contributes (to different degrees) to the output values of the total business process. To test for a function's effect on profitability it is necessary to know what that function's relative contribution to output value (as defined in market terms) is. This could help in explaining the relative importance of competencies within functions.

Once this is known the findings of studies on distinctive functional competencies can possibly be accurately interpreted. Explanations could be found of the relative level of competitive performance for primary functions and the relative contribution to total output value of each of those functions. Such an approach, which combined performance and relative importance over a number of functions, it is hoped, will give a fuller explanation of the relationship between output values, distinctive functional competence and profitability. This approach appears not to have been tested in this manner before. What organisational forms, tasks, assets, and process create those functional competencies is an important research question.

shown the usefulness of the clustering technique at a functional level to identify functional competencies.

A limitation of the Roth and Miller, (1994) study is that it clusters on the manufacturing function only and does not consider the relative importance of the other functions. Future research may use taxonomic clustering techniques, by function in a comprehensive manner and by output value priority to generate insight into the relationship of functional competency and financial performance within and between industry clusters.

2.2.6.1 Weaknesses in the competency approach and implications for managers

One weakness of the Hitt and Ireland (1985) study may be the "jump" directly from functional distinctive competencies directly to corporate level strategies, without an examination of the specific features of the SBU level strategies. The grand strategy types may therefore be too broad and suggest that distinctive competencies can be emphasised at SBU level on a top down corporate approach. If managers applied this approach uncritically they may damage SBU competitiveness in its particular industry setting by not recognising specific cost and market advantage trade-offs (Porter, 1996). As a result mismatches of resources and competencies may occur.

Therefore it may be appropriate to define grand strategy type and measure the relatedness of competencies at SBU level (Porter, 1996; Veliyath, and Srinivasan, 1985; Parker, and Helms, 1992; Snow, and Hrebiniak, 1980). The variables used to define grand strategy type could necessarily change from those used by Hitt and Ireland (1985) to possibly market specific ones (Mathur, 1988; Kotha and Vadlamani, 1995). This may result in a fuller explanation of differences in firm performance within industries (Siguaw and Diamantopoulos, 1995).

The theoretical model provided by the McGrath, MacMillan and Venkatraman, (1995) study is possibly limited in its explanatory power with respect to the question of why certain companies outperform others, as it does not extend far enough forward to include resources, functions, outputs and markets. The study does examine the intangible sources of competitive advantage. The findings of the McGrath, MacMillan and Venkatraman, (1995) study were confounded by the relationship between comprehension and deftness – deftness being dependent on comprehension. The study used groups as the unit of analysis suggesting that competencies arise from combinations of individuals. This could indicate that competency based explanations of business performance could consider functions as a logical unit of analysis.

The Vickery, Droge and Markland, (1993) study did not provide specific measurements of the objectives of the firm. Instead it relied on two broad classifications of generic strategy – low cost and differentiation. In this way the Vickery, Droge and Markland, (1993) study does not comply with its own definition of competence. This lack of definition as to what are the firm's objectives is a weakness in studies of competence. A future way forward in the search for competency based contingency variables is possibly to identify underlying cost and market advantage variables and the relative importance of their relationship to performance.
2.2.7 Environmental factors as an explanation of differences in business performance

The relationship of the environment to business performance has been a long-standing subject in the literature (Ansoff, 1987). Classifications of environments include munificence (Castrogiovanni, 1991), industry types (Dess, Ireland and Hitt, 1990) and industry cluster analysis (Harrigan, 1990). The proposition underlying these classifications is that firm performance is contingent on the degree that firm specific factors align with the characteristics of the environment.

Miller (1987) approaches the definition of the environment as follows:

"Although we do not believe that strategy or structure is determined by the environment... there could be some common relationships between environmental dimensions and those of strategy. The dimensions of dynamism...hostility...and heterogeneity...have also been used to characterise the environment...these are representative of major challenges facing the firm" (p62).

Miller (1987), in this definition, suggests that the emphasis of one environmental dimension over another will influence the strategic response of the firm. For example he suggests innovative responses to dynamic environments and marketing differentiation responses to intense hostility. A difficulty with this approach is that the strategic responses to both environments are essentially driven by innovation capabilities. The same criticism of the environmental characteristics can be made. For example where do the characteristics of dynamism end and the characteristics of hostility begin? These characteristics are not necessarily mutually exclusive – there is possibly insufficient theoretical distance between them. The common ground in the strategic response is the market orientation of these types. Innovation and differentiation outcomes are both seen in the market place. This gives weight to the theoretical possibility that the measurement of strategic types could be based on a range of prioritised “market visible” outcomes (Siguaw and Diamantopoulos, 1995; Atuahene-Gima, 1996).

Lenz and Engledow, (1986), identify 5 categories or “models” of environment in the literature (p 330). They suggest that:

"In order to determine the potential of these models for guiding managers' analysis of their environments, each was evaluated along three dimensions: Descriptions of the structural properties of the environment Assumptions about the nature and sources of environmental change, and Proposed means for managers to gain knowledge of their environments” (p330)

The structural properties of the environment arise from:

“Dominant aspects of an organisation’s environment are assumed to exist in and around the industry, or industries, in which a firm competes. Thus, for strategic decision-making there is no such thing as “the” environment – if the work of the environment is taken to mean a single, holistic entity. Instead, organisations may confront multiple environments, each with its own characteristics and pivotal competitive issues” (p 330).
This definition allows for a number of different kinds of interactions with "forces" (Porter, 1980) external to the organisation. The definition allows for these relationships to be idiosyncratic. The question, which is not asked, is which of these external relationships are consistently important across environments? The long-term competitive capacity of the firm is possibly determined by competitiveness of the market outputs – in other words the values it provides its customers (Mathur, 1988, Siguaw and Diamantopoulos, 1995, Atuahene-Gima, 1996, Greenley, 1995).

The following table classifies the environmental literature according to the (Lenz and Engledow, 1986) environmental properties of structure, change and knowledge.

Table 2: A classification of the literature based on the (Lenz and Engledow, 1986) properties.

<table>
<thead>
<tr>
<th>Environmental Property</th>
<th>Author (s)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure</strong></td>
<td>Prescott, J</td>
<td>1986</td>
</tr>
<tr>
<td></td>
<td>Miller, D</td>
<td>1986</td>
</tr>
<tr>
<td></td>
<td>Miller, D</td>
<td>1987</td>
</tr>
<tr>
<td></td>
<td>Johnson, G and Thomas, H</td>
<td>1987</td>
</tr>
<tr>
<td></td>
<td>Miller, D</td>
<td>1988</td>
</tr>
<tr>
<td></td>
<td>Lawless, M and Finch, L</td>
<td>1989</td>
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<tr>
<td></td>
<td>Hakansson, H and Snehota, I</td>
<td>1989</td>
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<tr>
<td></td>
<td>Dess, G, Ireland, R and Hitt, M</td>
<td>1990</td>
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<td></td>
<td>Zahra, S and Pearce, J</td>
<td>1990</td>
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<tr>
<td></td>
<td>Venkatraman, N and Prescott, J</td>
<td>1990</td>
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<td></td>
<td>Slater, S and Narver, J</td>
<td>1990</td>
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<tr>
<td></td>
<td>Huo, Y and McKinley, W</td>
<td>1990</td>
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<tr>
<td></td>
<td>Sharfman, M and Dean, J</td>
<td>1991</td>
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<tr>
<td></td>
<td>Rumelt, R</td>
<td>1991</td>
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<tr>
<td></td>
<td>Katobe, M and Okoroafo, S</td>
<td>1992</td>
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<tr>
<td></td>
<td>Rovizzi, L and Thompson, D</td>
<td>1992</td>
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<td></td>
<td>Lewis, A</td>
<td>1992</td>
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<td></td>
<td>Cartwright, W</td>
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<td></td>
<td>Dierickx, I and Cool, K</td>
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<td>Marlin, D, Lamont, B and Hoffman, J</td>
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<td>Golden, P, Johnson, D and Smith, J</td>
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<tr>
<td></td>
<td>Greenley, G</td>
<td>1995</td>
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<tr>
<td><strong>Change</strong></td>
<td>Friessen, P and Miller, D</td>
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<td></td>
<td>Donaldson, L</td>
<td>1987</td>
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<td></td>
<td>Collis, D</td>
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<td></td>
<td>Talwar, R</td>
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<td></td>
<td>Jennings, D and Seaman, S</td>
<td>1994</td>
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<tr>
<td><strong>Knowledge</strong></td>
<td>Shader, C, Mulford, C and Blackburn, V</td>
<td>1989</td>
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<tr>
<td></td>
<td>Veliyath, R and Srinivasan, T</td>
<td>1990</td>
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<td></td>
<td>Ghoshal, S and Westney, D</td>
<td>1991</td>
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</table>
The literature has a predominance of a structural approach to industry analysis. The emphases within that approach range from market orientations (Greenley, 1995, Hunt and Morgan, 1995), to business networks, (Hakansson and Snehota, 1989), through national environments (Huo and McKinley, 1992) and international environments (Katobe and Okoroafo, 1990). This weight of literature in favour of an industrial or structural approach to the environment emphasises the strength of the paradigm that suggests that firm performance is contingent on its orientation to a multiplicity of variables in the environment. The literature predominantly favours operationalisations of firms' orientations to the environment in market related terms (Rumelt, 1991, Miller, 1988). The evidence could point to this orientation providing consistently improved explanatory theories as to why firms have different economic performances.

A study by Kotha and Nair (1995) examined the relationship between the environment, realised strategies and business performance in the Japanese machine tool industry. Their study was longitudinal from 1979 - 1992. To account for performance they operationalised the hypotheses using a mixture of internal and external variables. For example in operationalising realised strategy they used two internal proxies, asset parsimony, cost efficiency and along with two external proxies advertising intensity and market share. They concluded that there was a significant relationship between environment, strategy and performance. The Kotha and Nair (1995) study follows in the tradition of others studies that have examined the “strategy-to-performance” relationship at business unit level (Capon et. al, 1990) and follows the cost/differentiation classification of Porter (1985).

2.2.7.1 Weaknesses in the environmental approach and implications for managers

Environmental types tend to be broad classifications (Lenz and Engledow, 1986) whilst SBUs tend to compete within industry clusters (Harrigan, 1990). This raises the question as to what is the appropriate definition of the relevant competitive environment. This definition could be important to managers in determining which environments are attractive to them in the first place and how to develop competitive capabilities in the second. The broad classifications of industry type do not include aspects of customer preferences. Customer preferences may be an important variable in explaining differences in business performance. Consequently improved definitions of the business environment could include characteristics of customer preferences. These customer preference-based definitions of business environments could be meaningful to managers in that the resources of the company could be configured to meet these preferences.

2.3 Resources as an explanation of differences in performance

The final theme in explaining differences in firm performance from the literature is the resource-based view of the firm. Barney (1991) defines this as,
“Firm resources include all assets, capabilities, organisational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness” (p 101)

The characteristic of these resources, and the reason for their economic value is their unequal distribution among competing firms. The resource-based view therefore differs from the industrial or structured view of the firm, in the following ways (Barney, 1991):

“First, these environmental models of competitive advantage have assumed that firms within an industry (or firms within strategic group) are identical in terms of the strategically relevant resources that they control and the strategies that they pursue. Second, these models assume that should resource heterogeneity develop in an industry or group (perhaps through new entry), that this heterogeneity could be short lived because the resources that firms use to implement their strategies are mobile (i.e. they can be bought and sold in factor markets)” (p 100).

The resource-based view of the firm strengthens the theoretical justification for searching for new explanations of the divergence in firm performance in examination of different resources types, strategies and the relationships between them. The central issue in the resource-based view is heterogeneity. As stated by Peteraf, (1993):

“Heterogeneity is the most basic condition. It is the sine-qua-non of competitive advantage and has long been a fundamental concept of strategic management” (p185)

The characteristics of this heterogeneity are the next most important issue, as this determines the sustainability of the advantage of the firm’s unique resources and capabilities. Barney (1991), describes this as follows:

“To have this potential, a firm’s resources must have four attributes: (a) it must be valuable, in the sense that it exploits opportunities and/or neutralises threats in a firm’s environment, (b) it must be rare among a firm’s current and potential competition, (c) it must be perfectly imitable, and (d) there cannot be equivalent substitutes for this resource that are valuable but neither rare or perfectly imitable” (p105).

Heterogeneity, in this view, is a necessary but not sufficient condition. The question is what is the relative importance of these attributes and is there a logical sequencing of their ordinal positions? It may be that the attribute “it exploits opportunities and/or neutralises threats in a firm’s environment,” i.e. is valuable, is a precondition to the usefulness of the other attributes. This attribute of value has characteristics of its own. For example it could be argued that it is inherently market (customer) orientated – it either generates unique value for the customer (opportunity) or limits competitors access to those customers (threat). In other words the values, which the resource generates, are based on market outcomes of those resources. On the other hand the other 3 resource attributes are inherently supply orientated. For example, the characteristics of rareness, imitability, and non-substitutability are characteristics of supply. The importance of these “supply” attributes is consequently not based on the strength of these attributes but is derived from their relationship (impact) on the a priori value attribute. For example, if a resource has little impact on the external opportunity or threats facing the firm, then regardless how rare, imitable, and non-substitutable the resource is, it will have little
economic value to the firm. The growing literature on the resource-based view of the firm does not appear to have, as yet, fully discussed the relationship between these resource attributes.

Peteraf, (1993) describes four theoretical conditions that underlie competitive advantage.

"The first of these is resource heterogeneity, from which come Ricardian or monopoly rents. Ex post limits to competition are necessary to sustain the rents. Imperfect resource mobility ensures that the rents are bound to the firm and shared by it. Ex ante limits to competition prevent costs from offsetting the rents" (p 180).

In this analysis the sources of competitive advantage relate to internal and supply related resources. Peteraf does not extend this analysis outward in terms of the "value" requirement as defined by Barney (1991). This requirement is implied in the observation (Peteraf, 1993) that:

"One might describe productive factors in use as having intrinsically different levels of "efficiency". Some are superior to others. Firms endowed with such resources are able to produce more economically and/or better satisfy customer wants" (p 180)

It is assumed that these resources produce the "right" outputs. This is a substantial assumption and when viewed against the requirement for resource heterogeneity appears to be inconsistent. There may be a gap between the required performance of these resources and their actual performance in terms of the outputs of the firm.

As Peteraf states:

"The resource-based model is fundamentally concerned with the internal accumulation of assets, and with asset specificity" (p188).

While the resource-based view correctly stresses heterogeneity, it is limited in its explanatory power, by not relating those internal resources to varied market related outputs. If these two aspects can be combined (the external examination of heterogeneous firm outputs and their relationship to internal heterogeneous resources) then an improved explanation of differences in firm economic performance could be constructed.

Mehra, (1996) recognises the importance of combining both a market orientated approach and resource-based approach in a study to determine whether a strategic group analysis improves explanation of differences in performance. He concludes:

"Therefore asset structures ought to be combined with market strategies for a rigorous operationalisation of strategic groups" (p319)

The question, which Mehra, (1996) does not answer, is which comes first, market led strategies or resource led strategies? Previous explanations have not been specific on this point and yet it could have consequences on the firm in the form of inappropriate resources for the chosen market or inappropriate markets for chosen resources. In either case the ability to generate above industry average returns could be prejudiced. Mehra, (1996) implies that resources come first:
"Under the new realities of global competition, traditional strategic recipes no longer hold. Successful competitors build their strategies not around products, but around deep knowledge of a few highly developed core skills" (p308).

The products or services on which a company competes may be constrained by the firm's history (Barney, 1993), but consideration could be given to the possibility that what defines a sustainable resource is a priori market led. Strategic change and the consequent re-engineering of business processes, competencies and resources are justified on the basis of shifts in market preferences (Mathur, 1988, Ramaswami, Flynn and Nilakanta, 1993).

Mehra, (1996) takes a strong position that resources define success:

"While superior performing product market actions are transparent to e player in the industry, what is not so readily apparent is the resource base required to successfully implement those strategies...the underlying emphasis in many industries appears to have shifted from being positioned based to being resource-based. In sum, according to the RBV, firm resource endowments rather than product market circumstances define success” (p309).

The effectiveness of unique resource endowments can be viewed as being prescribed by the evolving patterns of market place preferences. As Levitt's (1960) article pointed out, what is required is a focus on customer's needs rather than products – a state of “marketing myopia”. A strong focus on resources may lead to the same consequences as marketing myopia or as Miller (1990) suggested in the “Icarus Paradox”, companies can become so focussed in accumulating resources in a specialised area, that they lose sight of fundamental change in the market place. The internal orientation of the resource-based view may lead to strategic inertia (Ghemawat, 1991)

Creating unique and valuable visible outputs in the market place is possibly external evidence that the firm possesses the appropriate unique internal resources. Customers and competitors alike will see the market place outputs – this is unavoidable in an open economy – the ability of the firm to sustain its uniqueness could be a function of the uniqueness of the appropriate resources. The development of a theory that adequately relates the market positioning view and the resource-based view has yet to emerge. In particular an explanation of differences in business performance that leads from heterogeneous market outputs to heterogeneous resources is yet to be specified.


Mata, et al, (1995) concluded that I.T management skills could be the source of sustainable competitive advantage (p500). They suggest that functional testing of the resource-based model could be extended beyond I.T. to explain differences in firm performance. A comprehensive explanation of business performance could attempt to broaden the possibilities for functional research based on resource theory. It could do this by firstly determining the relative importance of output values and secondly by determining the relative importance of primary functions to that output. This line of explanation could go on to examine functional attributes
and assets which may be heterogeneous and the internal cause of sustainable competitive advantage.

For example the Mata, et al, (1995) model could be applied to the manufacturing function in a similar way to which it has been used for the IT function. It could test similar attributes i.e. access to capital, proprietary technology, technical manufacturing skills, managerial manufacturing skills. Focus could be given to this of this type of study by firstly identifying the relative importance of functions to value output. Such an explanation could assist by identifying the processes that create the valued outputs, thereby facilitating valid and reliable operationalisations of the heterogeneous resources, which give rise to sustainable competitive advantage. The Mata, Fuerst and Barney, (1995) study, while searching for unique and valuable resources at a functional level, does not extend the theory far enough on the vertical and horizontal dimensions. For example it does not substantially relate the IT resources to market uniqueness or prioritise the IT resources in terms of their sustainability. The importance of IT resources is not compared with the importance of other functional resources.

2.3.1 Weaknesses in the resource based approach and implications for managers


What resource-based explanations have not demonstrated is how this theory links the relative importance of functions in providing output that is valuable to customers. These explanations do not comprehensively search for differences in functional performance to explain differences in financial performance. If this approach is adopted, explanations could test for Ricardian rents (Caves and Porter, 1977), based on heterogeneity of functional capability. New explanations could be sought by examining the nature of the underlying resources that give rise to superior output value performance after the broader relationship to functional output performance has been established. It has been suggested that this approach will generate improved explanatory power (Mueller, 1986, Hansen and Wernerfelt, 1989, Rumelt, 1991) rather than an industry

The ability of firms to sustain their distinctive competency on an ex post basis or an ex ante basis is not directly addressed by prior resource explanations. A discussion of this theory could be useful as the approach may impact on later research. The ability to test for the effects of the ex post and ex ante limits would possibly require a longitudinal study, given the need to measure the before and after levels of competition in the occupied sector of the industry. To do this will require an understanding of the relative importance of functional competencies in the first instance leading to an understanding of the resources which give rise to those competencies in the second. Without this level of operationalisation of the companies' resources it is difficult to see how the explanatory potential of the resource-based theory could be tested empirically (Peteraf, 1993, Wernerfelt, 1995). Taking this approach may result in prioritised operationalisations of the assets which give rise to sustainable rents (Rumelt, 1984, Cave and Porter, 1977, Yao 1988, Ghemawat, 1986, Dierickx and Cool, 1989). This may be useful in understanding the possible causes of efficiency differences between firms, a strong limit on inimitability (Lipmann and Rumelt, 1982, Rumelt, 1987).

The weaknesses of the resource-based view may have a number of implications for managers. These weaknesses may, at the corporate strategy level, cause managers to focus on the acquisition of resources based on their scarcity, without sufficient evaluation of how value is to be added to these acquisitions. Another implication for management of these weaknesses, at the SBU level, could be a focus on current resources and capabilities rather than future resources and capabilities. This could come about because the strategic attention of managers is on resources rather than on customer preferences as agents of future change.

2.4 Summary and aim of this study

The early sections of this chapter discussed the need for a contingency-based view of the firm that was focussed on customer preferences as the prioritising mechanism for the firm’s outputs. It was argued that improved explanations of variances in business performance could occur when outputs of the firm were prioritised before other contingency factors such as structure, competencies etc. Thereafter the resource-based view has brought into focus the competitive importance of different factor inputs. The weaknesses of the existing explanations of differences in business performance were discussed. These included a lack of definition on what are the strategic outputs of the firm (congruency approach), linking functions directly to business performance rather than through cost and market advantages (functional, organisational, competency and resource views) no linkages to underlying resources (market place view) broad and unfocussed classifications (generic strategy and environmental views). The consequences of these weaknesses for managers are that they could make inappropriate corporate level acquisitions (resource-based view) define inappropriate market positions (generic strategy and environmental views) and misalign investment in resource development (functional, organisational, competency and market place views).

The aim of this study is to combine some of these explanations of differences in business performance to develop a theoretical model, which combines the strengths of both the resource and contingency views, eliminates some of the weaknesses and provides a cohesive explanation of differences in business performance. Such a model could include the following:
- Market output values prioritised in terms of their impact on business performance
- Efficiency factors prioritised in terms of their impact on business performance
- Functions prioritised by reference to their impact on the market output values and efficiency factors
- Functional resources prioritised by reference to their importance to functional outputs
- Inter-functional relationships prioritised by reference to their impact on market output values and efficiency factors
- Functional resources prioritised by reference to their impact on inter-functional relationships.

The prioritised analysis of outputs and their supporting resources may be an advance in the search for improved explanation of the differences in firm performance.

The following chapter is a discussion of such a theoretical model.
CHAPTER 3 - THE OUTPUT BASED VIEW OF THE FIRM

3.0 Introduction

The theoretical approach developed in this literature review is not entirely new but has simply been neglected recently in the corporate strategy literature. For example, linking functional importance to strategic performance was last studied by Hitt, Ireland and Palia (1982). Taking a market orientation (customer preference) to explaining differences in business performance has been discussed in the marketing literature recently (Slater and Narver, 1994, Hunt and Morgan, 1995, 1996). The marketing literature highlights the importance of customer preferences – an implied contingency variable in understanding a firm’s strategic orientation and performance.

This chapter develops a hypothetical framework, which relates business performance to a combination of market and efficiency performance factors. These factors are in turn dependent on the performance of functions, which are a varied collection of interrelated tangible and intangible resources. The model is therefore an explanation of business performance based on an initial market orientation as defined by market observable factors. This discussion defines the output-based view of the firm and operationalises these output values. A model of the output-based view of the firm is presented and propositions and hypotheses developed. The final discussion concludes with the theoretical contribution that this explanatory model makes.

3.1 The output based view

Two theoretical models are developed to explain the output-based view of the firm. The term model is being used here in the sense that it provides a graphical presentation of relationships between concepts. It suggests the direction of these relationships and is the basis for later quantification. The development of a theoretical model is recommended as a precursor to statistical testing (Hair, et al, 1998). In this way the theory can be tested for “fit” with the data. As any one model is only an approximation of reality, these two models give different but complementary perspectives on the same research phenomena. There are theoretically an infinite number of models that could be developed to explain differences in business performance. This discussion justifies the models developed here.

The first model establishes which outputs and inputs to include and relates these factors to the environment. The second model defines the relationships between particular outputs, efficiency and price variables to business performance. Jointly understanding these two models could make the resultant theory cohesive.

3.1.1 A model of the value/performance chain

The first model is the distillation of prior models and studies. It does not claim to be a causal explanation of business performance. It does link a number of concepts in a new way. These concepts are the value chain, strategic congruency, the resource-
based view of the firm, and distinctive competencies. The purpose of the model is to position this study in relation to these concepts. In other words it does not test all of the possible relationships described in the literature but focuses on identifying the important output values of the process and the relative importance of the primary value chain functions that produce them.

**A Model of the Value/Performance Chain**

This model divides the study of performance into two parts. The first are the output values from the conversion processes within the firm. These output values are the visible "above the line" variables which are seen by the customer. These are the values, which form the basis of the transaction between the supplier and the customer. The essential features of these "above the line" variables are that they have value to the customer and that they are directly observable by the customer in an intangible (service) or tangible (product) form. Some prior studies on the relationship of performance to firm factors have mixed these above the line and below the line variables in an arbitrary fashion. For example labour efficiency (below the line variable) is used with customer responsiveness (above the line variable) (Cleveland, et. al, 1989, Ferdows and Lindberg, 1987, Hayes and Clark, 1985, Lindberg, 1990, Vickery et. al, 1993.).
The output values therefore exclude all the "below the line" variables, which are the basis of transforming inputs into outputs. For example, the development of a new efficient production process or the restructuring of the customer service department to be responsive are not directly observable by the customer - the results of these changes certainly may be.

Why has this classification been developed? The theoretical justification is that firms compete on output values and are effectively competing on customer preferences. It is argued that knowing the relative importance of each of these values is the entry point in understanding the central theoretical strategy question of why firms have different levels of performance in an industry. Uniqueness of business performance reflects uniqueness of output values and hence uniqueness of functions. This classification is not evident in studies, which deal with functional performance (Greeley, 1995, Jaworski and Kohl, 1992, Slater and Narver, 1994, Reukert, 1992, Hart and Diamantopoulos, 1993). It is argued here that understanding the relative importance of the output values means that the underlying resources creating that performance can be measured in relative terms. This framework can then be used to test for differences in firm performance. It could be expected that certain patterns of output values and resource configurations could have higher performance capabilities than others. Particular configurations of output values potentially create above average business performance.

The model links the firm's functions to these prioritised output values and by examination of the relative impact of the functions on these output values derive the relative importance of the functions. This combination of relative output value and relative functional impact is the basis of future examination of "below the line" variables.

Theory has focussed on relating below line variables to performance (Peteraf, 1993, Rumelt, 1991, Schmalensee, 1985, Rumelt, 1984, Cave and Porter, 1977, Yao 1988, Ghemawat, 1986, Dierickx and Cool, 1989, Wernerfelt and Montgomery, 1988, Hansen and Wernerfelt, 1989). It is suggested by this model that improved explanatory power can be gained by focussing on the functions that have the greatest impact on the important output values. With this knowledge study can be directed at below the line variables i.e. the structure, skills, resources, processes, integration, coordination, congruency and distinctive competencies of the prioritised functions.

This model is therefore unique in a number of important ways. It explains differences in financial performance by understanding differences in the performance of output values. It prioritises functions in relation to prioritised output values. In order to achieve this it has operationalised output variables in a way, which is implicit to Porter's value chain.

In addition, a determinant of the relative financial performance of a firm could be the relative cost of producing the output (Galbraith and Schendel, 1983; Hambrick, 1983; Dess and Davis, 1984; White, 1986; Miller, 1988; Robinson and Pearce, 1988; Davis and Schul, 1993; McKee et al., 1989, O'Farrell et al, 1992, Cool and Schendel, 1988). Theoretically two competing firms may score equally well on the dimension of output value and yet still have significantly different financial performances. The difference
could be explained in terms of differences in productivity i.e. cost. This model does not look at the detailed internal structures, processes and assets that generate the cost. It takes total cost as the summation of the underlying transformation activities and assets. The model relates the total cost to the relative impact on cost of each function i.e. which functions can influence the total cost performance. Those functions, which impact on output values, need not necessarily be the same functions that impact significantly on cost. In this way the model is unique in that it could show the relative impact of functions on cost.

The model suggests that environmental variables impact on firm performance. Previous studies have shown that the environment may explain as much as 20% of performance difference (Powell and Schmalensee, 1985, Wernerfelt and Montgomery, 1988, Rumelt, 1991.). The model in this study excludes the environmental variables and controls for them by selecting and comparing companies from within the same industry. This approach has been used in prior studies. The presupposition being that these environmental variables impact companies in the same industry equally as suggested by a number of authors (Lewis, 1992, Rovizzi and Thompson, 1992; Davis et. al, 1991, Kay, 1993, Ramaswami et al 1993). The theory would suggest that the model should fit cross industry data less well than data, which is industry specific.

The model is seen as adding to the development of theory in the way it classifies above and below the line variables, the way in which these variables are related to functions and finally the operationalisation of these variables.

3.2 Introduction to the second theoretical model

From the discussion of the literature the following theoretical model is developed and explained.
FIGURE 4: THE RELATIONSHIPS BETWEEN RESOURCES, OUTPUTS, EFFICIENCY AND PERFORMANCE – THE OUTPUT BASED VIEW OF THE FIRM.

Resource Advantage (Firm functions)
- Operations
- Marketing
- Purchasing
- R&D
- Distribution
- After sale service

Cost advantage (Firm efficiency)
- Labour
- Capital
- Capacity utilisation
- Overhead

Customer preferences

Interaction

Market advantage (Firm outputs)
- Customer responsiveness
- Quality
- Innovation

Competitive advantage (Firm performance)
- Market share
- Return on investment
- Return on sales

Direction of resource prioritisation by customer preferences (as understood by the firm) via prioritisation of efficiency and firm outputs

Direction of resource, efficiency and firm output congruency with customer preferences (actual) results in firm performance.
The model primarily relates functions to output values (market advantage) and efficiency (cost advantage) and these in turn to business performance. Central to the logic behind these relationships is that the output values have a relationship with business performance and that they define the relative priorities of functions and their underlying resources.

The model suggests that the nature of the underlying resources will generate a resource advantage, which could be revealed in two types of advantage. These are cost advantage and market advantage. The effectiveness of the underlying resources will either result in tasks being performed at a lower cost than competitors and thereby giving rise to a cost advantage to the firm, or the resources will give rise to improved effectiveness in performance on the output values of the firm. This could give rise to a market advantage. Cost and market advantages arising from resource advantage and may occur simultaneously. In combination cost and market advantages give rise to the firm’s overall competitive advantage i.e. the ability to generate above industry average rates of return. The model therefore suggests that a resource advantage is not directly connected to a competitive advantage, but is first transformed into either a cost or market advantage or a combination of both.

What then is the contribution that this model makes to theory? This model is novel for a number of reasons:

- It uses the relationship between the output variables and business performance to prioritise the output variables and in turn prioritise the firm’s primary functions by reference to the high performing output values. The relationship of firm variables to business performance has not been deliberately limited to market visibles (outputs) in prior strategy studies. Prior studies have used a mixture of internal and external variables (Ramaswami, Flynn and Nilakanta, 1993, Hill, 1988, Miller and Dess, 1993).
- This model has linked functions to output values in order to prioritise them. Studies that include functions are often an examination of one function (Vickery, Droge and Markland, 1993). These studies evaluate functions on a range of internal and external variables without theoretical discrimination.
- Studies on the resource-based view of the firm make no attempt to prioritise the relevance of the studied resources (Mata, Fuerst and Barney, 1995). This theoretical model at least provides a prioritisation mechanism of the underlying functional resources. The prioritisation of inter-functional coordination can be added to this model to develop a cohesive explanation of business performance.
- Customer preferences as understood by the firm are given a central role in determining the relative value of the outputs of the firm.

The characteristics of this model aims to address some of the limitations of the studies discussed earlier and forms a limited set of relationships in the search for a high level of explanation of variance in business performance.

A detailed justification of the model from the literature follows:
3.3 General support for the model

Prior studies have given support for the emphasis of output values as the prioritising mechanism for the internal arrangements of the firm. For example, Mathur (1988) has described competitive strategy in the following terms:

"When discussing competitive strategy it is important to make two vital distinctions. The first one is that competitive strategy is primarily concerned with the positioning of the firm's outputs (or offerings), not of inputs. Outputs are what the customer buys - the benefits that he or she considers when making a buying decision. By contrast, inputs are the internal resources that go to make up what a firm offers to its customer. Of course there is an important linkage between inputs and outputs. But customers buying decisions are concerned solely with outputs and it is for their business that firms compete. The competitive positioning of outputs is where competitive strategy starts. The second vital distinction that has to be made is between a static and a dynamic view of a market" (p 30).

Mathur (1988), views changes in the market place as guiding changes in resources:

"The question "How do we compete today and how should we compete tomorrow?" is central. Tomorrow's positioning must take into account likely competitive moves and customer preferences. The answer could be incomplete until the changes required in the firm's internal skills and resources have been identified. Yet it is the outputs that determine the nature of the required changes" (p 57)

Mathur's "Transaction Lifecycle" (p 56) approach does not introduce the concepts of variability, imitability and the constrained nature of strategic decision-making because of historical resource decisions. It is primarily a defence of the a priori nature of output values.

Porter (1996) implies an output-based approach in his definition of strategic positioning:

"Strategic positioning means performing different activities from rivals' or performing similar activities in different ways" (p 62).

If this definition of strategic positioning applies only to internal activities, definitional problems arises as to what is operational effectiveness, as being better (Page 62) than rivals, implies differences in processes, skills, resources and outputs.

He continues:

"Competitive strategy is about being different. It means deliberately choosing a different set of activities to deliver a unique mixture of value" (p 64).

The crux of these definitions is the concept of value – and in particular, unique value. If unique activities do not generate unique and valuable outputs, the firm's strategy cannot be considered as competitive. The introduction of the concept of value
demarcates the essential difference between strategic positioning and operational effectiveness. What then is value?

Value is the utility sum of the entire non-price, product and service attributes offered by the firm, that the customer is willing to pay for. Firms attempt to increase their competitiveness by “adding value” (Wood, 1996).

Output value; for the purposes of this study, are those product and service attributes that can be “seen” in the market place and have value to the customer. The commonly cited output values in previous studies have been customer responsiveness, (Siguaw, Diamantopoulos, 1995, Golden, Johnson, Smith, 1995, Veliyath, Srinivasan, 1995) innovation, (Ramaswami, Flynn and Nilakanta, 1993, Parker and Helms, 1992, Atuahene-Gima, 1996) and quality (De Man, 1994, Dess and Davis, 1984, Corsten and Will, 1995). Each of these output values is explained in detail in the sections that follow.

Customer responsiveness is defined as the ability of the firm to adapt its operational capabilities to meet changing customer needs. Innovation is the ability to create new products and services with features that have value to customers. Quality is the ability to consistently conform to customers' specifications. Central to these definitions is the concept of ability. These abilities are the distinctive competencies (McGrath, MacMillan and Venkatraman, 1995, Snow and Hrebiniak, 1980), through which the resource-based view of the firm is linked to contingency theory.


"Furthermore, there may be great ambiguity as to specifically which resources are being used to produce the main values attributes. These two sources of causal ambiguity (resource to offering; offering to consumer) can create great uncertainty and thus render ineffective attempts to neutralise a competitor's comparative advantage” (p16)

Hunt and Morgan (1995, 1996) link customers to outputs and outputs to resources. They have labelled resource advantage as comparative advantage and emphasised its link to varied customer preferences. Their model links resources to cost advantage through efficiencies. They offer their model as an improved explanation of micro and macro economic performance. They do not include inter-functional coordination as a comparative advantage and they justify the inclusion of potential competitors because they may change the dynamics of the market. Potential competitors may change aggregate supply, but the direct relationship as a prioritising mechanism for resources, is not fully justified by Hunt and Morgan (1995, 1996). They do not test their model. The comparative advantage view of business provides marketing and micro and macro economic support for this project’s model.
3.3.1 Discussion of the customer responsiveness output value

The operationalisation of customer responsiveness is implied from a number of frequently cited studies in corporate strategy. These are shown in the table below:

**Table 3: Operationalisations of the customer responsiveness concept**

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Date</th>
<th>Type of Study</th>
<th>Customer Responsiveness Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitt M, Ireland R and Palia K</td>
<td>1982</td>
<td>Functional importance by grand strategy type</td>
<td>Product availability</td>
</tr>
<tr>
<td>Hambrick D</td>
<td>1983 (a)</td>
<td>Tests of Miles and Snow typologies</td>
<td>Relative service</td>
</tr>
<tr>
<td>Anderson C and Zeithaml C</td>
<td>1984</td>
<td>Product life cycle, strategy and performance</td>
<td>Frequency of product change</td>
</tr>
<tr>
<td>Dess G and Davis P</td>
<td>1984</td>
<td>Determinants of strategic group membership</td>
<td>Customer service, Capability to manufacture speciality products</td>
</tr>
<tr>
<td>White R</td>
<td>1986</td>
<td>Generic business strategies</td>
<td>Flexibility, Technical service, Availability</td>
</tr>
<tr>
<td>De Meyer A, Nakane J and Ferdows K</td>
<td>1989</td>
<td>Manufacturing futures survey</td>
<td>Ability to deliver on time</td>
</tr>
<tr>
<td>Hall R</td>
<td>1993</td>
<td>Intangible Resources and Capabilities</td>
<td>Ability to manage change, Customer/after sales service</td>
</tr>
<tr>
<td>Vickery S, Droge C and Markland, R</td>
<td>1993</td>
<td>Production competence and business strategy</td>
<td>Product flexibility, Process flexibility, Delivery speed, Delivery dependability, Production lead time</td>
</tr>
<tr>
<td>Kim J and Arnold P</td>
<td>1992</td>
<td>Manufacturing competence and business performance</td>
<td>Make rapid volume changes, Make rapid product mix changes, Customise products/services, Fast deliveries, Dependable delivery promises, Effective after sales service</td>
</tr>
<tr>
<td>Kim J and Miller J</td>
<td>1993</td>
<td>Manufacturing futures survey</td>
<td>Delivery speed</td>
</tr>
<tr>
<td>Ferdows K and De Meyer A</td>
<td>1990</td>
<td>Manufacturing performance</td>
<td>On time delivery, Delivery speed</td>
</tr>
</tbody>
</table>
Customer responsiveness is a concept comprised of a number of different variables. The following variables appear as operationalisations of the customer responsiveness concept on an output basis:

- The ability to consistently meet delivery/service promises to customers
- The ability to change volume requirements for customers
- The ability to change the product/service offering
- The effectiveness of presale/post sale activities

Customer responsiveness factors have been applied to a wide range of studies, which tend to explain differences in business performance as a common purpose. For example, Dess and Davis (1984) found that variations of intra-industry profitability and growth were related to group membership. In Dess and Davis' (1984) study the concept “customer responsiveness” was not directly included but factors that could be said to operationalise the concept were. In this case it was “customer service” and “capability to manufacture speciality products”. This was a study of Porter's generic strategy concept.

There are other factors, which relate to customer responsiveness, used in different studies. For example Hall (1993), used customer responsiveness factors in a resource-based investigation of sustainable competitive advantage. In this case customer service and after sales service were the factors used. The methodology in the Hall (1993) study was case-based in contrast to the Dess and Davis study, which was a survey. Customer responsiveness variables are used extensively in combination with other variables, in a variety of methodologies, to explain differences in firm performance.

What then is this concept “customer responsiveness” and why is it apparently important to corporate strategy research? Customer responsiveness could be defined as the ability a company has to adjust its operations, in terms of availability and product/service mix, within a time scale, which meets customers’ needs. The ideas in this definition are mix and volume flexibility, reliability and timeliness. These are concepts, which can be operationalised in the market place. As a result “customer responsiveness” is classified as an “output value” in this model. It is important to the explanation of differences in firm performance because it may contain a large proportion of the utility value for which the customer is prepared to pay. Having the right products, consistently available at the right time, could be the order winning criteria of customers and the aim of suppliers. For this reason it can have a high impact on the revenue potential of the firm through either generating volume or a premium price or both. For these reasons the concept “customer responsiveness” is operationalised in this model through a range of variables drawn from the literature.

As the purpose of this model is to find a limited set of factors, which explains the differences in firm performance, the concept “customer responsiveness” could contain these factors. Above average performance on this concept could create a market advantage.
3.3.2 Discussion of the innovation output value

Innovation is the ability firms have to develop new functional product and service features that have value to customers. These features are directly observable in the market place. Customers are possibly going to use these features for direct comparison purposes between competing suppliers, making purchasing decisions in favour of those products/services that have a combination of functional features that maximise their utility function. Consequently, the ability firms have in identifying new functionality that has value to the customer and being able to bring those features successfully to the market, is going to have an impact on the firm’s ability to increase sales or charge a premium or both. Innovation is therefore considered a potential source of “market advantage”.

What then are the differences between “customer responsiveness” and “innovation”? Customer responsiveness is the ability to adapt operational process to ensure the availability of the right mix and volume of products/services, consistently, to meet the customers needs. It implies effective communication (demand management) with the customer. On the other hand innovation is the ability to create new product/service features that have value to the customer. Innovation creates answers to the question “what does your product/ service do for me?” and customer responsiveness provides answers to the question “when, where and how can I have it?” In this way innovation and customer responsiveness variables are outputs of the firm’s processes and visible in the market place.

Innovation abilities are required to provide increases in operational performance to support competitive customer responsiveness. In this way innovation is an ability, which impacts on all a firm’s processes. This model makes a distinction between innovation as a market observable and innovation as a beneficial ability on processes internal to the firm and not directly observable in the market. The ability to do the same things in new ways (internal innovation) could be as important as providing new things (external innovation). Innovation will impact on a firm’s efficiency (cost structure), but it is not the focus of this model to measure this relationship directly.

The following table provides regularly cited studies that have utilised the concept of innovation on an output basis.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Date</th>
<th>Type of Study</th>
<th>Innovation Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitt M, Ireland, R and Palia K</td>
<td>1982</td>
<td>Functional importance by grand strategy type</td>
<td>New product development</td>
</tr>
<tr>
<td>Miller, D and Friesen, P</td>
<td>1983</td>
<td>Strategy and the environment</td>
<td>Number of new products</td>
</tr>
<tr>
<td>Hambrick, D</td>
<td>1983 (b)</td>
<td>High profit strategies-A contingency approach</td>
<td>Product innovation expenditures Percentage sales from new products</td>
</tr>
<tr>
<td>Anderson, C and Zeithaml, C</td>
<td>1984</td>
<td>Product life cycle, strategy and performance</td>
<td>Development time for new products and services</td>
</tr>
<tr>
<td>Author(s) and Year</td>
<td>New Innovation Variables</td>
<td>Previous Research Areas</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>Dess, G and Davis, P, 1984</td>
<td>Determinants of strategic group membership</td>
<td>Developing/refining existing products, New product development</td>
<td></td>
</tr>
<tr>
<td>Prescott, J, 1986</td>
<td>Environment, strategy, performance study</td>
<td>R&amp;D expense to gross revenues</td>
<td></td>
</tr>
<tr>
<td>White, R, 1986</td>
<td>Generic business strategies</td>
<td>Product variations</td>
<td></td>
</tr>
<tr>
<td>Miller, D, 1986</td>
<td>Configurations of strategy and structure</td>
<td>New product sales percentage, R&amp;D percentage, Average age of products, Frequency of product changes</td>
<td></td>
</tr>
<tr>
<td>Kim, J and Arnold, P, 1992</td>
<td>Manufacturing competence and business performance</td>
<td>Make rapid changes in design, Introduce new products quickly</td>
<td></td>
</tr>
<tr>
<td>Powell, T, 1992</td>
<td>Organisational alignment</td>
<td>First to introduce new products, R&amp;D expenditure more than competitors</td>
<td></td>
</tr>
<tr>
<td>Hall, R, 1993</td>
<td>Intangible resources and capabilities</td>
<td>Ability to innovate</td>
<td></td>
</tr>
<tr>
<td>Vickery, S, Droge, C and Markland, R, 1993</td>
<td>Production competence and business strategy</td>
<td>New product introduction, Design innovation, Product development cycle time, Product technical innovation, Product improvement, New product improvement, New product development, Original product development</td>
<td></td>
</tr>
</tbody>
</table>

The innovation variables that can be distilled from the literature as measuring innovation on an output basis are as follows:
Time taken to introduce new products/services
Level of design innovation
Rate of new product innovation
Success rate of new products/services

Miller and Friesen, (1983) in a frequently cited study of the relationship between strategy making and the environment, used "the rate, relative to competitors, of new product/service introduction by the firm" (p232). They showed that output innovation was related to both the dynamism of the industry and the success of the firm. They did not, consider innovation as an output value but they included innovation as an internal capability i.e. "the rate of change in your methods of production or rendering of services" (p232), which could be appropriately classified as a customer responsiveness or efficiency variable in this model. One of the benefits of the output-based view of the firm is that it possibly helps to classify types of innovation in order to generate "distance" between concepts, which could otherwise overlap and become confused when operationalised and the results interpreted.

3.3.3 Discussion of the quality output value

The concept of quality is pervasive in prior studies, as the following table indicates. As described for the innovation variable, quality can be either an ability, which affects internal processes, or it can be a characteristic of the external product or service offered by the firm. It is this latter form of quality, which is of central interest to the model. This is because quality, which can be measured in market place terms, is considered to be an important factor influencing the firm’s ability to charge a premium price, increase revenues or both. Quality is an internal characteristic, which is related to the reduction of cost. This model, in attempting to isolate variables that directly affect revenues (the firm’s market advantage), does not directly measure quality as it impacts on efficiency and cost. The model suggests potential benefits in treating quality as a variable with internal and external properties.

Table 5: Operationalisations of the quality concept

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Date</th>
<th>Type of Study</th>
<th>Quality Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hambrick, D</td>
<td>1983 (a)</td>
<td>Tests of Miles and Snow typologies</td>
<td>Relative quality</td>
</tr>
<tr>
<td>Hambrick, D</td>
<td>1983 (b)</td>
<td>High profit strategies-A contingency approach</td>
<td>Relative product quality, Relative image, Relative service</td>
</tr>
<tr>
<td>Anderson, C and Zeithaml, C</td>
<td>1984</td>
<td>Product life cycle, strategy and performance</td>
<td>Quality of customer services relative to competitors, Product quality average in comparison to competitors</td>
</tr>
<tr>
<td>Dess, G and Davis, P</td>
<td>1984</td>
<td>Determinants of strategic group membership</td>
<td>Product quality control, Reputation within industry, Brand identification</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Year</td>
<td>Title of paper</td>
<td>Key Concepts</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------</td>
<td>------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Prescott, J</td>
<td>1986</td>
<td>Environment, strategy, performance study</td>
<td>Relative product quality</td>
</tr>
<tr>
<td>White, R</td>
<td>1986</td>
<td>Generic business strategies</td>
<td>Reliability, Image</td>
</tr>
<tr>
<td>Miller, D</td>
<td>1986</td>
<td>Configurations of strategy and structure</td>
<td>Product quality, Product image, Services quality</td>
</tr>
<tr>
<td>De Meyer, A., Nakane, J and Ferdows, K</td>
<td>1989</td>
<td>Manufacturing futures survey</td>
<td>Yield problems and rejects, Producing to high quality standards</td>
</tr>
<tr>
<td>Powell, T</td>
<td>1992</td>
<td>Organisational alignment</td>
<td>Price premium based on higher quality</td>
</tr>
<tr>
<td>Hall, R</td>
<td>1993</td>
<td>Intangible resources and capabilities</td>
<td>Reputation of product, Reputation of company, Functionality</td>
</tr>
<tr>
<td>Vickery, S, Droge, C and Markland, R</td>
<td>1993</td>
<td>Production competence and business strategy</td>
<td>Product durability, Quality (Conformance to specs), Design quality, Brand image</td>
</tr>
<tr>
<td>Kim, J and Arnold, P</td>
<td>1992</td>
<td>Manufacturing competence and business performance</td>
<td>Consistently low defect rates, Reliable products</td>
</tr>
<tr>
<td>Ferdows, K., De Meyer, A,</td>
<td>1990</td>
<td>Manufacturing performance</td>
<td>Quality conformance</td>
</tr>
</tbody>
</table>

The following output quality variables can be distilled from the literature.

- Consistency of conformance to customer specifications
- Quality reputation
- Strength of the brand on the quality dimension

In a study of the product life cycle, Anderson and Zeithaml, (1984), considered quality of services relative to competitors and calculated an average product quality. They found that quality was an important predictor variable of ROI in the growth and maturity phases of the product life cycle. This could suggest that quality as an "output value" impacts revenue generation in the growth phase and is possibly an important differentiating factor in the mature phase of the product life cycle.

Additionally, Venkatraman and Prescott (1990) showed in a study that tested the alignment between strategy and environment, that the importance of relative quality was a variable that maintained its importance to firm performance across a wide range external of environments.
These and other studies point towards the output value “quality” as being an important and robust measure of a firm’s market place competitiveness.

In summary, the three output value concepts of customer responsiveness, innovation and quality form the basis of the firm’s collective “market advantage”.

### 3.3.4 Discussion of the efficiency concept

Efficiency is not an output (market visible) concept. A theoretical model, which attempts to explain differences in firm performance, could include a concept (efficiency) that is related to cost, on the basis that business performance (profit) is a function of both revenues and costs. The efficient use of resources could be related to the competitive cost structure of the business. There could be strong covariance between the “cost advantage” of a firm and the “market advantage” as strong market advantage could produce higher volumes and these volumes could be the basis of acquiring lower cost inputs and generate lower per unit production costs. Additionally, the lower costs could be the basis of a market advantage through competitive pricing. In either case, measuring the efficiency concept is important in attempting to capture the maximum amount of variability in business performance.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Date</th>
<th>Type of Study</th>
<th>Efficiency Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitt, M, Ireland, R and Palia, K.</td>
<td>1982</td>
<td>Functional importance by grand strategy type</td>
<td>Efficiency of equipment</td>
</tr>
<tr>
<td>Hambrick, D</td>
<td>1983 (b)</td>
<td>High profit strategies-A contingency approach</td>
<td>Capacity utilisation Employee productivity Relative costs and prices</td>
</tr>
<tr>
<td>Anderson, C and Zeithaml, C</td>
<td>1984</td>
<td>Product life cycle, strategy and performance</td>
<td>Capacity utilisation average Employee productivity average</td>
</tr>
<tr>
<td>Dess, G and Davis, P</td>
<td>1984</td>
<td>Determinants of strategic group membership</td>
<td>Operating efficiency</td>
</tr>
<tr>
<td>Prescott, J</td>
<td>1986</td>
<td>Environment, strategy, performance study</td>
<td>Capacity utilisation Employee productivity Relative direct cost Manufacturing expenses</td>
</tr>
<tr>
<td>Harrigan, K</td>
<td>1985</td>
<td>Strategic group analysis by clustering</td>
<td>Employee productivity</td>
</tr>
<tr>
<td>White, R</td>
<td>1986</td>
<td>Generic business strategies</td>
<td>Labour productivity Capital intensity</td>
</tr>
<tr>
<td>Miller, D</td>
<td>1986</td>
<td>Configurations of strategy and structure</td>
<td>Relative cost per unit Capacity utilisation</td>
</tr>
<tr>
<td>De Meyer, A, Nakane, J and Ferdows, K</td>
<td>1989</td>
<td>Manufacturing futures survey</td>
<td>Overhead costs</td>
</tr>
</tbody>
</table>
The following are operationalisations of the efficiency concept found in the literature:

- Unit output costs of the operations process
- The ratio of capital to output (capital efficiency)
- Ratio of labour cost to output (labour efficiency)
- Level of capacity utilisation

Prescott (1986), in a frequently cited study of various environments as moderators of the relationship between strategy and performance, showed that capacity utilisation and employee productivity were significant predictors of performance over a range of business environments. Likewise Hambrick (1983) showed that capacity utilisation (asset parsimony) was an important factor within a number of high performing clusters in the capital goods manufacturing industry.

These studies indicate that capital efficiency, cost efficiency and employee productivity are important and robust measures of the "cost advantage" concept in the theoretical model presented in this study.

In summary, the model has addressed the basic components of operating profit, namely revenues and cost. The revenue generating potential of the firm is measured through its "market advantage" as seen in "market visible" customer responsiveness, innovation and quality variables and through its "cost advantage" as measured through its efficiency variables.

### 3.3.5 Discussion of the concept of functions

The ability of a firm to generate either a cost or market advantage is a result of its mix of tangible and intangible resources. These resources are embedded in a firm's functions. Functions in the context of this study are logical groupings of skills and assets with similar operational goals. For example the operations function in a manufacturing firm could contain a range of interrelated assets and skills for the purpose of producing a common set of products. The second theoretical model developed in this study posits that the importance of these assets and skills to both cost advantage and market advantage is varied. Consequently the effectiveness of these functions will have a varied impact on the output values and efficiency of the firm (Hunt and Morgan, 1995, 1996). It is beyond the scope of this study to analyse the exact mix of tangible and intangible assets in each function. Functions are a mid range concept to act as a proxy for these unique configurations of assets.
Table 7: Operationalisations of the functions concept

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Date</th>
<th>Type of Study</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snow, C and Hrebiniak, L</td>
<td>1980</td>
<td>Strategy, distinctive competence and organisational performance</td>
<td>General management, finance, marketing, market research, product R&amp;D, engineering, production, distribution, legal affairs, personnel</td>
</tr>
<tr>
<td>Hitt, M, Ireland, R and Palia, K</td>
<td>1982</td>
<td>Functional importance by grand strategy type</td>
<td>General administration, Production/operations, Engineering/R&amp;D, Marketing, Finance, Personnel, Public and government relations</td>
</tr>
<tr>
<td>Ferdows, K and De Meyer, A.</td>
<td>1990</td>
<td>Manufacturing performance</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Kim, J and Arnold, P</td>
<td>1992</td>
<td>Manufacturing competence and business performance</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Vickery, S, Droge C and Markland, R</td>
<td>1993</td>
<td>Production competence and business strategy</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Kim, J and Miller, J</td>
<td>1993</td>
<td>Manufacturing futures survey</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

The empirical testing of the impact of functional level strategy on business performance has not been extensively developed in the strategy literature (Hitt et al, 1982). Most studies on functional level strategies have been in manufacturing. A wider coverage of functions could possibly give improved insights into the differences in firm performance. The following functions emerge from the literature as candidates:

- Purchasing
- Research and development
- Operations
- Distribution
- Marketing
- After sales customer support

These represent (other than purchasing – which is included because of its potential impact on input costs and R&D because of its potential impact on innovation), Porter’s (1985) primary value chain functions.
Hitt, Ireland and Palia (1982) showed that functional importance was significantly different depending on grand strategy type. Additionally they found that functional importance varied by production type (batch size and continuous production). They did not attempt to relate functional importance with either a cost or market advantage. One of the aims of the model is to make that assessment. Resources combine in unique ways to create a “resource advantage”, which manifests in functional effectiveness.

### 3.4 This model’s theoretical contribution

By way of concluding the literature review the following is an assessment of the theoretical contribution that the theoretical model makes using Whetton’s (1989) criteria.

Any contribution that this model makes is built on the work of others.

As stated by Whetton (1989):

> "Most organisational scholars are not going to generate a new theory from scratch. Instead, they generally work on improving what already exists" (p492)

The model could have made a contribution by extending the “what, how, why” and “who, where, and when” elements of prior research (Dubin, 1978).

In terms of the “what” of theory development this model could provide a valid set of factors in relation to the phenomenon under study, namely functions, output values, efficiency and business performance.

In terms of “how” the theoretical model suggests the relationships between these factors, namely functions underpinning cost and market advantages which in turn support the firm’s overall competitive advantage. In other words the model links higher rates of returns to underlying resources via competitive cost and revenue performances.

In terms of “why” it provides an orientation towards customer preferences as a contingency that determines what constitutes a market advantage and a prioritisation of resources. The model therefore makes a contribution by extending the two descriptive elements of “what” and “how” and in explanation through the extension of “why”.

In terms of “whom, where and when”, which are the limits of the generalisation of the theory, this model could include within and between industry comparisons to test the limits of generalisability.

#### 3.4.1 Extension of “What”

The objective of this model, as with a number of strategy models, is to explain differences in business performance – this is the prime phenomenon under
consideration. To achieve this, the output-based model provides an argument for the emphasis on "market visibles" or output values, namely customer responsiveness, innovation and quality. Whilst these concepts have been used extensively in prior studies, they have not been grouped in this manner before. This in turn influences the operationalisation of the underlying variables because they too must share the common characteristic of being "visible" in the market place and develops a new emphasis in explaining differences in business performance. The model uses these variables as a means of prioritising functions to generate insights in development of theory (Whetton, 1989).

The variables in this model are developed from prior theoretical models. Based on the results of those studies they reflect a new combination of these variables to identify the resource, cost and market advantage and business performance concepts in the model.

3.4.2 Extension of "How and why"

The model suggests that the choices that customers make about which product and service to buy are based on product attributes visible in the marketplace. This is not to suggest that all customers have perfect knowledge about the existence of all the product/service features. Knowledge about the product and service features that are not visible in the marketplace is excluded from their choice criteria.

In a market place where customers have choices, it is the choices that customers make which will have a significant impact on firm performance. Increased customer choice for one supplier over another could lead to increases in turnover, price premiums, market share and possible economies of scale. This variability of choice could be a function of differences in the nature of output values (market visibles) of firms and completeness of customers' knowledge of each firm's product/service offering. The model therefore, links differences in a firm's business performance to differences in the firm's performance on output values. The model reflects this linkage and "Adds order to the conceptualisation by explicitly delineating patterns" (Whetton, 1989, p491)

The central application of this theory is that if managers can strategically position their businesses on the important output values and generate high levels of performance on them, this could have a significant impact on business performance.

Having established a "prioritisation mechanism" of output values based on their relationship to business performance the model in this study derives functional importance from each function's relationship with the prioritised output values. The model suggests that the relative importance of each function is not uniformly distributed among functions. Different functions will impact on different outputs in different ways and degrees.

This cohesive linkage of functions to output values is new in the strategy literature. The marketing literature has developed similar untested ideas (Hunt and Morgan, 1995, 1996) Other studies have included some output values and internal performance
criteria in the evaluation of one or other functions, and have done this to measure that function’s relative strategic importance to generic strategies rather than output values in particular (Vickery, Droge and Markland, 1993). Why should this theoretical shift be necessary? The answer is that output values are produced by the firm’s value chain (Porter, 1985) and this comprises functions that are linked in various ways. An explanation of differences in business performance could be comprehensive by first linking functions to business performance via output values.

The varied nature of functional importance is derived from the varied nature of customers’ preferences for the output values produced by the firm. Underlying functions are resources (Barney, 1991, Peteraf, 1993), which enable the outputs to be produced. These resources themselves could be varied in terms of their impact on output values and business performance. Studies of the resource-based view of the firm are predominantly inward looking (i.e. they are operationalised through internal variables) and do not adequately link resources to external variables and in particular to the output values of the firm. This linkage is logically important as it establishes the resources that have greatest value to the firm and are the source of their competitive advantage. The durability of that competitive advantage could be a function of the rapidity of change in customer preferences and the ability of competitors to imitate output performance.

Identifying the relative importance of functions is viewed in this explanation as a necessary part of the process in focussing on the relative importance of underlying resources. The studies of resources, competitive advantage and core competencies lack this external prioritisation. The model contributes to theory by providing a logical and systematic approach in the search for patterns of strategic importance, recognising that these patterns may vary by industry.

How stable is this model when applied to different contexts of “Whom”, “Why” and “When?” (Dubin, 1978) The model suggests patterns of importance between output values, functions and business performance and these patterns of importance could vary between industries. Whether similar industries but in different countries (extension of the theory) will have similar patterns of relationships is not known. Geographic location could modify the explanation of differences in firm performance.

The patterns of importance suggested by the model may not necessarily remain stable over time. If the source of the changes were to be consistent with this model, the changes would have to be shown to be arising from a shift in customers’ preferences.

Changes in the patterns of importance over time would not invalidate the theoretical contribution made by this model but could rather underline the reasonableness of evaluating the economic importance of functions and resources through the prioritisation mechanism of output-based values as shaped by customer preferences.

3.4.3 A summary of how this model improves the explanation of differences in business performance

Business performance can be viewed as a function of revenues, costs and resources. Prior explanations of business performance have used parts of this function. For example relating organisation types or functional competencies to business
performance. It is the incomplete nature of these explanations that result in weaknesses. Some of these explanations are incomplete structurally and in content. For example the functional view of business performance is structurally incomplete because it links functional importance directly to business performance rather than via cost and market advantages. This model could improve explanation of business performance by recognising that functions produce both market outputs and costs and are thereby only indirectly related to business performance. The model develops a range of cost and market outputs which are directly related to business performance.

Unlike previous explanations of differences in business performance this model groups variables into those that are visible in the market place and affect revenues and those that are “below the line” and affect costs. In prior explanations of business performance variables that affect cost and variables that affect revenues have been used together without distinction. This model could improve explanation of differences in business performance by showing the relative importance of cost and market advantages to business performance. Within cost and market advantages the particular variables that are important to business performance could be identified.

The resource-based view of the firm suggests that business performance can be explained through characteristics of input factors. Take for example the uneven availability of certain important raw materials. This view is potentially limited because it does not sufficiently consider the importance to customers of the outputs of these resources. The proposed model suggests that the importance of resources is based on their relationship with the important cost and market variables. In this way the model may provide an improved explanation of the relationship of resources to business performance. Prior resource based explanations of business performance often emphasise one type of resource. The proposed model contains a wider coverage of functions (and hence resources) than is found in prior studies and as a result could improve the explanation of differences in business performance.

3.4.4 A summary of how this model may help managers

The model when applied at the industry (or industry cluster) level could provide a number of insights that may be helpful to managers. It could provide an overview of which cost, market and resource factors combine to produce higher business performance in the selected group of firms. At a SBU strategic level the model could indicate the comparative importance of cost and market advantage to business performance. For example should managers emphasise cost or market advantages in the development of organisational structure, competencies and resources. The model could indicate which efficiency or output values could be emphasised in achieving higher business performance.

In the development of functional level strategies the model may be useful to managers by indicating which functions are important to cost and market advantages. This knowledge can be useful in ensuring that there is consistency in the development in important resources and competencies. This may help to keep functional strategic choices made by functional managers consistent with the strategic SBU choices made by executives. The knowledge of which are the important functions can focus managers’ time on the underlying resources, competencies and processes that make those functions important.
Corporate level managers may find the model useful when it is used for cross industry comparisons. It is possible that different industries may have different combinations of cost and market advantages and resources to explain differences in business performance. Understanding which SBU and functional level strategies are important in the industries of interest may help in making portfolio management decisions. For example how would an acquisition fit with existing SBU resources and competencies? What would be the opportunities for the transfer of skills?

The model may be useful to managers at corporate, SBU and functional levels.

3.5 Literature review summary

The output-based view of the firm builds from contingency theory to the resource-based view of the firm through prioritisation of outputs and functions. The primary external contingency is customer preferences, which determine the ranking of output values in terms of their impact on business performance. The presuppositions to this model are that there is effective customer choice in the market place and that these preferences are reasonably stable over time. The means of meeting these preferences may not be as stable.

Prior studies that attempt to explain differences in firm performance have tended not to categorise variables on the basis of whether they are outputs or whether they are factors internal to the firm. These studies have mixed the two types of variables in searching for environmental, structural or competency explanations of firm performance.

The prioritisation of output values in turn influences the relative importance of functions (competencies, assets, processes). Prior discussion of the resource-based view of the firm has largely neglected the valuation of resources from the perspective of the outputs they produce. Instead these discussions tend to focus on the value of resources being derived from their limited availability. The output-based view suggests that the value of a firm’s resources is in direct relationship to the value of the goods and services that they produce or the cost advantage they create. In other words resources do not have intrinsic value rather they have derived value.

The features of the output-based view of the firm are summarised in the table below.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Justification</th>
<th>Prior studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prioritisation of firm’s outputs based on customer preferences</td>
<td>Revenues flow to a firm in relation to its ability to meet customers preferences</td>
<td>Tended to view outputs in general terms such as market share (e.g. PIMS studies).</td>
</tr>
<tr>
<td>Categorisation of variables into above and below the line types based on whether they are visible in the market or not</td>
<td>Profits are a function of revenues and costs. Above the line variables focus on revenues and below the line variables focus on</td>
<td>Market variables used in a mixed way with other internal variables or environmental variables. No clear treatment of</td>
</tr>
</tbody>
</table>
In addition the expectation (as a result of different customer preferences between industries) is that the variables that are important in one industry are could be different in other industries.

Certain aspects of this view of business performance are investigated in the chapters following.
CHAPTER 4- METHODOLOGY

4.0 Introduction

The theoretical model developed from the literature review is largely of the theory verification type. For example the relationship of a number of the market output to business performance variables have been tested in prior studies in various configurations for different purposes (Bogner, Thomas and McGee, 1996, McGee and Thomas, 1986, Miller and Dess, 1993). The theory verified here is therefore descended from a long tradition in the literature that examines differences in business performance. Consequently, to some extent, the concepts and the underlying variables are not new, but how they are configured together into one cohesive proposition is new.

This means that the use of qualitative research does not carry as much importance as quantitative research in this case, (Yin, 1994, Miles and Huberman, 1994) as the categories and relationships used in the model have a background in the literature. A number of the prior strategy studies have used quantitative data, in particular survey data (Dess, Ireland and Hitt, 1990, Lenz, 1981, Rumelt, 1991, Slater and Narver, 1994, Venkatraman and Prescott, 1990, Powell, 1992, Dess, Lumpkin and Covin, 1997, Venkatraman, 1990). As a result previous researchers have used a number of variables consistently to test concepts. The established existence of these variables gives some weight for the use of quantitative measures. The model defines the relationships to be tested. These have been built from the contingency and resource theories. When the relationships in the theory are built on prior theories the appropriate methodology to test these relationships is quantitative research (Yin, 1994, Miles and Huberman, 1994). However the methodological justification used is based on the nature of the problem investigated. This is discussed in section 4.2

The chapter first discusses the use of initial interviews to validate the variables and relationships of the model with senior businessmen. Secondly the development of the survey instrument is examined. Thirdly pilot testing of the questionnaire is explained. Fourthly sample selection and the main survey are discussed. How the data are to be explored is discussed as well as the statistical procedures. Fifthly the post survey interviews are discussed. Finally the weaknesses of the methodology are discussed, with recommendations for future improvements. The following diagram shows the steps followed in this research:
FIGURE 5: THE METHODOLOGICAL STEPS

Propositions

Methodological justification

**Step 1**
- Pilot Questionnaire and Sampling Design

Step 2
- Pre Survey Interviews

**Step 3**
- Pilot Test

Step 4
- Main Survey

**Step 5**
- Post Survey Validation

**Statistical Tests**
- Discriminant analysis
- Multiple regression

**Data Tests**
- Reliability
- Validity
- Bias
- Missing data
- Outliers
- Homoscedasticity
- Linearity
- Collinearity
4.1 Propositions

The development of propositions follows a two-stage pattern in this study. They begin with the highest possible level of aggregation and then examine the relationships identified in the theoretical model in greater detail.

4.1.1 Controlling Proposition.

*Competitive advantage is a function of a varied set of market, cost and resource advantage variables and these relationships vary between industries*

The objective of this study is to create a model, which explains a significant proportion of the variability in business performance. The above proposition is predicated on the notion that resource advantage is the fundamental level of competitive advantage as it is the basis for creating either a cost or market advantage or both. Cost and market advantages are intermediate level advantages, which combine to determine the overall competitive advantage of the firm. In simultaneous combination, these variables could explain a high proportion of business performance. This approach of identifying a number of potential contingency variables and testing them simultaneously is based on well-established methods.

For example, Grinyer, McKiernan and Yasai-Ardekani, (1988) showed in their study of contingent variables in the UK Electrical Engineering Industry, a conjoint analysis of “contingent strategic, market, planning, and organisational contingencies” (p 298), which explained a high proportion of business performance variability.

It is possible to use a similar methodology but rather than using an eclectic selection of contingent variables, this research confines itself to and justifies resource, cost and market advantage variables. The model implies that a systematic understanding of output values, efficiency and resource variables is the appropriate route to a prioritised understanding of the other variables used by Grinyer et al which are largely aspects of firm tangible and intangible resources.

There is an implication that the theoretical model will fit the data to a significantly improved degree at an industry level. As Grinyer et al (1998) note,

“Our findings indicate clearly that models applied at the level of SIC industries by industrial economists may equally, and theoretically most appropriately be applied at that of the market. In this they provide empirical support for Caves and Porter (1997), who argue that the appropriate level of analysis is the sub-industrial group...Equally economists need to recognise that company specific factors, including superior resources, may influence profit margins strongly” (p313).

To test this proposition multiple regressions are used. These regression equations are compared and contrasted between industries.
4.1.1.1 Hypothesis 1 – output values and business performance

H1: There is a positive relationship between output values; efficiency, price and business performance and these relationships vary by industry.

This proposition is derived from the revenue-related concepts in the theoretical model; namely, output values and price and the cost related concept, namely efficiency. The basic notion is that these concepts do not have equal importance to business performance. According to Venkatraman (1990), it is the varied nature of these relationships, which are of primary interest in understanding the sources of competitive advantage.

This proposition extends the analysis of the varied nature of the relationships, by examining variations between industries. The strategic reference points, as defined by Fiegenbaum, Hart and Schendel (1996), could possibly vary between industries and consequently explain differences in importance of underlying competencies between industries.

The final point that this proposition makes is that the explanatory power of the model could increase as the level of industry aggregation is reduced. This arises because the specific nature of competitive advantage is lost when industries are merged.

Hypothesis 1 is tested in two stages. The first stage is a two-group discriminant analysis where the groups are the manufacturing and service sectors respectively and the significant predictor variables are identified. The sub hypothesis for this first stage is stated as follows:

H1a: There are varied relationships between output values, efficiency, and price and industry types.

The second stage is a multiple regression where output values, efficiency and price are related to business performance. The sub hypothesis for this second stage is as follows:

H1b: The higher the effectiveness of performance on output, efficiency and price the higher will be business performance.

Three multiple regressions are performed: one for the full data set (with validation and hold out samples) and one each for the manufacturing and service sectors.

4.1.1.2 Hypothesis 2 – output values, efficiency and functional impact

H2: There is a positive relationship between output values, efficiency, and functional impact and these relationships vary by industry.
This proposition suggests that the relative importance of functions varies between and within industries. The purpose of this proposition is to enable a degree of generalisation of the output based view of the firm. On the one hand not only does the relationship of functions to output values vary, but on the other it varies across industries. Consequently important functions and competencies in one industry will not be as important in another. As concluded by Hitt, Ireland and Stadter (1982), the variability of functional importance has strong implications for strategic management at the corporate, SBU and functional levels.

The central notion to the proposition is that the relative importance of functions varies by its impact on the output values. The importance of the proposition derives from the possible insights that may be obtained into the functional resources that form the basis of core competencies and competitive advantage (McGrath, MacMillan and Venkatraman, 1995, Snow and Hrebiniak, 1980).

As discussed in the literature review, the model gives emphasis to the importance of customer preferences in determining the priorities of both firm efficiency (cost advantage) and market advantage (output values). Market advantage, as reflected in the firm’s relative performance on “visible to the customer” output values; will determine the quality of the revenues the firm earns (price premium and volume). Firm efficiency determines the cost base of the firm. These two factors in combination give rise to the quality of the firm’s business performance (competitive advantage). There is an interaction effect between the cost and market advantages, for example volume can sometimes facilitate efficiency.

The importance given to a firm’s resources is derived from the relative importance of the firm’s cost and market advantages. The resource advantage of a firm, in this model, is only indirectly linked to the firm’s competitive advantage through its cost and market advantages.

Hypothesis 2 focusses on resources and is tested in two stages. The first stage is a two-group discriminant analysis where the groups are the manufacturing and service sectors respectively and the significant predictor variables are identified. The sub hypothesis for this first stage is stated as follows:

\[ H2a: \text{There are varied relationships between functional effectiveness and industry types} \]

The second stage is a multiple regression where functional effectiveness is related to market advantage and cost advantage. The sub hypotheses for this second stage are as follows:

\[ H2b: \text{If certain functional effectives performances increase then the relative effectiveness of performance on market advantage will increase.} \]

And

\[ H2c: \text{If certain functional effectives performances increase then the relative effectiveness of performance on cost advantage will increase.} \]
Three multiple regressions are performed for each of the above hypotheses: one for the full data set and one each for the validation and hold out samples.

Where the hypotheses relate to the model is shown here in conclusion.

**FIGURE 6: THE RELATIONSHIPS BETWEEN RESOURCES, OUTPUTS, EFFICIENCY AND PERFORMANCE – THE OUTPUT BASED VIEW OF THE FIRM.**
4.2 Methods considered and justification of the selected method

The freestanding models of the contingency and resource-based explanations of differences in business performance have not been widely tested in the UK nor have these explanations been integrated into one cohesive proposition. It is therefore the aim of this project to test a cohesive model of business performance in the UK that addresses the limitations of the prior explanations. Given these aims, alternative methods have been considered with respect to their ability to provide knowledge on the differences in business performance that can be relied upon. The initial choice was with respect to the overall methodological approach. Was it to be positivistic (Robson, 1993) or phenomenological (Easterby-Smith et al, 1991)? A number of steps and features of the positivistic approach have been suggested by Robson (1993) and Easterby-Smith et al (1991). The tables below adapt these positivistic steps and features and comments on their applicability to the aims of this project.

Table 9 Steps in the positivistic approach  
(Source: Adapted from Robson, 1993)

<table>
<thead>
<tr>
<th>Steps in the positivist approach</th>
<th>Aims of the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Deducting a testable proposition about the relationship between two or more events or concepts from the theory</td>
<td>The project has discussed the limitations of existing explanations of the differences in business performance and deducted a testable cohesive proposition between two or more concepts from the theory</td>
</tr>
<tr>
<td>Step 2: Expressing the hypothesis in operational terms which propose a relationship between two specific variables</td>
<td>Hypotheses have been operationalised that propose a relationship between two specific variables. For example the relationship between market advantage and business performance (H1b)</td>
</tr>
<tr>
<td>Step 3: Testing the operational hypothesis</td>
<td>The choices in testing the operational hypothesis could be through experiment or survey</td>
</tr>
<tr>
<td>Step 4: Examining the specific outcome of the enquiry</td>
<td>The aim of the project is develop a cohesive explanation of business performance. The outcome of the tests could be compared with prior explanations to see if an improved explanation has been achieved.</td>
</tr>
<tr>
<td>Step 5: If necessary, modify the theory in the light of the findings</td>
<td>The model could be modified in the light of the findings.</td>
</tr>
</tbody>
</table>

The Robson (1993) steps in the positivistic approach suggest that a cohesive model of differences in business performance can be evaluated using the positivistic approach. If this approach is selected then a decision is required on whether the testing will be via a survey or an experiment.
Table 10: Features of positivism
(Source: Adapted from Easterby-Smith et al, 1993)

<table>
<thead>
<tr>
<th>Feature of Positivism</th>
<th>The aims of the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independence: The observer is independent of what is being observed</td>
<td>The project aims to understand the relationships between resources, cost and market advantages and business performance. The observer is independent of what is being observed.</td>
</tr>
<tr>
<td>Value-freedom: The choice of what to study and how to study it can be made on objective criteria rather than by human beliefs and interests</td>
<td>The variability of business performance is an objective criteria rather than a belief.</td>
</tr>
<tr>
<td>Causality: The aim of the social sciences should be to identify causal explanations and fundamental laws that explain regularities in human behaviour</td>
<td>The project aims to identify patterns in the relationships between firms and within firms that have different business performance outcomes. The project is seeking regularities in business behaviour.</td>
</tr>
<tr>
<td>Hypothetico-deductive: Science proceeds through a process of hypothesising fundamental laws and then deducting what kinds of observations will demonstrate the truth or falsity of these hypotheses</td>
<td>The project is built upon prior hypotheses that attempt to explain differences in business performance. Deductions are made as to which kinds of observations will demonstrate the truth or falsity of the cohesive model.</td>
</tr>
<tr>
<td>Operationalisation: Concepts need to be operationalised in a way which enables facts to be measured quantitatively</td>
<td>The variables in the model are actual events and could be measured quantitatively</td>
</tr>
<tr>
<td>Reductionism: Problems as a whole are better understood if they are reduced to the simplest possible elements</td>
<td>The aim of the project is to evaluate a cohesive explanatory model which is specified in simple terms</td>
</tr>
<tr>
<td>Generalisation: In order to be able to generalise about regularities in human social behaviour, it is necessary to select samples of sufficient size</td>
<td>The model can be tested in different populations to understand its applicability in different contexts</td>
</tr>
<tr>
<td>Cross-sectional analysis: Such regularities can most easily be identified by making comparisons of variations across samples</td>
<td>By selecting different samples comparisons can be made of explanations of business performance variability</td>
</tr>
</tbody>
</table>

There appears to be a close match of the features of positivism and the aims of this research.

Phenomenology characteristics and the aims of this project are compared in the table following.
A positivist approach to the research would appear to have the best fit with the aims of this project. The weaknesses of the positivist approach are recognised. These include the inflexible nature of the positivist approach. For example the direction of the research cannot be changed once data collection has started (Saunders et al, 1997). The reasons why the relationships between the variables developed in the way they did will not be understood using the positivist approach.

Having concluded that the positivist approach best suits the purpose of this project the research strategy was considered. The decision here was should the design be experimental or survey and then should it be cross-sectional or longitudinal?

The question of whether the design should be experimental or survey is a question of whether causal or correlational explanations are sought for the differences in business performance (Sekeran, 1992). To determine whether variable X causes variable Y requires that both X and Y should covary, that X should precede Y and that no other variable can cause the change (Sekeran, 1992). The aim of the project is to test the correlational relationships between numbers of variables. The purpose of the study is not to show causality. The model to be tested meets two of the three causality requirements. The study expects the variables to covary (for example market advantage and business performance) and it would be reasonable to expect that some of the variables should precede others (for example producing output values that can be sold before revenues can be obtained). However it cannot be claimed that there are no other variables that cause business performance. The aim of the project is to examine relationships within their context (i.e. industries) and this is not possible using an experimental design. There are practical considerations. The subjects of investigation are firms and there would be difficulties in holding all variables constant whilst the causal variable of interest is manipulated to observe the effect on the dependent variable. The aim of the project is to improve the generalisability of the findings. Given the tight controls on experimental design there is some doubt on the transferability of the findings to other contexts using this research strategy. The high internal validity of the experimental design is traded-off with the need for external
validity (generalisability). For these reasons a survey research strategy was adopted in preference to an experimental strategy.

To help clarify whether a cross-sectional or longitudinal strategy should be followed the following comparative table was constructed.

Table 12 A cross sectional versus a longitudinal study
(Source: This Study)

<table>
<thead>
<tr>
<th>Cross sectional strategy</th>
<th>Longitudinal strategy</th>
<th>Aims of the study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not measure change in relationships over time but rather the incidence of a phenomenon</td>
<td>Appropriate for investigating changes in relationships</td>
<td>To investigate the relationships of resources, cost and market advantages to business performance. The aims of the project are therefore the investigation of the incidence of a phenomenon rather than the how these relationships change over time.</td>
</tr>
<tr>
<td>Can identify correlational relationships but not causality</td>
<td>Can help in identifying causality</td>
<td>The aim of the study is not causality but rather correlational</td>
</tr>
<tr>
<td>Can compare factors across a range of settings which increase external validity but not internal validity</td>
<td>Is usually limited to one or a few settings, thereby increasing internal validity at the possible expense of external validity</td>
<td>The aim of the study is to improve generalisability</td>
</tr>
</tbody>
</table>

A cross sectional approach was chosen recognising that some internal validity may be lost as well as the potential for identifying causality.

A range of data collection techniques was considered for the survey strategy. The advantages disadvantages in terms of the aims of the study are as follows.

Table 13 Data collection techniques compared
(Source: Adapted from Sekeran, 1992)

<table>
<thead>
<tr>
<th>Data collection method</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Impact on the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face-to-face interviews</td>
<td>• Scope and depth of data • Rapport with interviewees helps understanding of complex issues</td>
<td>• Interviewer bias • Cost of a large sample size</td>
<td>• Scope and depth of data not required because variables are prescribed • Cost of collection</td>
</tr>
</tbody>
</table>
Telephone interviews

- Subjects contactable over a wide geographic area
- Immediate responses

- Non-availability of respondent (blocked calls)
- Non observation of nonverbal responses

- Reduced responses due to length of interview and lack of immediate availability of respondents

Personally administered questionnaires to groups of individuals

- Establish rapport
- Immediate clarifications
- Immediate collection of returns

- Requires proximity of firms

- Cost of travel for collection
- CEO responses required rather than groups

Mailed questionnaires

- Subjects contactable over a wide geographic area

- Low response rates
- Uncertainty as to who is the respondent

- Low response rates affecting the generalisability of the study
- Questions on nature of respondents

Observational studies

- Understand complex issues through direct observation
- Clarification of issues
- Minimal self report bias
- Scope and depth of data

- Expensive due to the time requirements for observations
- Observer bias

- Too costly for the sample size required

Telephone and postal were the two possible survey methods. The postal method was chosen because the telephone technique resulted in interviews that were too long and time pressures on the interviewees may have adversely affected the reliability of the answers. The telephone technique was used for follow-up calls to non-respondents.
In summary, a positivist approach employing a cross sectional survey strategy with data collected using a postal questionnaire was adopted as being necessary and sufficient to meet the aims of the project.

### 4.2.1 Consequences of adopting this approach

As a consequence of adopting this approach certain constraints need to be placed on the interpretation of any findings in this project. The following table summaries these constraints as they arise from each stage of the research design.

**Table 14 Epistemological constraints on interpretation of findings**

(Source: This study)

<table>
<thead>
<tr>
<th>Approach taken</th>
<th>Trade-off incurred</th>
<th>Constraints on interpretation of results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positivist as against phenomenological</td>
<td>• Increased internal validity but lower external validity</td>
<td>• Loss of generalisability but compensated for if sufficient sample sizes are achieved across a range of contexts (industries)</td>
</tr>
<tr>
<td></td>
<td>• Less understanding of why differences in performance may have occurred</td>
<td>• Conclusions on what has occurred is possible but not why</td>
</tr>
<tr>
<td>Survey as against experimental</td>
<td>• Lower internal validity but increased external validity</td>
<td>• Associations between variables but not causality can be deduced</td>
</tr>
<tr>
<td></td>
<td>• Correlational rather than causal</td>
<td>• Increased generalisability if sufficient sample sizes are achieved across a range of contexts (industries)</td>
</tr>
<tr>
<td>Cross-sectional as against longitudinal</td>
<td>• Correlational rather than causal</td>
<td>• Interpretations cannot be predictive</td>
</tr>
<tr>
<td></td>
<td>• Incidents of the phenomenon but not changes in the phenomenon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Lower internal validity but increased external validity</td>
<td></td>
</tr>
<tr>
<td>Mailed questionnaires versus others</td>
<td>• Breadth versus depth</td>
<td>• Associations between variables but not causality can be deduced</td>
</tr>
<tr>
<td></td>
<td>• Response versus</td>
<td>• No interpretation of how or why the relationships may change is possible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increased generalisability if sufficient sample sizes are achieved across a range of contexts (industries)</td>
</tr>
</tbody>
</table>

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In summary, the main constraints placed on the interpretation of the findings by the research approach taken is that causality cannot be identified, how changes over time occur cannot be identified and consequently predictions cannot be made and generalisability is constrained by the range of contexts investigated and sample size. What can be interpreted is the association between the variables at the point in time that the data were collected and within their contexts.

4.3 The survey instrument

A copy of the final questionnaire is to be found in Appendix 1.

Data were validated and checked by two approaches, (a) triangulation (different views) – did they show the same thing, (b) proofing (different methods) – did they yield the same result. Comparing supplier responses with customer responses performed triangulation. Comparing respondents’ financial performances with financial performances from published sources triangulated financial measures. Proofing was performed by a range of cross referenced, but independent questions built into the questionnaire.

The questionnaire is divided into sections, which reflect the concepts of the theoretical model. These are:

4.3.1 Company profiles

A series of corporate profiles were constructed to ensure that measurement of performance was at the strategic business unit (SBU) level. This was necessary to avoid the loss of specificity that can occur in consolidated reporting (Hitt, Ireland and Stadter, 1982).

4.3.2 Company financial performance

The financial performance of the SBU was measured on a 7-point Likert scale. A seven-point scale was used in order to counter the possibility of responses being clustered around the mean (Dean and Snell, 1996). The use of Likert scales is generally accepted in strategy research without reducing accuracy with respect to objective measures (Dess and Robinson, 1984, Miller and Friesen, 1983, Bourgeois, 1985). The central point in the scale (4) was labelled as the industry average to provide an external benchmark against which firms could rate themselves. The actual benchmark value was not provided on the questionnaire but responses were verified after survey against the actual industry benchmark. (How these actual industry figures were calculated are to be found in the results chapter). This allowed for additional post survey testing of the degree of objectivity in the self-rating Likert scales.
Labelling of the mid point as the industry average was an attempt to increase the objective nature of the scale and allowed for later triangulation of the responses with financial data collected from an independent source – Dunn and Bradstreet financial services. Taking this approach was confirmed in the pre-survey interviews to be acceptable, ensuring a higher level of confidentiality and simplicity in completing the questionnaire. Using the 7-point Likert scale was therefore considered to be an important element in increasing completion rates of questionnaires for the reasons of confidentiality and simplicity. In addition a greater spread of responses is possible with a 7-point scale. The range of Likert scales in strategy studies varies from 5 to 11, with most being either 5 or 7 point scales as reflected in the table below of frequently cited studies.

Table 15: Profile of strategy studies

<table>
<thead>
<tr>
<th>Author</th>
<th>Study type</th>
<th>Performance</th>
<th>Scale type</th>
<th>Statistical tests</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dean, J and Snell, S, 1996</td>
<td>Manufacturing strategy</td>
<td>Quality, lead time, productivity</td>
<td>7 point Likert scale</td>
<td>Correlations, regressions</td>
<td>92</td>
</tr>
<tr>
<td>Dess, G, Lumpkin, G and Covin, J, 1997</td>
<td>Contingency, configuration and performance</td>
<td>Sales growth, profitability, ROI, overall performance</td>
<td>7 point Likert scale</td>
<td>Factor analysis, Anova, correlations, regressions</td>
<td>32</td>
</tr>
<tr>
<td>Powell, T 1996</td>
<td>Industry structure</td>
<td>Profitability, sales growth, overall performance</td>
<td>5 point Likert scale</td>
<td>Factor analysis, correlations, regressions</td>
<td>54</td>
</tr>
<tr>
<td>McGrath, R, MacMillan, I and Venkatraman, S, 1995</td>
<td>Competence</td>
<td>Competence</td>
<td>5 point Likert scale</td>
<td>Regressions</td>
<td>113</td>
</tr>
<tr>
<td>Kotha, S and Vadlamani, B, 1995</td>
<td>Generic strategies</td>
<td>Cost / differentiation</td>
<td>5 Point Likert scale</td>
<td>Structural equation model</td>
<td>160</td>
</tr>
<tr>
<td>Nath, D and Sudharshan, D, 1994</td>
<td>Strategic coherence</td>
<td>Cost, turnover</td>
<td>7 point scale</td>
<td>Factor analysis, cluster analysis</td>
<td>71</td>
</tr>
<tr>
<td>Jennings, D and Seaman, S, 1994</td>
<td>Strategic adaptation</td>
<td>Value, profitability, risk</td>
<td>5 point Likert scale</td>
<td>Correlation, factor, cluster</td>
<td>115</td>
</tr>
<tr>
<td>Zahra, S and Covin, J, 1993</td>
<td>Strategy, technology and performance</td>
<td>Return on sales</td>
<td>7 point Likert scale</td>
<td>Correlations, cluster</td>
<td>103</td>
</tr>
<tr>
<td>Reger, R and Huff, A 1993</td>
<td>Strategic groups</td>
<td>Earnings, cost</td>
<td>11 point Likert scale</td>
<td>Cluster analysis</td>
<td>23</td>
</tr>
</tbody>
</table>
With respect to the validity and reliability of using Likert scales Dess and Robinson, (1984) and supported by Govindarajan and Fisher (1990) directly tested the relationship between subjective and objective measures of return on assets and growth in sales. They used a five-point scale where the respondent was asked to compare their performance "to firms of similar sales volume in your industry and region" (p268). Their findings for these performance measures were correlated i.e. the subjective Likert measurements correlated with their actual industry performance. Govindarajan and Fisher (1990) do not advocate the substitution of objective measures for subjective measures. They suggest that subjective measures only be used when:

"(1) Accurate objective measures are unavailable, and (2) the alternative is to remove the consideration of performance from the research design" (p271).

The use of subjective performance measures in this study is justified on the grounds that financial data were not available for much of the population set. A number of the strategic business units were either not quoted on the stock exchange, or were subsidiaries of diversified conglomerates. For these companies it could be difficult to isolate the patterns that the research was expected to reveal.

In this study it was decided to attempt to enhance the response rate and then use triangulation methods to assess the reliability of the subjective measures. Identifying respondents for which financial data were available and comparing this with the subjective ratings, which were made against industry average, did this. The detailed results are to be found in the next chapter.

Additionally, contained within the financial section of the questionnaire was a subjective rating of the importance of each financial measure to output values. These were independent (internal to the questionnaire) questions to cross validate the correlations of output values (section 4) to business performance (section 2).

Powell (1992) noted, "using subjective measures does invite comment", (p125). Powell justified the use of subjective measures for profitability, sales growth and overall financial performance on the following grounds:

" (1) Differences in accounting measures...(2) CEO's being well informed on their firm's performance...(3) a number of firms being privately held and not providing direct financial information...(4) no survey identification numbers removes the incentive to provide misleading subjective ratings...(5) CEO perception of performance is an important independent variable in and of itself" (p125).

Whether these justifications apply was explored in the pre-pilot survey and were confirmed.

The financial performance measures used were typical of financial performance measures used in strategy studies. They were sales performance, market share performance, return on sales and return on investment performance (Miller and Friesen. 1983, Parnell and Wright, 1993, Banker, Chang and Majumdar, 1996,
Chakravarthy, 1986). Despite the use of subjective measures, convergent validity was tested through the triangulation process.

An aspect of the design of the questionnaire was to separate the financial performance measures into external and internal types. External measures of financial performance were those that are derived from public accounts and internal measures were those that were derived from the internal budget of the company. The logic behind this approach lies in the definition of what is a weak or a strong financial performance. The external measure of a strong performance is defined as a return on investment above industry average (Porter, 1985 pp3-6).

External measures do not reflect a situation where the company may be failing on these measures but the firm may be actually increasing its internal financial performance that is not yet manifest in an above average external performance. In other words internal management may be starting from a low level externally but are seeing a trend of improvement (or failure) internally. The converse may be true in that a firm, which appears to be successful externally, is performing below expectations internally, which may reflect a future deterioration in external performance (or improvement). This internal financial performance was measured through a comparison of actual performance against budget.

All financial measures were based on the last 12 months performance. This short time frame is possibly important where subjective recollection of say five years performance could be less accurate.

Consequently this is a cross-sectional study with some of the weaknesses shared by all cross-sectional studies in that it measures the static position of the company at one point in time and does not auto-correlate the performance of the SBU with output values that created the performance. In other words a previously different mix of output values may have created the current performance levels. The current mix of output values may result in a different future performance level. The weight of prior strategy studies uses cross-sectional analysis (Dess, Lumpkin and Covin, 1997, Oliver, 1997, Miller and Chen, 1996) with a few longitudinal studies (Bogner, Thomas and McGee, 1996, Segars, Grover and Kettinger, 1994). This possibly arises from the real difficulties in obtaining operational data over a period of time. This was confirmed in the pre-pilot study where historical records were of little use to management and were not demanded for legal reporting purposes.

The impact of these weaknesses is lessened to some extent by the possibility that the output values that relate to financial performance are stable over time (Marlin, Lamont and Hoffman, 1994, Fiegenbaum, Hart and Schendel, 1996, Robinson and Pearce, 1998, Porter, 1996). The patterns of relationships found for industries studied are could be reasonably robust over time, as advocated by Porter (1996):

"Tailoring organisation to strategy, in turn, makes complementarities more achievable and contributes to sustainability. One implication is that strategic positions should have a horizon of a decade or more, not of a single planning cycle" (pp74-75).
The epistemology of this project however precludes causal interpretations that rely on longitudinal observations of stability.

The financial performance measures were the basis for identifying the relative importance of the output values as described in the theoretical model. The following table summarises these measures:

### Table 16: Business performance variables

<table>
<thead>
<tr>
<th>Business performance measure</th>
<th>Business performance variable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External business performance</strong></td>
<td></td>
</tr>
<tr>
<td>(Measured against industry average)</td>
<td>Market share</td>
</tr>
<tr>
<td></td>
<td>Return on sales</td>
</tr>
<tr>
<td></td>
<td>Return on investment</td>
</tr>
<tr>
<td><strong>Internal business performance</strong></td>
<td>Sales performance</td>
</tr>
<tr>
<td>(Measured against internal budget)</td>
<td>Return on sales</td>
</tr>
<tr>
<td></td>
<td>Return on investment</td>
</tr>
</tbody>
</table>

#### 4.3.3 Measuring output values (Market advantage)

Output values are those values, identifiable in the marketplace, that have value to the customer. They are the tangible and intangible features of the products and services that are offered to the customer for which the customer is prepared to pay. Not all outputs from the firm will necessarily have value to the customer. Likewise all relevant customer needs may not be met by the output of the firm. This study examines the relationship of firm performance on these output values to business performance. The output values measured in this study are given in the following table.
### Table 17: Variables to measure output values

<table>
<thead>
<tr>
<th>Output value type</th>
<th>Variable used to measure output value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer responsiveness</td>
<td>Consistently meeting delivery/service promises</td>
</tr>
<tr>
<td></td>
<td>Adjustment to changed customer volume requirements</td>
</tr>
<tr>
<td></td>
<td>Adjustment to changed customer specifications</td>
</tr>
<tr>
<td></td>
<td>Effectiveness in winning new customers</td>
</tr>
<tr>
<td></td>
<td>Customer retention rates</td>
</tr>
<tr>
<td><strong>Innovation</strong></td>
<td>Time taken to introduce new products/services</td>
</tr>
<tr>
<td></td>
<td>Level of design innovation</td>
</tr>
<tr>
<td></td>
<td>Rate of new product introduction</td>
</tr>
<tr>
<td></td>
<td>Success rate of new products</td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td>Consistency of conformance to specifications</td>
</tr>
<tr>
<td></td>
<td>Quality reputation</td>
</tr>
<tr>
<td></td>
<td>Strength of brand on quality dimension</td>
</tr>
</tbody>
</table>

The customer responsiveness output value is constructed from variables, confirmed in the pre-survey interviews and cited frequently in prior studies. These criteria apply to all the output values in this study. The first three of these customer responsiveness variables are visible in the market place and the last two are strong proxies for visible customer responsiveness output values – although they are not directly observable.

#### 4.3.3.1 Consistently meeting delivery/service promises.

Reliability of delivery of the product and service has consistently been shown to be an important dimension of the value which customers purchase (Kim and Miller, 1993). Reliability is in effect a reduction of risk to the customer. It enables other activities of the customer to be planned with a higher degree of certainty that an expected performance will take place.

#### 4.3.3.2 Adjustment to changed customer volume requirements.

The ability of a firm to adjust its volumes at short notice in response to customers changed needs is a valued capability (Miller and Roth, 1994, Kim and Arnold, 1992) It
implies that the firm can protect the customer from changed circumstances. This ability means that the customer does not need to invest in resources, such as inventories, to hedge against volume volatility.

4.3.3.3 Adjustment to changed customer specifications

A changed customer specification indicates that what the customer values is changing. Firms that can respond to those changes effectively are possibly going to add value to customers (Corbett and Van Wassenhove, 1993 Parthasarthy and Sethi, 1993, Schroeder and Pesch, 1994, Upton, 1994)

4.3.3.4 Effectiveness in winning new customers

This variable could indicate that the external communication process with potential customers has at least caused some convergence between what the customer wants and what the firm says that it can provide. Whilst this variable is not a direct output variable it is indicative of performance on a variety of output variables such as frequency of communication, and adaptability of communication content. It was recommended as a customer responsiveness variable in the pre-survey interviews. (Reichheld, 1990, St.John and Rue, 1991)

4.3.3.5 Customer retention rates

This variable could increase as the firm improves its ability to deliver value. This ability to sustain value has a direct influence on firm performance. Whilst this variable is not a direct output variable it is indicative of performance on a variety of output variables such as customer satisfaction, flexibility and communication. It was recommended as a strong indicator of customer responsiveness in the pre-survey interviews. (Reichheld, 1990, Anderson, Fornell and Lehmann, 1994)

4.3.3.6 Time taken to introduce new products/services

The cycle time (from product inception to product launch to product decline) between product introductions is reducing (Stalk, 1988, Topfer, 1995, Drew, 1995, Loch, Stein and Terwiesch, 1996). The ability to increase the value to the customer speedily in the form of new product features is an important market visible performance variable (De Meyer, Nakane, Miller and Ferdows, 1989)

4.3.3.7 Level of design innovation

In the market, firms compete on the features of their products and services. Consequently higher levels of design innovation improve the prospects for adding value to customers and thereby increase business performance. (Anderson and Zeithaml, 1984)

4.3.3.8 Rate of new product introduction

The frequency of new product introduction reflects a firm that is capable of understanding changes in customer preferences and converting them into product
offerings. The more efficient that process, the greater the possibility for business performance (Corsten and Will, 1995, Aaby and Discenza, 1993)

4.3.3.9 Success rate of new products

The underlying logic is that the strength of the innovation process could be ultimately measured by customers’ acceptance of the values that the new products offer (Mercer, 1993, Juttner and Wehrli, 1994, Atuahene-Gima, 1996).

4.3.3.10 Consistency of conformance to specifications

The quality of a product is viewed in terms of its fit with customers’ expectations (Powell, 1995, Vickery, Droge and Markland, 1993). The consistency with which companies achieve conformance is valuable to customers because it lowers the customers’ risk—uncertainty about their inputs.

4.3.3.11 Quality reputation

The strength of the quality reputation in the industry could be an indication of the firm’s ability to meet customers’ expectations (Hambrick, 1983, Dess and Davis, 1983)

4.3.3.12 Strength of brand on quality dimension

Quality is an inferred or derived attribute of a brand. Some studies have implied that the more that the brand is credible on this dimension, the greater its impact could be on firm performance (Dess and Davis, 1984, Miller, 1986).

A questionnaire was created from the variables described and sent to a customer nominated by the supplier. This aimed to triangulate the supplier responses independently with the customer responses. A copy of the questionnaire is found in the Appendix.

The theoretical model shows two other factors, which are not output values, but have an influence on business performance. These are price and cost.

4.3.4 Measuring efficiency (Cost advantage)

The cost factors were measured by a number of efficiency variables. Thus the ability of the firm to generate revenues in this model is a function of its performance on output values. Price is a factor in the model, which could cause significant differences in business performance (Miller, 1984). For example two firms, which have equal total costs and performance on output values, could have differing business performance because of differences in price. Costs in turn are accounted for by efficiency factors. Total costs are not directly observable in the market place but need to be accounted for in order to account for business performance. For example two companies may have the same performance on output values and price, but different business performances because of differences in total cost. Some of the internal productivity factors have been incorporated into the balanced scorecard approach (Kaplan and Norton, 1996 pp 152). The Kaplan and Norton (1996) model has a strong revenue emphasis but does not provide a prioritising mechanism between cost and revenue factors. The model
developed in this study attempts to find the prioritised relationships between resource, productivity and revenue factors. Efficiency and price are made up of the variables in the following table.

Table 18: Non output value variables of price and efficiency

<table>
<thead>
<tr>
<th>Concept</th>
<th>Variable – (Measured against industry average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>Unit operational costs</td>
</tr>
<tr>
<td></td>
<td>Unit capital costs</td>
</tr>
<tr>
<td></td>
<td>Unit labour cost</td>
</tr>
<tr>
<td></td>
<td>Capacity utilisation</td>
</tr>
<tr>
<td>Prices</td>
<td>Price level achieved</td>
</tr>
</tbody>
</table>

4.3.4.1 Unit operational costs

The ability of the firm to control operational costs to below industry average unit cost may be a source of competitive advantage (Robinson and Pearce, 1988, Parthasarthy and Sethi, 1993, Istvan, 1992)

4.3.4.2 Unit capital costs

This variable measures the level of output to capital employed. Firms, which use their capital more intensively than the industry average, could generate high business performance (Hitt, Ireland and Palia, 1982, White, 1986)

4.3.4.3 Unit labour costs

Labour efficiency has frequently been used as a measure of ability to compete on cost – the ability to produce the output values at a low per unit cost is a source of competitive advantage (Hambrick, 1983, Prescott, 1986, Harrigan, 1985)

4.3.4.4 Capacity utilisation

The ability to maximise throughput has the effect of amortising fixed costs over a larger number of units – the fixed cost per unit is lower. This gives rise to a cost advantage (Miller, 1986, Venkatraman and Prescott, 1990, Banker, Chang, Majumdar, 1996)

4.3.4.5 Price level achieved

This variable could affect profitability in opposite ways. A higher than industry average unit price could reflect a price premium thereby generating above average industry returns. Conversely the price may be lower than industry average and still yield
a higher than industry rate of return through increased volumes. Either way relative price levels are an important factor in business performance (Nath and Sudharshan, 1994, Venkatraman and Prescott, 1990, Miller and Dess, 1993)

4.4 Pre survey interviews

The purpose of the pre-survey interviews was to discuss the important variables and relationships as described in the model with senior executives. The basic question being asked in these interviews was "Did the variables and their relationships accord with experience?" An early draft of a questionnaire was discussed to assess its readability, consistency and ease of completion. Others (Powell, 1992, Vickery, Droge and Markland, 1993, Hitt and Ireland, 1985) have employed this pre-survey approach for the same purposes. The methodology used in the pre-survey interviews was as follows:

- A pre-survey questionnaire was developed using variables from prior studies (refer discussion of the survey instrument)
- Initial contact was made by letter and then followed up with a telephone call
- An interview was held with the executive and on one occasion an independent observer was included to provide a quality check on the process
- Comprehensive notes were made of the interview, which were sent to the participating executive for them to evaluate for accuracy and interpretation.
- The notes were manually sorted into categories, which formed the basis of amendments to the final survey instrument

The observations from these pre-survey interviews were used in evaluating and developing the questionnaire. The changes to the early draft of the questionnaire as a result of these interviews were to:

- Include industry average as the midpoint on the 7-point Likert scale for both financial and operational data. Adoption of this approach meant reliance on subjective performance ratings. To confirm the degree of reliability of these subjective ratings meant that the research methodology would have to include a number of triangulation methods. These trade-offs were deemed necessary in order to achieve the required simplicity and timeliness in completion of the questionnaire. This was not a preferred approach methodologically; rather it was a matter of either measuring them subjectively or dropping these financial and operational items from the study. Using such an approach has been justified in previous studies (Dess and Robinson, 1984). If the sample had been restricted to where data were available then so few (if any) companies could have been included as to make the study impossible.
- Drop a question based on the size of order. This recommendation was typical of the problems with collecting directly observable quantified objective operational data. This data are collected in firms for temporary reporting purposes only. These data are consequently transitory and they are not required to be kept for statutory purposes, as are financial records. Additionally if these operational data were to be collected for research purposes, it could have required the assistance of a number of people within the firm. This could have greatly reduced the postal survey response rate. The only way this information could be gathered on a longitudinal basis to correspond with the time periods of financial performance data would be by using a case based approach. To generate this kind of information in this manner across four industries and in
enough firms is a task requiring financial and logistical support well beyond that which was available. The respondents’ subjective ratings on operational items were triangulated with responses from their customers on the same items, to establish the reliability of the respondents recalled assessment of their performance against industry average.

- Simplify the customer responsiveness questions. For example the question on lead-time was previously broken down into various types of lead-time. This level of detail was not available from companies. (Refer discussion above).
- Include customer acquisition and retention rates as measures of customer responsiveness. Customer acquisition rates were seen to be an appropriate proxy for a number of observable customer responsiveness activities that are not a direct part of the price paid for the product or service purchased. For example the effectiveness of pre-sale activities, such as promotions, personal contact, and advice are not paid for directly by the potential customer but were seen to translate into acquisition rates. Similarly there are a number of post sale activities, which are carried out by the firm, which are not directly paid for by the customer, are observable in the market place, and directly influence retention rates. There is obviously an important part of acquisition and retention performance, which is explained by the firm’s performance on the basic service and product sold.
- Comments on the difficulty in collecting objective operational data similarly apply to the reliability of the customer promises question, which asked for specific percentages by order type.
- The flexibility of operations question was too detailed and could not solicit a response. It was simplified.
- Innovation questions were simplified, again on the basis of non-availability of data at this level of objectivity.
- Cost questions were simplified and other efficiency questions such as capacity and labour efficiency were added.
- The measurement of business performance was changed to include last year’s performance against industry average and against internal budget. Asking specific objective financial data were seen as too risky to the response rate (as found in the pre-survey study) and was therefore collected on a subjective basis as discussed previously. Additionally a number of the firms’ financial data were not available from public sources. If subjective ratings had not been used, these firms would have been excluded from the sample. Using subjective financial performance ratings meant that accuracy of recall was possibly going to reduce substantially the greater the number of years back data were required. Where actual financial data were available from secondary sources this was used to triangulate the subjective ratings. (This was less than 10% of all companies in each industry)
- The demographics section was moved to the front of the questionnaire and simplified.

In summary, the initial questionnaire had attempted to measure output values on objectively detailed measures of time and quantity. This data had been shown by these initial interviews to be impractical and possibly unavailable to internal management. Consequently subjective measures were used (7 point Likert scales) with industry averages used as the mid-point and the number of triangulation tests increased to account for this possible loss of objectivity.
4.5 The pilot study

The pilot study was undertaken in two stages. The first stage was to get a class of thirty, second year MBA students to complete the questionnaire. They were timed and their comments were noted. On average they took twenty minutes to complete. Comments on the order of questions asked were made. The students were managers in their mid to late thirties from a broad range of industries and specialties.

The second stage of the pilot test was to send the questionnaire out to 32 companies in the electrical components manufacturing industry. A response rate of 21 % of useable questionnaires was achieved using a letter with a telephone follow-up. A number of modifications were carried out to increase the internal consistency of the questionnaire and its structure.

4.6 The main survey

In the main survey four industries were chosen – two were manufacturing and two were service industries. This choice of industries could allow for comparisons between industries and within industries. This could help to make the findings generalisable (Baysinger and Hoskisson, 1990) a component in valid theory building. 500 UK companies were chosen from each industry on a descending order of size (sales) from lists purchased from Dunn and Bradstreet. The industry classification codes were checked to ensure that the companies provided represented the industries selected. The following table summarises the industry selection.

<table>
<thead>
<tr>
<th>Industry selected</th>
<th>Industry type</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer components</td>
<td>Manufacturing</td>
<td>500</td>
</tr>
<tr>
<td>Automotive components</td>
<td>Manufacturing</td>
<td>500</td>
</tr>
<tr>
<td>Financial</td>
<td>Services</td>
<td>500</td>
</tr>
<tr>
<td>Logistics</td>
<td>Services</td>
<td>500</td>
</tr>
</tbody>
</table>

All four industries were selected because of the relatively intense nature of competition in these industries (Hood, Young and Lal, 1994, Shipchandler, Terpstra and Shaheen, 1994, Bart and Habib, 1991, Mehra, 1996). The intensity of competition was an important factor as it was likely to result in better-defined differences in the relative importance of output values and functions (Miller, 1988, Porter, 1980, Grant, 1988). In addition to the above, a comparison of the Dunn and Bradstreet lists was made with the Extel listings and where companies had been omitted they were added.

Industry performance trends were extracted from the Bloomberg database to see whether any longitudinal factors may have influenced the results. The period taken for these comparative returns is from August 1994 to February 1999 (Appendix 3).
period of the survey was August 1997. It is possible that the prior 12 months had the most influence on the survey results i.e. September 1996 to August 1997. In the case of the UK logistics services industry it had under-performed the FTSE 350 index although it displayed the same basic trend. That trend was one of positive growth in returns. Individual companies within the sector could have shown higher levels of variability e.g. NFC Plc. The industry trend in average returns would be the same for all respondents within that industry and consequently have a consistent effect on the survey results.

This study examines differences in the importance of relationships between industries. The relative importance of relationships between the factors that influence business performance could remain relatively stable within industries as firms seek to create unique positions for themselves over time (Porter, 1996). Consequently the difference in return trends between industries could have little effect on the results of this study.

This study could be limited by the fact that it is cross-sectional. The findings could be less generalisable because the relationships identified will not have been shown to be consistent over time. This will still be an open question. How and why these relationships change will not be investigated – these are questions better answered through a longitudinal study.

4.7 Sampling procedure

By using published lists in establishing the sample, it cannot be guaranteed that every firm competing in the 4 industries had an equal chance of being selected. If the population of interest is defined as the top firms that account for at least 75% of the industries market then the final selection was close to a census because of the comprehensiveness of the lists used. Access to the population was available at a cost that was not prohibitive for a postal survey. Therefore there was no need to take stratified or other sampling variants. The issue was rather to ensure that the patterns of non-responses did not contain bias, which is the case for any random or non-random sampling plan. Consequently the sampling procedure cannot be classified as a convenience sample (Burns and Bush, 1998) and non-probabilistic. The sample ensured that a high proportion of the total turnover of each industry population (as defined) was included based on prior knowledge of the industry size. This method of company selection can be based on the argument that this study is primarily interested in explaining differences in business performance and that by capturing at least 75% of industry market share, patterns of important market, cost and resource advantages could be found.

4.8 Data Analysis

The following section provides details of how the data were to be examined for normality before the development of regression and discriminant functions to test the hypotheses.

4.8.1 Graphical examination of the data

Dependent and independent variables were to be depicted in graphical univariate distributions to determine the shape of the normal distribution.
4.8.2 Missing Data

The data were to be analysed to determine whether there were any distinct patterns or whether the data were missing completely at random. To test for the randomness of the missing data, the data file would be split on a variable with missing data. In other words a file without missing values for the variable and another file with missing values of the variable could be created. A t-test could be carried out on a third variable to ascertain whether there was a significant difference between the two groups (Hair, Anderson, Tatham and Black, 1998). Missing data were replaced using the mean substitution method. This gives rise to concerns relating to understating the true variance; distorting the actual distribution and depressing observed correlations (Hair, Anderson, Tatham and Black, 1998). In all cases the effect of the mean substitution on correlations could be examined i.e. an examination of the correlations with and without substitution. The extent of missing data was to be investigated.

4.8.3 Outliers

Outliers were to be identified using, univariate, bivariate and multivariate techniques and a decision on retention or deletion made for those designated as outliers.

4.8.4 Tests of normality

Beyond a visual examination of the normal probability plots, z values for skewness and kurtosis were to be calculated and where these values exceeded +2.58 assumptions of the normality of the distribution at the .01 probability level were to be rejected. In addition the Shapiro-Wilks and Kolomogorov-Smirnov tests were to be included to test for normality in the data (Hair, Anderson, Tatham, Black, 1998).

4.8.5 Homoscedasticity

The data were to be tested for the assumption of homoscedasticity using the Levene test. The presence of heteroscedasticity could cause interpretation problems with the multiple regression and discriminant analyses.

4.8.6 Linearity

The assumption of linearity was to be tested by examination of the scattergrams and through simple regression and an examination of residuals.

4.8.7 Multicollinearity

The independent variables were to be tested for multicollinearity through examination of the variance inflation factor (VIF) where high VIF scores indicate high levels of collinearity. The cut off VIF value is set at .10. Values above this could result in exclusion of the offending independent variable.

4.8.8 Holdout sample

A validation sample is to be extracted from the main sample for validation purposes of the regression equations. The holdout sample would be randomly selected within
industry proportions. Validating the results was seen as more important than using the full data set to establish an unvalidated regression/discriminant model, even at the expense of model fit.

4.9 Post survey validation

The findings of the research were discussed with 6 executives chosen from among those who had responded to the questionnaire. The purpose was to check whether the findings and subsequent discussion accorded with their knowledge of the industry. In particular it was necessary to identify whether the varied relationships between output values, efficiency, price and business performance were consistent with the priorities they gave to these variables in practice. Similar questions were asked to confirm this study's findings with regard to the prioritised relationships between functional effectiveness and output value, efficiency and price performance. Finally the post survey validation was to help uncover reasons for differences in the triangulation data.

4.10 Conclusion

The approach described in this chapter is positivist and is justified on the grounds of that it confirmatory of concepts and variables well established in the literature and is necessary and sufficient to meet the aims of the study. The primary aim of this methodology is to examine the relationships between resource, cost and market advantages with business performance. In addition it examines the effect of industry type on those relationships. The potential threats to validity and reliability in the survey instrument come from the use of subjective measures and the potential inclusion of weak variables or the exclusion of strong explanatory variables. A pre-survey process and the use of well-established variables mitigated these threats. Sources of bias could come from using single respondents and non-random completion rates.
CHAPTER 5 – DATA DESCRIPTION

5.0 Introduction

Descriptive statistics and analysis of the survey is discussed in this chapter. The purpose of this descriptive analysis is to understand any limitations in the data so that the findings can be appropriately circumscribed. They are first tested for normality and limitations for use in multivariate data tests. The data are then analysed to test reliability and validity.

5.1 Descriptive statistics

The following table is an analysis of the number and source of addresses for the survey.

Table 20: The number and source of addresses for the main survey.

<table>
<thead>
<tr>
<th>Source</th>
<th>Electronic components manufacturing</th>
<th>Automotive components manufacturing</th>
<th>Financial services</th>
<th>Logistics services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dunn &amp; Bradstreet selection</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>2000</td>
</tr>
<tr>
<td>Extel Company Analysis selection</td>
<td>96</td>
<td>77</td>
<td>40</td>
<td>39</td>
<td>252</td>
</tr>
<tr>
<td>Total</td>
<td>596</td>
<td>577</td>
<td>540</td>
<td>539</td>
<td>2252</td>
</tr>
</tbody>
</table>

The Dunn and Bradstreet lists were selected on a first 500 by turnover basis. This would ensure that at least 75% of each industry’s total market size could be included in the sample; in effect coverage of the population of interest in each industry. In other words the population was defined as those companies that comprised 75% of the turnover of each industry ranked in descending order. Random sampling was not necessary as each company in the population was accessible and had an equal probability of being selected.

The range of size of company captured in this way was from large to small (as measured by number of employees on the returned questionnaires). By capturing this range, size effects on the results could be measured. The size distribution in the selected SIC codes was expected to be right skewed with a high proportion of small firms in each sector. As a result of this population distribution, by selecting the top 500 by size in each industry a high proportion of the total turnover in each sector was captured as shown in the following table.
Table 21 Cumulative analysis of market size by industry

<table>
<thead>
<tr>
<th>Cumulative ranking</th>
<th>Cumulative proportion</th>
<th>Cumulative ranking</th>
<th>Cumulative proportion</th>
<th>Cumulative ranking</th>
<th>Cumulative proportion</th>
<th>Cumulative ranking</th>
<th>Cumulative proportion</th>
<th>Cumulative ranking</th>
<th>Cumulative proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronics components manufacturing</td>
<td>Automotive components manufacturing</td>
<td>Financial services</td>
<td>Logistics services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>945</td>
<td>1.00</td>
<td>840</td>
<td>1.00</td>
<td>1336</td>
<td>1.00</td>
<td>1806</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>902</td>
<td>0.98</td>
<td>798</td>
<td>0.98</td>
<td>1208</td>
<td>0.97</td>
<td>1684</td>
<td>0.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>657</td>
<td>0.93</td>
<td>581</td>
<td>0.92</td>
<td>627</td>
<td>0.89</td>
<td>1121</td>
<td>0.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>460</td>
<td>0.85</td>
<td>391</td>
<td>0.81</td>
<td>444</td>
<td>0.79</td>
<td>706</td>
<td>0.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>254</td>
<td>0.71</td>
<td>198</td>
<td>0.66</td>
<td>237</td>
<td>0.63</td>
<td>308</td>
<td>0.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>133</td>
<td>0.55</td>
<td>96</td>
<td>0.49</td>
<td>117</td>
<td>0.45</td>
<td>128</td>
<td>0.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>0.39</td>
<td>49</td>
<td>0.32</td>
<td>56</td>
<td>0.28</td>
<td>75</td>
<td>0.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>0.23</td>
<td>17</td>
<td>0.16</td>
<td>14</td>
<td>0.11</td>
<td>49</td>
<td>0.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.06</td>
<td>2</td>
<td>0.02</td>
<td>2</td>
<td>0.02</td>
<td>2</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Dunn and Bradstreet industry lists were checked for completeness against the Extel Company Analysis listings. Where companies were found to be missing they were added to the final mailing. In this way a high penetration of the potential population by size was achieved. It is possible that few companies in these UK industries were overlooked that could have had an impact on the total turnover of the industry. The following table gives the sizes of the industry SIC codes used in this study as obtained from Dunn and Bradstreet.

Table 22: Estimated population size of the SIC categories used in this study

<table>
<thead>
<tr>
<th>Electronic components manufacturing</th>
<th>Automotive components manufacturing</th>
<th>Financial services</th>
<th>Logistics services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total available – Dunn and Bradstreet</td>
<td>945</td>
<td>840</td>
<td>1336</td>
<td>1806</td>
</tr>
<tr>
<td>Total supplier questionnaires</td>
<td>596</td>
<td>577</td>
<td>540</td>
<td>539</td>
</tr>
<tr>
<td>Sample Percentage</td>
<td>63.1</td>
<td>68.7</td>
<td>40.4</td>
<td>29.9</td>
</tr>
</tbody>
</table>

The following table shows the number of useable responses that was achieved after reminder mailings and telephonic follow up calls. The difference in sample percentages reflects differences in the size of the “tail” in each industry. For example there were higher numbers of small companies in the logistics services industry than the electronic components industry i.e. less market concentration.
Table 23: Useable response rate.

<table>
<thead>
<tr>
<th>Supplier manufacturer components</th>
<th>Electronic components manufacturing</th>
<th>Automotive components manufacturing</th>
<th>Financial services</th>
<th>Logistics services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>supplier questionnaires</td>
<td>596</td>
<td>577</td>
<td>540</td>
<td>539</td>
<td>2252</td>
</tr>
<tr>
<td>Useable returns</td>
<td>39</td>
<td>24</td>
<td>13</td>
<td>28</td>
<td>104</td>
</tr>
<tr>
<td>Percentage</td>
<td>6.5%</td>
<td>4.2%</td>
<td>2.4%</td>
<td>5.2%</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

The number of returns due to unknown at address was less than 10, indicating high address accuracy. Follow-up telephone calls and returned regret letters received indicated that the reason for non-return of questionnaires was company policy, which dictated non-participation in research. Other reasons for the low response rate could be attributed to the complexity and length of the questionnaire, particularly for smaller companies. A few letters received from smaller companies would support this observation. The other reason for the low response rate could be attributed to the fact that the survey was targeted at named managing directors, who seem to be increasingly inundated with questionnaires and consequently less inclined to complete them. The low response rate from the financial services industry could arise from the inherently manufacturing bias in the value chain approach in the questionnaire construction. The wording of the questionnaire attempted to adjust for this bias.

Using a single questionnaire across service and manufacturing industries has been noted as problematic in prior studies (Bart and Habib, 1991). There was no strong indication in the pilot study that this could be a problem and a trade-off was made against the benefits of improved generalisation of findings.

The following table shows a summary of the employee distribution by industry.

Table 24: To show the employee distribution (size proxy) by industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>Max</th>
<th>Min</th>
<th>Mean</th>
<th>Skewness</th>
<th>&lt;100 (%)</th>
<th>&lt;300 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronics</td>
<td>2000</td>
<td>5</td>
<td>226.7</td>
<td>3.2</td>
<td>51.3</td>
<td>84.6</td>
</tr>
<tr>
<td>Automotive</td>
<td>2000</td>
<td>9</td>
<td>531.7</td>
<td>1.1</td>
<td>37.5</td>
<td>54.2</td>
</tr>
<tr>
<td>Financial</td>
<td>24000</td>
<td>34</td>
<td>2426.2</td>
<td>3.6</td>
<td>7.7</td>
<td>53.8</td>
</tr>
<tr>
<td>Logistics</td>
<td>8500</td>
<td>5</td>
<td>1046.0</td>
<td>2.6</td>
<td>57.1</td>
<td>75.0</td>
</tr>
</tbody>
</table>

The above distribution figures show the predominance of small to medium sized firms by count in the returned questionnaires. The distribution is positively skewed in all cases. For example in the electronic component manufacturing industry 84.6% of the number of respondents had 300 or less employees and firms of less than 100 employees accounted for 51.3% of the distribution. This positive skewness possibly reflects the firm size distribution in the industry as found in other studies of this type (Miller and Friesen, 1982). Whether the larger firms have different relationships within the theoretical model is tested later in the results section.
The number of respondents is adequate for inferential statistics at an aggregated level (Mazen, Hemmasi, Lewis, 1987) When the data are split on industry type the number of respondents falls to a level where regression analysis is possible but not structural equation modelling. The use of structural equation modelling had to be abandoned at this level.

There could be a problem with the fact that the research design required only a single respondent per company, leading to concerns about single respondent bias. The targeted respondent in this study was the senior executive (managing director) for the reason that the nature of the study required a respondent who would be likely to have the best overall perspective of the firm and its performance. To include functional specialists could have possibly invited a higher degree of respondent bias but with the potential benefit of improved reliability.

Another issue is the use of small data sets. The use of small data sets is not uncommon in this type of study. Grinyer, McKiernan, and Yasai-Ardekani, (1988) in a study of the UK electrical engineering industry collected data from 45 companies, with financial support from the Economic and Science Research Council. From this data set they construct regression models with average return on investment (and other business performance measures) as the dependent variable and up to 9 independent variables. (They found company and market specific factors to be good predictor variables of business performance). The following table shows other recent studies that have utilised relatively small sample sizes.

<table>
<thead>
<tr>
<th>Author</th>
<th>Analytical approach</th>
<th>Industry</th>
<th>Topic</th>
<th>Useable responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulton, W, et al, 1982</td>
<td>Correlations, Factor analysis</td>
<td>3 sub classifications</td>
<td>Strategic Planning: Determining the Impact of Environmental Characteristics and Uncertainty</td>
<td>103</td>
</tr>
<tr>
<td>Miller, D and Friesen, 1982</td>
<td>Correlations</td>
<td>Cross-industry</td>
<td>Structural Change and Performance: Quantum Versus Piecemeal-Incremental Approaches</td>
<td>89</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Methodologies</td>
<td>Sample Size &amp; Environment</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------------------------</td>
<td>----------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Gupta, A, 1987</td>
<td>Correlations, Multiple regressions</td>
<td>Cross industry - Fortune 500</td>
<td>SBU Strategies, Corporate SBU Relations and SBU Effectiveness in Strategy Implementation</td>
<td>58</td>
</tr>
<tr>
<td>Miller, D, 1987</td>
<td>Correlations, Factor analysis, Regressions</td>
<td>Cross industry</td>
<td>Strategy Making and Structure: Analysis and Implications for Performance</td>
<td>97</td>
</tr>
<tr>
<td>Keats, B and Hitt, M, 1988</td>
<td>Correlations, regressions, structural equation modelling</td>
<td>Cross-industry</td>
<td>A Causal Model of Linkages among Environmental Dimensions, Macro Organisational Characteristics and Performance.</td>
<td>110</td>
</tr>
<tr>
<td>Kim, L and Lim, Y, 1988</td>
<td>Correlations, Factor, Cluster analysis</td>
<td>Korean electronics</td>
<td>Environment, Generic Strategies and Performance in a Rapidly Developing Country: A Taxonomic Approach.</td>
<td>54</td>
</tr>
<tr>
<td>Venkatraman, N, 1990</td>
<td>Structural equation modelling</td>
<td>Cross – industry</td>
<td>Performance Implications of Strategic Coalignment: A Methodological Perspective</td>
<td>110</td>
</tr>
<tr>
<td>Authors</td>
<td>Method</td>
<td>Industry</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------</td>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Feeser, H and Willard, G, 1990</td>
<td>Chi-square</td>
<td>High tech firms</td>
<td>Founding Strategy and Performance: A Comparison of High and Low Growth High Tech Firms</td>
<td>42</td>
</tr>
<tr>
<td>Powell, T, 1992</td>
<td>Correlations</td>
<td>Ladies apparel and furniture manufacturing</td>
<td>Organisational Alignment as Competitive Advantage</td>
<td>113</td>
</tr>
<tr>
<td>Reger, R and Huff, 1993</td>
<td>Cluster analysis</td>
<td>Banking industry</td>
<td>Strategic Groups: A Cognitive Perspective</td>
<td>23</td>
</tr>
<tr>
<td>Parthasarthy, R and Sethi, P, 1993</td>
<td>Correlations, regressions</td>
<td>Cross industry</td>
<td>Relating Strategy and Structure to Flexible Automation: A Test of Fit and Performance Implications</td>
<td>87</td>
</tr>
<tr>
<td>Mehra, A.</td>
<td>Cluster analysis</td>
<td>Banking industry</td>
<td>Resource and</td>
<td>45</td>
</tr>
</tbody>
</table>
The above table suggests that the useable response rate in this study (104) is not exceptionally low in relation to other strategy studies using multivariate data techniques. In addition the data are tested for normality and minima for the tests used are observed. This is not, a justification of small sample sizes and in this study the response rate was disappointing given the effort that went into ensuring a good response rate. The low response rate has been a function of adversely changing company policy towards participation in research, questionnaire complexity and funding limits. Efforts were made, within resource limits, to achieve a maximum response rate.

The studies in the above table come mainly from the Strategic Management Journal and the Academy of Management Journal. The sample sizes in the table are the norm in these journals and reflect PhD fieldwork results. Those studies, which have used much larger samples, have been well funded or used the PIMS database (1638 business units) (Prescott, J, 1986, Hambrick, D, 1985). It is interesting to note from the above table the range of statistical tests performed using these sample sizes and include discriminant analysis, factor analysis, cluster analysis and structural equation modelling.

The purpose of including a number of industries in this study was to increase the generalisability of the findings. Recognising that this type of study has not been conducted on these UK industries before, the data collected provides a basis for future research.

For these reasons it was thought justifiable to continue with the analysis of this data within the limitations of sample size.

5.1.1 Graphical examination of the data

In this section some dependent and independent variables are depicted in graphical univariate distributions. The shape of the normal curve is commented upon. Not all the variables are shown in graphical form here. The examples selected are shown below. The other variables were scrutinized.
FIGURE 7: NORMAL CURVE OF RETURN ON SALES

Return on sales against industry average

FIGURE 8: NORMAL CURVE OF RETENTION RATES
The above indicative univariate distributions suggest that the data conform to the assumptions of normality. The following normal probability plots confirm the visual appearance of normality.
The above three normal probability plots provide evidence that the data are normally distributed. The lower observed values above the normal plot suggest some negative skewness. This visual evidence is tested using direct statistical methods.
5.1.2 Missing Data

The extent of missing data was investigated. There are 16 variables central to this study which gives rise to 1664 data points (104 respondents by 16 variables). 48 data points were missing or 2.8% of the total. As these were shown to be missing completely at random they were not a concern.

5.1.3 Outliers

Outliers were identified using multivariate techniques and a decision on retention or deletion made for those designated as outliers. Mahalanobis D² (measures the distance of an observation from the mean center) was used for this purpose, as some of the statistical analysis was to be in some form of multiple regressions. No significant outliers were found within the independent variables.

5.1.4 Tests of normality

Beyond a visual examination of the normal probability plots, z values for skewness and kurtosis were calculated and where these values exceeded +/-2.58 assumptions of the normality of the distribution at the .01 probability level were to be rejected. These values are shown in the following SPSS descriptive table and subsequent Z calculations.

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N Statistic</th>
<th>Skewness Statistic</th>
<th>Kurtosis Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on sales against industry average</td>
<td>101</td>
<td>-.489</td>
<td>.240</td>
</tr>
<tr>
<td>Retention rates</td>
<td>103</td>
<td>-.770</td>
<td>.238</td>
</tr>
<tr>
<td>Effectiveness of operations</td>
<td>56</td>
<td>-.777</td>
<td>.319</td>
</tr>
<tr>
<td>Valid N (list wise)</td>
<td>54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above table shows negative skewness in the data, which is confirmed in the following table
Table 27: The skewness and kurtosis calculations of normality

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Z values of Skewness</th>
<th>Z values of Kurtosis</th>
<th>Critical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on sales</td>
<td>2.006</td>
<td>0.52</td>
<td>+/-2.58</td>
</tr>
<tr>
<td>Retention rates</td>
<td>3.19</td>
<td>0.45</td>
<td>+/-2.58</td>
</tr>
<tr>
<td>Operations effectiveness</td>
<td>2.37</td>
<td>0.96</td>
<td>+/-2.58</td>
</tr>
</tbody>
</table>

This table shows that the data are normal with respect to kurtosis but not normal with respect to one variable (retention rates) in terms of skewness. The consistent negative skewness in the data would suggest that responses were optimistic in relation to the industry average.

In addition the Kolomogorov-Smirnov test was carried out to test for normality in the data (Hair, Anderson, Tatham and Black, 1998). The following table gives the result of this test.

Table 28: The Kolomogorov-Smirnov tests of normality

<table>
<thead>
<tr>
<th>Tests of Normality</th>
<th>Kolmogorov-Smirnov Statistic</th>
<th>Df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on sales against industry average</td>
<td>.209</td>
<td>54</td>
<td>.000</td>
</tr>
<tr>
<td>Retention rates</td>
<td>.234</td>
<td>54</td>
<td>.000</td>
</tr>
<tr>
<td>Effectiveness of operations</td>
<td>.226</td>
<td>54</td>
<td>.000</td>
</tr>
</tbody>
</table>

The Kolomogorov-Smirnov test shows that the distributions are not normal. This is possibly due to the consistent skewness in the data. As the data were negatively skewed the above variables were transformed by employing a square root transformation (Hair, Anderson, Tatham and Black, 1998). The results showed no significant improvement on the pre-transformed data, therefore the original data were retained. It was noted that when smaller sample sizes were used the Kolomogorov-Smirnov test showed normality. This suggests that the Kolomogorov-Smirnov test is possibly sensitive to sample size with higher sample sizes being too easily rejected. Notwithstanding the skewness of the data, which does not reach significant proportions on all variables and is consistent across all variables, in other respects the data appear to meet the conditions for multivariate data analysis.
5.1.5 Homoscedasticity

The data were tested for the assumption of Homoscedasticity using the Box’s M test because the comparison involves the equality of variance/covariance matrices. The result is shown below.

Table 29: To test the degree of Homoscedasticity in the variables

<table>
<thead>
<tr>
<th>Box’s Test of Equality of Covariance Matrices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Box’s M</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>Df1</td>
</tr>
<tr>
<td>Df2</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
</tbody>
</table>

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a) Design: Intercept+RETENRAT+EFFOPS+TYPE

The above Box’s M test does not suggest that there is a high degree of heteroscedasticity in the data at alpha = .05

5.1.6 Linearity

The assumption of linearity was to be tested by examination of the scattergrams and through simple regression and then an examination of the residuals. The following sample scattergrams does provide some evidence that the relationships are linear. The relationships are positive and statistically significant (e.g. \( r = .366 \)).

FIGURE 13: SCATTER GRAMS – CUSTOMER RETENTION RATES VERSUS BUSINESS PERFORMANCE

Customer retention rate \( (r = .366^{**}) \)
A multiple regression analysis of the above variables was performed and the partial regression plots examined as below.
The above partial regression plots for retention rates and effectiveness of operations suggest that the relationships are linear.

5.1.7 Multicollinearity

No evidence was found for excluding variables on the basis of multicollinearity in the multiple regressions.

5.2 Holdout sample

A validation sample was extracted from the main sample for validation purposes of the multiple discriminant equations. The holdout sample was randomly selected within industry proportions. The results of the validation are discussed later with each discriminant function.

The split sample technique was used to validate the multiple regressions.

5.3 Scale reliability

The scales developed for this study included scales for internal and external financial performance and scales for output values and efficiency. To test the degree, to which they are unidimensional, Cronbach’s alpha tests were carried out (Dean, J and Snell, S, 1996). A summary is given in the following table.
Table 30: Scale reliability analysis

<table>
<thead>
<tr>
<th>Scale Description</th>
<th>Cronbach’s Alpha</th>
<th>Number of items in scale</th>
<th>Construct type</th>
</tr>
</thead>
<tbody>
<tr>
<td>External financial</td>
<td>.6802</td>
<td>3</td>
<td>Narrow</td>
</tr>
<tr>
<td>Internal financial</td>
<td>.7863</td>
<td>3</td>
<td>Narrow</td>
</tr>
<tr>
<td>Customer responsiveness</td>
<td>.6526</td>
<td>5</td>
<td>Moderate</td>
</tr>
<tr>
<td>Innovation</td>
<td>.8049</td>
<td>4</td>
<td>Moderate</td>
</tr>
<tr>
<td>Quality</td>
<td>.7285</td>
<td>3</td>
<td>Moderate</td>
</tr>
<tr>
<td>Efficiency</td>
<td>.7407</td>
<td>4</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

The reliability tests give evidence that the variables included in the scales were unidimensional. Van de Ven and Ferry (1979) have suggested that for a scale of three items Cronbach’s alpha should fall in the ranges shown in the following table.

Table 31: To show suggested Cronbach’s alphas for construct types using a three-item scale.

<table>
<thead>
<tr>
<th>Construct type</th>
<th>Suggested Alpha value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrow</td>
<td>0.70-0.90</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.55-0.70</td>
</tr>
<tr>
<td>Broad</td>
<td>0.35-0.55</td>
</tr>
</tbody>
</table>

Given these classifications the scales developed for this study can be considered reliable. The measure of external financial performance is slightly below the suggested threshold and this is caused by the measure of market share, which is commented on in the triangulation section.

5.4 Validation tests

The purpose of these tests was to independently verify the responses captured by the questionnaire to identify possible sources of bias and other threats to validity. The structure of these tests was to develop a number of independent questions within the questionnaire (internal validation) and independent measures external to the questionnaire (external validation). The following diagram shows how this was organised.
A criticism of the use of Likert scales is their subjective characteristic (Cronbach, Gleser, Nanda, and Rajaratnum, 1972). Likert scales were used in this study to measure a number of variables including business performance. The reason for this was based on the advice given by executives in the pre-survey interviews, which suggested that requests for specific financial data could jeopardise the response rate. In addition the number of potential respondents could be substantially reduced if filtered on the basis of available financial data. The business performance ratings were validated post survey with financial data collected from available sources and for those companies, which were recorded in these sources. Whilst Likert scales are technically ordinal data they were treated as interval for the purposes of this study and the reasonableness of this assumption was found to hold as shown in the discussion below.

5.4.1 Financial measures of performance

The comparison of external measures of performance was made between the ratings executives had given themselves in the questionnaire and a rating calculated using financial data obtained from the Dunn and Bradstreet index of top UK companies. The purpose of this analysis was to triangulate the subjective ratings respondents had given themselves against an actual industry average (7 point scale). The actual industry average of financial performance for sales and return on sales was estimated using the last years reported financial data. The range of data points for each financial measure was divided into 7 equal groups, with the highest and lowest performances forming the upper and lower class intervals. Industry average estimates were compiled from the financial data gathered for the sample group. The actual class intervals were then calculated by reference to the lower and upper class intervals and
the actual industry average. The sample estimation of each industry parameter is shown below in the following table.

Each firm’s actual return on sales performance (1995) was converted onto this actual industry based 7-point scale and entered into the SPSS database. Each firm’s actual return on sales performance was statistically compared to the subjective rating given by executive managers’ estimate of the firm’s performance using paired t-tests and correlations.

Calculating the change in sales over the last 12 months created the actual market share performance scale. The range of change from the highest positive to lowest negative was then used to create 7 classes as shown below. The firm’s actual performance was then classified according to this estimate of the actual industry scale and entered into the SPSS database. Each firm’s actual market share performance was statistically compared to the subjective rating given by executive managers’ estimate of the firm’s performance using paired t-tests and correlations.

No validation was carried out on the estimates of return on investment due to the unavailability of total investment data. The null hypotheses for these business performance triangulation tests were as follows:

Ho1: There is no relationship between the Likert scale measures of return on sales and the actual return on sales (1995).
Ho2: There is no significant relationship between the Likert scale measurements of market share change and actual market share change (1995)
Ho3: There is no difference between the Likert scale measures of return on sales and the actual return on sales (1995).
Ho4: There is no significant difference between the Likert scale measurements of market share change and actual market share change (1995)

Table 32: The actual industry performance Likert scales (figures shown are upper class limits and based on the years change in market share).

<table>
<thead>
<tr>
<th>Industry</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Market share</td>
<td>56.62%</td>
<td>45.06%</td>
<td>34.58%</td>
<td>23.56%</td>
<td>12.53%</td>
<td>1.51%</td>
<td>-9.51%</td>
</tr>
<tr>
<td>ROS</td>
<td>32.81%</td>
<td>14.45%</td>
<td>9.12%</td>
<td>7.83%</td>
<td>4.96%</td>
<td>3.36%</td>
<td>1.83%</td>
</tr>
<tr>
<td>Automotive Market share</td>
<td>159.91%</td>
<td>121.23%</td>
<td>82.73%</td>
<td>44.14%</td>
<td>5.56%</td>
<td>-33.03%</td>
<td>-71.62%</td>
</tr>
<tr>
<td>ROS</td>
<td>13.4%</td>
<td>13.24%</td>
<td>12.9%</td>
<td>6.91%</td>
<td>5.32%</td>
<td>3.88%</td>
<td>0.12%</td>
</tr>
<tr>
<td>Financial Market share</td>
<td>43.94%</td>
<td>35.25%</td>
<td>26.56%</td>
<td>17.87%</td>
<td>9.19%</td>
<td>0.5%</td>
<td>-8.19%</td>
</tr>
<tr>
<td>ROS</td>
<td>21.12%</td>
<td>18.31%</td>
<td>8.43%</td>
<td>4.93%</td>
<td>1.11%</td>
<td>0.85%</td>
<td>-13.24%</td>
</tr>
<tr>
<td>Logistics Market share</td>
<td>109.13%</td>
<td>88.77%</td>
<td>68.41%</td>
<td>48.05%</td>
<td>27.68%</td>
<td>7.32%</td>
<td>-13.04%</td>
</tr>
<tr>
<td>ROS</td>
<td>11.13%</td>
<td>9.61%</td>
<td>6.67%</td>
<td>5.12%</td>
<td>4.28%</td>
<td>2.80%</td>
<td>-0.42%</td>
</tr>
</tbody>
</table>

115
The details of the main results are given in the table below:

<table>
<thead>
<tr>
<th>Measure</th>
<th>Test</th>
<th>Statistic</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on Sales</td>
<td>Correlation</td>
<td>.502**</td>
<td>Reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>Paired t-</td>
<td>.015</td>
<td>Reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market share</td>
<td>Correlation</td>
<td>.062</td>
<td>Fail to reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>Paired t-</td>
<td>.005</td>
<td>Reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>test</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(* * p<.001)

5.4.2 Comment on the validation of internal and external measures of financial performance

There is a significant correlation between the Likert scale measures of return on sales and the actual (1995 – later figures were not available in a number cases) return on sales. Degrees of association may have been lost due to the actual (1985) financial figures used in the analysis not being the latest used by the respondents (the questionnaire being mailed in 1987). Additionally the reported actual financial figures may have included other SBUs performances, which the respondent did not include.

Using similar techniques, Powell (1992) correlated subjective and objective measures of profitability and considered 0.58, significant at p<.001, to be strong evidence,

"That although the two measures were not identical, objective financial performance constituted a key element of the CEO's subjective assessment of the firm's financial performance" (page 126).

Using a Cronbach's alpha interrater reliability approach to the objective and subjective measures of return on sales, the alpha coefficient is .65, which indicates that these two items are measuring the same construct. When analysed at industry level the electronic components industry has an alpha coefficient of .82 (n = 20) (Pearson's correlation = .77). This evidence indicates an adequate level of reliability of the subjective return on sales measure used in this study.

The paired t-test showed that there was a significant difference in the average scores between the Likert measurements and the actual return on sales measurements. This has possibly arisen from the wide dispersion of a few scores. When these outlying scores are examined they show in some cases that the firm has made an acquisition during 1995 and the return on sales has been lowered from 1994 due to a write-offs. The removal of the outliers resulted in a failure to reject the null hypothesis i.e. the means could not be shown to be significantly different.

The other potential cause of these outliers (usually the Likert scale is 4 points greater than the actual) occurs where the firm has had a poor 1994 (negative) return on sales
followed by an improvement to a positive 1995 return on sales indicating an unusual 1994 event. This year on year positive performance improvement may be an above industry performance, which is not reflected in the single year 1995 calculations of return on sales. This highlights one of the problems of measuring one year's performance. The theoretical model would suggest that the patterns of relationships between the variables could remain stable over time and not be subject to individual company’s yearly fluctuations in performance.

When the actual (1995) return on sales is correlated with and compared to the budgeted return on sales (internal financial measure of return on sales) the correlation coefficient is .321* (still significant) and the paired t-test statistic is p=. 940. Consequently using internal measures of return on sales the tests would result in a rejection of the relationship null hypotheses and an acceptance of the difference null hypothesis. This may indicate fewer extreme differences in interpretation of return on sales performance using budgeted measures. It suggests that the CEO’s “subjective” evaluation of their performance may contain additional information not revealed in ratings based on available reported financial data such as new product launches, productivity initiatives etc.

When the sample is split based on size (small <100, medium 101-500, large >500 employees), to test for the effect of size the following is the result:

<table>
<thead>
<tr>
<th>Size/Measure</th>
<th>Test</th>
<th>Statistic</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small firms (n=46) Return on Sales</td>
<td>Correlation</td>
<td>.585*</td>
<td>Reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>Paired t-test</td>
<td>.023</td>
<td>Fail to reject null hypothesis</td>
</tr>
<tr>
<td>Small firms Market share</td>
<td>Correlation</td>
<td>.211</td>
<td>Fail to reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>Paired t-test</td>
<td>.704</td>
<td>Reject null hypothesis</td>
</tr>
<tr>
<td>Medium firms (n=34) Return on Sales</td>
<td>Correlation</td>
<td>.691**</td>
<td>Reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>Paired t-test</td>
<td>.867</td>
<td>Reject null hypothesis</td>
</tr>
<tr>
<td>Medium firms Market share</td>
<td>Correlation</td>
<td>.038</td>
<td>Fail to reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>Paired t-test</td>
<td>.016</td>
<td>Fail to reject null hypothesis</td>
</tr>
<tr>
<td>Large firms (n=24) Return on Sales</td>
<td>Correlation</td>
<td>.585*</td>
<td>Reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>Paired t-test</td>
<td>.023</td>
<td>Fail to reject null hypothesis</td>
</tr>
<tr>
<td>Large firms Market share</td>
<td>Correlation</td>
<td>.211</td>
<td>Fail to reject null hypothesis</td>
</tr>
<tr>
<td></td>
<td>Paired t-test</td>
<td>.704</td>
<td>Reject null hypothesis</td>
</tr>
</tbody>
</table>

(** p<. 001, *p<.05)
The above table suggests that medium sized firms rated themselves consistently with the actual (1995) financial calculations for return on sales. Small and large sized firms did better in judging their market share performance.

The lack of correlation and the difference in the paired means of the sample for market share performance may have arisen from differences in definition of what industry the firm is operating in. This point was confirmed in the post survey validation interviews. The definition of industry is possibly more important to the validation of market share than it was to return on sales because the ratio calculation in return on sales is possibly less susceptible to differences in absolute size and definition. The average actual market share was calculated using 1994 sales as the base year. The following table gives the mean change in 1995 over 1994 (=100).

**Table 35: To show the industry mean changes in sales.**

<table>
<thead>
<tr>
<th>Industry</th>
<th>1995 Sales Index (Means) (1994 = 100)</th>
<th>1995 Sales Index (Medians) (1994 = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronics</td>
<td>123.57</td>
<td>115.30</td>
</tr>
<tr>
<td>Automotive</td>
<td>144.14</td>
<td>117.68</td>
</tr>
<tr>
<td>Financial</td>
<td>117.88</td>
<td>120.24</td>
</tr>
<tr>
<td>Logistics</td>
<td>148.05</td>
<td>111.08</td>
</tr>
</tbody>
</table>

These means may have been influenced by activities such as acquisitions during 1995, consolidation with other SBU sales and differences in reporting time scales. These differences could have resulted in a loss of association between the Likert scale measurements, and the actual market share change calculations and the occurrence of outliers. The data are skewed as a result of these outliers, as comparison with the median values indicates.

In conclusion, there is evidence that the Likert scales reliably measure return on sales. The picture in terms of market share is less clear and requires post survey validation to confirm the suspicion that market definition was a factor in causing this ambiguity. If this were the case this may not by itself mean that the market share measurement using Likert scales was unreliable.

5.4.3 Internal validation of the relationship of output values to financial performance

The relationship of output values, efficiency and price has been analysed using internal responses to both the financial and output value questions. The questionnaire contained direct questions (section 2 of the questionnaire) that related financial performance to output values (refer questions 2.2, 2.4, 2.6 and 2.9 in the questionnaire). These relationships were compared in the following steps:

a) The file was split by industry
b) The output values to business performance impact questions were correlated to see what relationships existed between these scores.
The output value impact scales were correlated with the output value performance scales.

**Table 36: To show the significant relationships between customers responsiveness impact scales to evaluate the consistency of responses**

(The electronic components manufacturing industry n=39)

<table>
<thead>
<tr>
<th>Output impact value</th>
<th>Sales</th>
<th>Market share</th>
<th>Return on Sales</th>
<th>Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market share</td>
<td>.598**</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return on Sales</td>
<td>.036</td>
<td>.316</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Return on Investment</td>
<td>.279</td>
<td>.408*</td>
<td>.573**</td>
<td>1.0</td>
</tr>
</tbody>
</table>

(** p<.001, *p<.05)

The above correlations indicate a significant degree of consistency between the customer responsiveness impact scores. In particular sales are correlated to market share and return on sales to return on investment. These results could indicate that respondents were consistent in their evaluation of the relationship of the customer responsiveness output value to business performance.

**Table 37: To show the relationship between innovation impact scales to evaluate the consistency of responses**

(The electronic components manufacturing industry n=39)

<table>
<thead>
<tr>
<th>Output impact value</th>
<th>Sales</th>
<th>Market share</th>
<th>Return on Sales</th>
<th>Return on Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market share</td>
<td>.639**</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return on Sales</td>
<td>.715**</td>
<td>.571**</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Return on Investment</td>
<td>.477**</td>
<td>.296</td>
<td>.545**</td>
<td>1.0</td>
</tr>
</tbody>
</table>

(** p<.001, *p<.05)

The above correlations indicate a significant degree of consistency between the innovation impact scores. This reflects consistency by the respondents in how they scored the innovation output’s impact on business performance.
Table 38: To show the relationship between quality impact scales to evaluate the consistency of responses
(The electronic components manufacturing industry n=39)

<table>
<thead>
<tr>
<th>Output impact value</th>
<th>Sales</th>
<th>Market share</th>
<th>Return on Sales</th>
<th>Return on investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market share</td>
<td>.628**</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return on Sales</td>
<td>.695**</td>
<td>.360*</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Return on Investment</td>
<td>.548**</td>
<td>.360*</td>
<td>.528**</td>
<td>1.0</td>
</tr>
</tbody>
</table>

(** p<.001, * p<.05)

The above correlations indicate significance between the quality impact scores. This reflects consistency in the way in which respondents evaluated the impact of quality on business performance.

The other 3 industries reflect the same levels of consistency. Correlations between output value impact scales and output value performance scales showed that there are no significant patterns of relations between impact and performance. This means that while firms can identify which output values impact on business performance, this is not necessarily the same as actually performing well on those same output values – the difference perhaps between knowing what to do and being able to do it!

5.4.4 External validation using the customers' evaluation of supplier

The suppliers were the main respondents in this research. They had evaluated their performance on output values using 7-point Likert scales. They were asked to supply the name of a customer so that the suppliers' ratings could be checked. A questionnaire (Appendix 2) was sent to the customers using the same output value, efficiency and price scales as the suppliers used. 38 customer questionnaires were sent out and 13 useable responses were received back – a response rate of 34.2%.

The following is an analysis of the customers' responses compared with the suppliers responses. A paired t-test was carried out to test if there was a significant difference between the suppliers' and customers' view of the suppliers' performance (Appendix 3). 7 of the 18 paired variables showed a significant difference. The suppliers consistently rated themselves higher than the customers against industry average. The only variable where this was reversed was on price where the suppliers rated themselves below industry average and the customers rated the suppliers above industry average. This possibly arises from a bias towards establishing a preferential bargaining position by either side. Whilst this reflects potential bias in the responses, this bias is consistent.
5.4.5 Internal validation of resource importance to output values

This study includes the relative impact of functions on output values. The theory suggests that there could be significant differences in the relative impact of functions on output values. In order to triangulate the impact scores that form the basis of this analysis, a series of questions (3.2, 3.3, 3.4), which measured the ex ante and ex post limits to imitation (a proxy for impact) were included in the questionnaire for this purpose.

The scores on these questions were correlated with the impact scores on question 3.1 to evaluate the degree of consistency between responses. Strong correlations could indicate a high level of consistency in the way respondents' evaluated functional impact.
Table 39: Correlations of purchasing impact scores to test the degree of consistency of responses

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Purchasing impact index</th>
<th>Difficulty to establish purchasing function</th>
<th>Investment in purchasing</th>
<th>Purchasing skill level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1.000</td>
<td>.369**</td>
<td>.349**</td>
<td>.410**</td>
</tr>
<tr>
<td>Difficulty to establish</td>
<td>.369**</td>
<td>1.000</td>
<td>.453**</td>
<td>.456**</td>
</tr>
<tr>
<td>purchasing function</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment in purchasing</td>
<td>.349**</td>
<td>.453**</td>
<td>1.000</td>
<td>.358**</td>
</tr>
<tr>
<td>Purchasing skill level</td>
<td>.410**</td>
<td>.456**</td>
<td>.358**</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing impact index</td>
<td>.000</td>
<td></td>
<td>.001</td>
<td>.000</td>
</tr>
<tr>
<td>Difficulty to establish</td>
<td>.000</td>
<td></td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>purchasing function</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment in purchasing</td>
<td>.001</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Purchasing skill level</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>94</td>
<td>93</td>
<td>94</td>
<td>93</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

This table is illustrative of the correlations found for the other functions. It indicates a significant relationship between the various independent measures of functional impact. This suggests that the respondents reliably answered the questions relating to the importance of functions to output values.
5.5 Summary of validation and reliability tests

The internal tests give some support to the reliability and validity of the output value measures and impact scores used in this study. Respondents showed themselves to be consistent in the way they measured both output values and functional impact. The external validation measures (financial measures and customer evaluations of suppliers) give some support to the reliability of the Likert scales but highlight some of the problems with "objective" data. With certain limitations (notably the skewed nature of some of the data) the data were seen to conform adequately to the assumptions of normality to allow the use of multivariate analysis.
CHAPTER 6 – DATA ANALYSIS

6.0 Introduction

The focus of this chapter is to test the hypotheses and provide a basis for validating the theoretical model. The analysis is carried out in two stages using discriminant functions to specify the differences between industries and regression functions to specify the relationships between different aspects of the model as shown in the diagram below.

FIGURE 18: TO SHOW THE RELATIONSHIP OF THE HYPOTHESES TO THE THEORETICAL MODEL

- **H1a** – Discriminant analysis
- **H1b** – Multiple regressions
- **H2a** – Discriminant analysis
- **H2b** – Multiple regressions

Direction of resource prioritisation by customer preferences (as understood by the firm) via prioritisation of efficiency and firm outputs

Direction of resource, efficiency and firm output congruency with customer preferences (actual) results in firm performance.
The first hypothesis examines the output and efficiency performance variables relationship with business performance. This relationship, the model suggests, is varied (examined through multiple regression) and that these relationships vary between the manufacturing and service industries (examined through discriminant analysis). The management interest in these hypotheses is that knowing which efficiency and output variables are important to each industry and have a sizeable impact on business performance are important considerations in the strategy formulation process. The theory would suggest that these relationships are not consistent between industries.

The second hypothesis examines the output and efficiency performance variables relationship with functional effectiveness. This relationship, the model suggests, is varied (examined through multiple regression) and that these relationships vary between the manufacturing and service industries (examined through discriminant analysis). The management interest in these hypotheses is that knowing which functional effectiveness variables are important to each industry and impact output and efficiency performance, are important considerations in the strategy formulation process, particularly with regard to the allocation of resources. The theory could suggest that these relationships are not consistent between industries.

The purpose of this approach is to test the hypotheses at industry level and to comment on the findings. For example if the study had been limited to one industry the question could have arisen as to whether the findings held as industry settings were changed.

6.1 Testing hypothesis H1

This section covers the testing of the hypotheses, which were derived from the theoretical model. The first hypothesis to be tested is:

\[
\text{H1: There is a positive relationship between output values; efficiency, price and business performance and these relationships vary by industry.}
\]

Hypothesis 1 is tested in two stages. The first stage is a two-group discriminant analysis where the groups are the manufacturing and service sectors respectively and the significant predictor variables are identified. The sub hypothesis for this first stage is stated as follows:

\[
\text{H1a: There are varied relationships between output values, efficiency, and price and industry types.}
\]

The second stage is a multiple regression where output values, efficiency and price are related to business performance. The sub hypothesis for this second stage is as follows:

\[
\text{H1b: If the relative effectiveness of performance on output, efficiency and price increases then business performance will increase.}
\]
Three multiple regressions are performed: one for the full data set (with validation and hold out samples) and one each for the manufacturing and service sectors.

The relationship of the tests and hypotheses (H1a and H1b) to the theoretical model are shown below.

**FIGURE 19: TO RELATE THE TESTING OF H1 TO THE THEORETICAL MODEL**

- **H1a - Discriminant analysis**
- **H1b - Multiple regressions**

Direction of resource prioritisation by customer preferences (as understood by the firm) via prioritisation of efficiency and firm outputs

Direction of resource, efficiency and firm output congruency with customer preferences (actual) results in firm performance.
6.1.1 Two-group discriminant analysis

The dependant variable in this analysis is nominal; being two groups namely the manufacturing sector and the service sector. As suggested by the theoretical model it would be expected that the discriminating variables could be different between these two groups. The independent variables are measured on Likert type scales, which are treated as interval data for the purposes of this test. These independent variables cover the effectiveness of the resources of the firm, and the level of performance on efficiency and market output values.

6.1.2 Sample size considerations

The total sample of 104 is split into analysis and holdout (validation) samples. The analysis sample is 62 and the holdout sample is 42 providing a ratio of 1 to 5 observations to independent variables. This ratio is considered to be the minimum for this kind of analysis (Hair, et, al, 1998). If the sample had not been split this ratio could have increased to 7 to 1. It was considered more important to validate the results than to increase the number of observations in the analysis sample. The holdout sample was randomly selected using group proportions.

6.1.3 Discriminant analysis assumptions

The assumptions of normality, linearity and multicolinearity have been tested previously and have generally met acceptable levels. Box's M test for equal covariance was performed and the difference between the two groups was not found to be significant. An example of this test is given below:

<table>
<thead>
<tr>
<th>Test Results</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>F Appro</td>
<td>1.57</td>
</tr>
<tr>
<td>df</td>
<td>1</td>
</tr>
<tr>
<td>df</td>
<td>6868.3</td>
</tr>
<tr>
<td>Sig.</td>
<td>.20</td>
</tr>
</tbody>
</table>

Tests null hypothesis of equal population

a Validation coding = analysis sample
6.1.4 Estimation of the output values, efficiency and price discriminant model and assessing the overall fit

The first discriminant function tested to see if there are output value, efficiency and price variables, which discriminate significantly between the manufacturing and service sectors. The hypothesis that is tested is as follows:

\[ H_{Ia}: \text{There are varied relationships between output values, efficiency, and price and industry types.} \]

Table 41: To show the equality of group means

<table>
<thead>
<tr>
<th>Tests of Equality of Group Meansa</th>
<th>Wilks' Lambda</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smean(PRICCHRG)</td>
<td>.991</td>
<td>.521</td>
<td>1</td>
<td>60</td>
<td>.473</td>
</tr>
<tr>
<td>Smean(CONSITEN)</td>
<td>1.000</td>
<td>.011</td>
<td>1</td>
<td>60</td>
<td>.915</td>
</tr>
<tr>
<td>Smean(REPUTATI)</td>
<td>.991</td>
<td>.540</td>
<td>1</td>
<td>60</td>
<td>.465</td>
</tr>
<tr>
<td>Smean(BRANDS)</td>
<td>.979</td>
<td>1.260</td>
<td>1</td>
<td>60</td>
<td>.266</td>
</tr>
<tr>
<td>Smean(DELIPROM)</td>
<td>.953</td>
<td>2.972</td>
<td>1</td>
<td>60</td>
<td>.090</td>
</tr>
<tr>
<td>Smean(OPSCANG)</td>
<td>.975</td>
<td>1.542</td>
<td>1</td>
<td>60</td>
<td>.219</td>
</tr>
<tr>
<td>Smean(PRODOFFE)</td>
<td>.985</td>
<td>.896</td>
<td>1</td>
<td>60</td>
<td>.348</td>
</tr>
<tr>
<td>Smean(WINCUSTO)</td>
<td>.954</td>
<td>2.891</td>
<td>1</td>
<td>60</td>
<td>.094</td>
</tr>
<tr>
<td>Smean(RETENRAT)</td>
<td>.997</td>
<td>.156</td>
<td>1</td>
<td>60</td>
<td>.694</td>
</tr>
<tr>
<td>Smean(NEWPRDSE)</td>
<td>.974</td>
<td>1.578</td>
<td>1</td>
<td>60</td>
<td>.214</td>
</tr>
<tr>
<td>Smean(DESINNOV)</td>
<td>.950</td>
<td>3.130</td>
<td>1</td>
<td>60</td>
<td>.082</td>
</tr>
<tr>
<td>Smean(RATENEWP)</td>
<td>.998</td>
<td>.131</td>
<td>1</td>
<td>60</td>
<td>.718</td>
</tr>
<tr>
<td>Smean(SUCCRATE)</td>
<td>.939</td>
<td>3.907</td>
<td>1</td>
<td>60</td>
<td>.053</td>
</tr>
</tbody>
</table>

\[ a. \text{Validation coding = analysis sample} \]

The groups, which appear to have the greatest difference in means, are the success rate of new product introductions, design innovation, the ability to meet delivery promises and the ability to win new customers. These variables indicate that customer service and innovation are discriminatory dimensions between the manufacturing and service sectors.

The purpose of this analysis is to determine which variables are efficient in discriminating between firms in the service and manufacturing sectors. As a result a stepwise procedure is used in estimating the discriminant function. The Mahalanobis \( D^2 \) is used in the stepwise procedure to estimate the variable with the greatest power of discrimination (Hair, et al, 1998).
The 4 variables to remain in the analysis at step 4 were, success rates of new products, the ability to win new customers, the rate of new product development, and design innovation, as shown in the table below.

Table 42: To show the accepted variables

<table>
<thead>
<tr>
<th>Variables in the Analysis</th>
<th>Tolerance</th>
<th>F to Remove</th>
<th>Min. D Squared</th>
<th>Between Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(SUCCRATE)</td>
<td>1.000</td>
<td>3.907</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(WINCUSTO)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(NEWPRDSE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(DESINNOV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(SUCCRATE)</td>
<td>.946</td>
<td>5.573</td>
<td>.219</td>
<td>1 and 2</td>
</tr>
<tr>
<td>SMEAN(WINCUSTO)</td>
<td>.946</td>
<td>4.547</td>
<td>.296</td>
<td>1 and 2</td>
</tr>
<tr>
<td>SMEAN(NEWPRDSE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(DESINNOV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(SUCCRATE)</td>
<td>.905</td>
<td>8.947</td>
<td>.331</td>
<td>1 and 2</td>
</tr>
<tr>
<td>SMEAN(WINCUSTO)</td>
<td>.942</td>
<td>4.762</td>
<td>.656</td>
<td>1 and 2</td>
</tr>
<tr>
<td>SMEAN(NEWPRDSE)</td>
<td>.850</td>
<td>4.595</td>
<td>.670</td>
<td>1 and 2</td>
</tr>
<tr>
<td>SMEAN(DESINNOV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(SUCCRATE)</td>
<td>.762</td>
<td>5.058</td>
<td>.984</td>
<td>1 and 2</td>
</tr>
<tr>
<td>SMEAN(WINCUSTO)</td>
<td>.930</td>
<td>5.354</td>
<td>.958</td>
<td>1 and 2</td>
</tr>
<tr>
<td>SMEAN(NEWPRDSE)</td>
<td>.738</td>
<td>7.281</td>
<td>.793</td>
<td>1 and 2</td>
</tr>
<tr>
<td>SMEAN(DESINNOV)</td>
<td>.734</td>
<td>3.958</td>
<td>1.084</td>
<td>1 and 2</td>
</tr>
</tbody>
</table>

*Validation coding = analysis sample*

The multivariate attributes of the discriminant function are shown in the tables below.
Table 43: To show the significance of the discriminant function

<table>
<thead>
<tr>
<th>Test of Function(s)</th>
<th>Wilks' Lambda</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.755</td>
<td>16.280</td>
<td>4</td>
<td>.003</td>
</tr>
</tbody>
</table>

*a.* Validation coding = analysis sample

The above Wilks' Lambda test shows the function to be significant. In addition the canonical correlation as shown in the table below explains 25% (canonical correlation squared) of the variance in the dependent variable, industry type.

Table 44: To show the canonical correlation of the discriminant function.

<table>
<thead>
<tr>
<th>Eigenvalues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

*a.* First 1 canonical discriminant functions were used in the analysis.

*b.* Validation coding = analysis sample

The canonical correlation shows that the function has reasonable discriminatory power.

The following table shows the structure matrix of the discriminant loadings by independent variable.
The above structure matrix shows that there are 3 variables that have a strong effect (above .3) in discriminating between the industry types. The three variables are success rates of new products, design innovation, and the ability to win new customers. On examination of the means of these variables, the manufacturing sector is higher on both the innovation related variables (success rate of new products and design innovation) and the services sector is higher on the ability to win new customers.

The following graphs show the centroids for the manufacturing and service sectors respectively.
FIGURE 20: FUNCTION 1 CANONICAL DISCRIMINANT FUNCTION – MANUFACTURING

Canonical Discriminant Function 1

Economic sector = Manufacturing

VALIDATI: 1 analysis sample

The manufacturing sector has a centroid of -.37 and the service sector has a centroid of .84 as shown in the graph below.

FIGURE 21: FUNCTION 1 CANONICAL DISCRIMINANT FUNCTION – SERVICE

Canonical Discriminant Function 1

Economic sector = Service

VALIDATI: 1 analysis sample

The manufacturing sector has a centroid of -.37 and the service sector has a centroid of .84 as shown in the graph below.
The overall fit of the function is determined by an assessment of the predictive accuracy of the function. The following table shows the classification results.

Table 46: To show the classification results of the analysis sample

<table>
<thead>
<tr>
<th>Classification Results</th>
<th>Predicted Group Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Economic sector</td>
</tr>
<tr>
<td>Origin</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>% 1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Cross-validated</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>% 1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by all cases other than that case.
b. 72.6% of original grouped cases correctly classified.
c. 71.0% of cross-validated grouped cases correctly classified.
d. Validation coding = analysis sample

The above analysis sample correctly classified 72.6% of the cases. The holdout sample showed that the function correctly classified 71.4% of the cases. The slightly lower predictive ability of the holdout sample relates to its smaller sample size. The maximum chance criterion (if all the observations were allocated to the largest group – the manufacturing sector) is 66%.

The calculated proportional chance criterion is calculated as follows:

\[
C_{pro} = p^2 + (1-p)^2
\]

Where

\[
C_{pro} = \text{proportional chance criterion}
\]
\[
p = \text{proportion of firms in group 1}
\]
\[
1-p = \text{proportion of firms in group 2}
\]

(Source: Hair, et al, 1998)

The value of the proportional chance criterion is \((.307^2 + .693^2) = 57.4\%\)
Therefore the discriminant function is marginally (14%) better than chance in classifying industry membership based on functional effectiveness.

A final measure of classification accuracy is Press’s Q as calculated below.

\[
\text{Press’s Q (analysis sample)} = \frac{(62- (45\times2))^2}{60} = 13.07 \\
\text{Press’s Q (holdout sample)} = \frac{(42- (30\times2))^2}{42} = 7.71
\]

The predictive capability of the analysis sample is statistically significant as the Press’s Q value exceeds the critical value of 6.63. The holdout sample provides a significant improvement in prediction over chance, which provides evidence of the internal validity of the discriminant function.

### 6.1.5 Discriminant analysis of cost advantage variables

When the cost advantage variables are analysed using the stepwise method the following structure matrix results.

#### Table 39: To show the structure matrix of the cost advantage variables

<table>
<thead>
<tr>
<th>Structure Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>SMEAN(CAPUTILI)</td>
</tr>
<tr>
<td>SMEAN(CAPEFFIC)</td>
</tr>
<tr>
<td>SMEAN(LABEFFIC)</td>
</tr>
<tr>
<td>SMEAN(OPSEFFIC)</td>
</tr>
</tbody>
</table>

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

a. This variable not used in the analysis.

Out of the four cost advantage variables only capacity utilisation was a significant predictor variable with the mean for the service sector higher than the mean for the manufacturing sector.

### 6.1.6 Conclusion to test of hypothesis H1a

The above discriminant function shows that certain output, efficiency and price values are significantly different between the manufacturing and service sector as suggested by the theoretical model. The market advantage variables, success rates of new products, design innovation, and the ability to win new customers discriminate between the manufacturing and service sectors. Capacity utilisation is the cost
advantage variable that discriminates between the two sectors. These results are reflected on the model below and lead towards acceptance of hypothesis

\[ H1a: \text{There are varied relationships between output values, efficiency, price, and industry types.} \]

The implications for management are discussed in the final chapter.

**FIGURE 22: TO RELATE THE TESTING OF H1B TO THE THEORETICAL MODEL**

[Diagram of resource, cost, and competitive advantages]
6.1.7 Estimating the business performance regression model and assessing overall model fit

The purpose of the regression model is to test the hypothesis that the relationships between output, efficiency and price values explain a proportion of the variability of business performance as predicted by the theoretical model. This hypothesis is stated as follows:

\[ H1b: \text{If the relative effectiveness of performance on output, efficiency and price increases then business performance will increase.} \]

The management interest in this question is the relative proportions of the independent variables that explain changes in the business performance scale. These would be reflected in the beta values of the independent variables. In order to place this hypothesis (highlighted) in context, the theoretical model is reproduced below.

**FIGURE 23: TO RELATE THE TESTING OF H1B TO THE THEORETICAL MODEL**

![Diagram showing resource advantage, customer preferences, interaction, competitive advantage, market advantage, cost advantage, and competitive advantage with relationships highlighted for H1a and H1b.]
The objective of this regression analysis is to identify which factors explain the greatest level of change in business performance. The difference in power of the regression function between industries is of interest. In other words does the model fit one industry better than another i.e. how generalisable is the model? The dependent variable, business performance is a scale made up of the items, market share, return on investment and return on sales (budgeted and actual). The independent variables comprise the efficiency and output value items.

The research design resulted in 104 useable responses. This sample size has an effect on the reliability of the $R^2$ that can be detected. A sample size of 100 with 20 independent variables will detect $R^2$ values explaining 21% of the variance with a power of .80 at a significance level ($\alpha$) of .05 (Hair, et, al, 1998). The actual sample of 104 with 17 independent variables could therefore detect $R^2$ less than 21% variance with a power of .80 at a significance level ($\alpha$) of .05. The ratio of independent variables to sample size is 6:1 (104/17), which is above the generally accepted minimum of 5:1 (Hair, et, al, 1998).

The multiple regression assumptions were met as discussed earlier in this chapter. Additionally the sampling procedure, which defined the population as the set of firms that accounted for at least 75% of market share, resulted in effective representation and deemed adequate for the objectives of this study.

The first regression calculated was based on the total sample and this was analysed for linearity, homoscedasticity, independence of the residuals and normality. The assumption of linearity is analysed through the following residual and partial regression plot.

**FIGURE 24: RESIDUALS SCATTERPLOT – BUSINESS PERFORMANCE SCALE**

Scatterplot

Dependent Variable: Business performance scale
The above plot does not show any non-linear pattern in the residuals, indicating that the overall equation is linear. The partial regression plots for all the independent variables, significant to the equation, showed well-defined relationships to the dependent variable. The above plot confirms the homoscedasticity of the data. The figure below confirms the normality of the error term of the regression variate as the values fall along the diagonal without systematic departures from it (Hair, et al, 1998).

**FIGURE 25: STANDARDISED RESIDUAL PLOT OF BUSINESS PERFORMANCE SCALE**

![Standardised Residual Plot](image)

The regression model (calculated using the enter method) was found to be significant and the .01 level as shown in the ANOVA table below.

**Table 47: ANOVA of business performance scale**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>46.674</td>
<td>17</td>
<td>2.746</td>
<td>4.249</td>
</tr>
<tr>
<td>Residual</td>
<td>55.567</td>
<td>86</td>
<td>.646</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>102.242</td>
<td>103</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Predictors: (Constant), SMEAN(BRANDS), SMEAN(PRODOFFE), SMEAN(LABEFFIC), SMEAN(WINCUSTO), SMEAN(PRICECHRG), SMEAN(RATENEW), SMEAN(DELIPROM), SMEAN(RETENRAT), SMEAN(CAPEFFIC), SMEAN(CONSTEN), SMEAN(SUCCRATE), SMEAN(DESINNOV), SMEAN(REPUTATI), SMEAN(OPSCHI), SMEAN(CAPUTIL), SMEAN(CESINNOV), SMEAN(REPUTATI), SMEAN(OPSCHI) |
| Dependent Variable: Business performance scale |

The regression had a $R^2$ of .457 explaining 45.7% of the dependent variable, business performance. This compares favourably with strategy studies of business performance.
Table 48: Business performance regression summary

Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.676a</td>
<td>.457</td>
<td>.349</td>
<td>.8038</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), SMEAN(BRANDS), SMEAN(PRODOFFE), SMEAN(LABEFFIC), SMEAN(WINCUSTO), SMEAN(PRICCHRG), SMEAN(RATENEWP), SMEAN(DELIPROM), SMEAN(RETENRAT), SMEAN(CAPEFFIC), SMEAN(CONSITEN), SMEAN(SUCCRATE), SMEAN(OPSEFFIC), SMEAN(CAPUTIL), SMEAN(DESINNOV), SMEAN(REPUTATI), SMEAN(OPSCHANG), SMEAN(NEWPRDSE)

b. Dependent Variable: Business performance scale

The interpretation of the variate is derived from the following table.

Table 49: Independent variables coefficients

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Standardize</th>
<th>5% Confidence Interval for B</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients</td>
<td>Lower Bound</td>
<td>Upper Bound</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>t</th>
<th>Sig</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>-.166</td>
<td>.781</td>
<td>- .212</td>
<td>.832</td>
<td>-1.718</td>
<td>1.366</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SMEAN(DELIPROM)</td>
<td>1.886E-02</td>
<td>.096</td>
<td>.023</td>
<td>.196</td>
<td>.845</td>
<td>-1.73</td>
<td>2.10</td>
<td>.453</td>
</tr>
<tr>
<td></td>
<td>SMEAN(OPSPCAN)</td>
<td>1.168E-02</td>
<td>.107</td>
<td>.013</td>
<td>.111</td>
<td>.912</td>
<td>-2.00</td>
<td>2.24</td>
<td>.462</td>
</tr>
<tr>
<td></td>
<td>SMEAN(PRODOFF)</td>
<td>4.643E-02</td>
<td>.090</td>
<td>.052</td>
<td>.516</td>
<td>.607</td>
<td>-1.33</td>
<td>2.25</td>
<td>.613</td>
</tr>
<tr>
<td></td>
<td>SMEAN(WINCUSTO)</td>
<td>9.415E-03</td>
<td>.076</td>
<td>- .011</td>
<td>-.123</td>
<td>.902</td>
<td>-1.61</td>
<td>1.42</td>
<td>.761</td>
</tr>
<tr>
<td></td>
<td>SMEAN(RETENRAT)</td>
<td>6.01E-02</td>
<td>.083</td>
<td>.091</td>
<td>.911</td>
<td>.365</td>
<td>-.090</td>
<td>2.42</td>
<td>.632</td>
</tr>
<tr>
<td></td>
<td>SMEAN(NEWPRDSE)</td>
<td>8.01E-02</td>
<td>.097</td>
<td>-.060</td>
<td>-.496</td>
<td>.621</td>
<td>-2.41</td>
<td>1.45</td>
<td>.431</td>
</tr>
<tr>
<td></td>
<td>SMEAN(DESINNOV)</td>
<td>-.133</td>
<td>.095</td>
<td>-.182</td>
<td>-.161</td>
<td>.109</td>
<td>-.296</td>
<td>.030</td>
<td>.501</td>
</tr>
<tr>
<td></td>
<td>SMEAN(RATENEW)</td>
<td>.211</td>
<td>.133</td>
<td>.094</td>
<td>.172</td>
<td>1.414</td>
<td>.161</td>
<td>-.054</td>
<td>.320</td>
</tr>
<tr>
<td></td>
<td>SMEAN(SUCCRATE)</td>
<td>.222</td>
<td>.098</td>
<td>.245</td>
<td>2.313</td>
<td>.023</td>
<td>.031</td>
<td>.410</td>
<td>.562</td>
</tr>
<tr>
<td></td>
<td>SMEAN(OPSEFFIC)</td>
<td>4.761E-02</td>
<td>.098</td>
<td>.052</td>
<td>.487</td>
<td>.628</td>
<td>-1.47</td>
<td>2.42</td>
<td>.564</td>
</tr>
<tr>
<td></td>
<td>SMEAN(CAPEFFIC)</td>
<td>4.761E-02</td>
<td>.838</td>
<td>.090</td>
<td>.321</td>
<td>3.137</td>
<td>.002</td>
<td>.104</td>
<td>.463</td>
</tr>
<tr>
<td></td>
<td>SMEAN(LABEFFIC)</td>
<td>4.848E-02</td>
<td>.086</td>
<td>.052</td>
<td>.524</td>
<td>.602</td>
<td>-1.25</td>
<td>2.15</td>
<td>.651</td>
</tr>
<tr>
<td></td>
<td>SMEAN(CAPUTIL)</td>
<td>4.303E-02</td>
<td>.091</td>
<td>.052</td>
<td>.473</td>
<td>.638</td>
<td>-1.38</td>
<td>2.24</td>
<td>.518</td>
</tr>
<tr>
<td></td>
<td>SMEAN(PRICCHRG)</td>
<td>1.59</td>
<td>.089</td>
<td>.161</td>
<td>1.784</td>
<td>.078</td>
<td>-.018</td>
<td>.337</td>
<td>.773</td>
</tr>
<tr>
<td></td>
<td>SMEAN(CONSITEN)</td>
<td>4.983E-02</td>
<td>.103</td>
<td>.054</td>
<td>.485</td>
<td>.629</td>
<td>-1.54</td>
<td>2.54</td>
<td>.516</td>
</tr>
<tr>
<td></td>
<td>SMEAN(REPUTATI)</td>
<td>.178</td>
<td>.114</td>
<td>.179</td>
<td>1.554</td>
<td>.124</td>
<td>-.050</td>
<td>.405</td>
<td>.479</td>
</tr>
<tr>
<td></td>
<td>SMEAN(BRANDS)</td>
<td>-.146</td>
<td>.109</td>
<td>-.139</td>
<td>-1.33</td>
<td>.185</td>
<td>-.362</td>
<td>.071</td>
<td>.585</td>
</tr>
</tbody>
</table>

* Dependent Variable: Business performance scale.
The three significant variables from the above table are:

- The success rate of new products
- Prices charged
- The quality reputation of the firm

Consequently the regression variate can be formulated as follows:

\[ Y_{\text{Business performance}} = -0.166 + 0.221X_{\text{New Products}} + 0.159X_{\text{Prices}} + 0.178X_{\text{Quality}} \]

The above regression suggests that there is a positive relationship between the success rate of new products, prices charged and the quality reputation of the firm to overall business performance. An examination of the beta coefficients of these significant variables shows that the success rate of new products explains the greatest proportion of business performance variation.

### 6.1.8 Validation of the regression results

The purpose of validating the above regression results is to ensure that the results are generalisable to the population and are not limited to the sample used in the estimation. The two methods used to validate these results are an examination of the adjusted \( R^2 \) value and the use of the split sample technique.

When the adjusted \( R^2 \) value (.349) is compared with the \( R^2 \) value (.457) the difference could indicate that the estimated model is not overfitted to the data and that there are sufficient data observations to the number of variables in the variate (Hair et al, 1998).

The overall results are compared with the split sample results as shown in the table below.

### Table 50: Model fit statistics

<table>
<thead>
<tr>
<th>Model Component</th>
<th>Statistic</th>
<th>Overall (n=104)</th>
<th>Sample 1 (n=62)</th>
<th>Sample 2 (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model fit</td>
<td>( R^2 )</td>
<td>.457</td>
<td>.571</td>
<td>.661</td>
</tr>
<tr>
<td></td>
<td>Adjusted ( R^2 )</td>
<td>.349</td>
<td>.405</td>
<td>.422</td>
</tr>
<tr>
<td></td>
<td>Std error of estimate</td>
<td>.804</td>
<td>.740</td>
<td>.804</td>
</tr>
</tbody>
</table>

An examination of the adjusted \( R^2 \) values, \( R^2 \) values and the standard error of the estimate show high levels of similarity, indicates good generalisation properties in the model.
6.1.9 Estimating the regression model for the manufacturing sector

To examine the nature of the relationships between business performance and efficiency, price and output values at the industry level the data file was split by industry and the following regression models developed for each industry. The first industry to be analysed is the manufacturing industry.

Table 51: Manufacturing model summary

<table>
<thead>
<tr>
<th>Model Summary (^{b,c})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

\(^a\) Predictors: (Constant), SMEAN(BRANDS), SMEAN(OPCHANG), SMEAN(LABEFFIC), SMEAN(WINCUSTO), SMEAN(PRCHRG), SMEAN(DESINNOV), SMEAN(PRODOFF), SMEAN(CAPEFFIC), SMEAN(SUCRATE), SMEAN(CONSITEN), SMEAN(RETENRAT), SMEAN(OPSEFFIC), SMEAN(RATENEWP), SMEAN(CAPUTIL), SMEAN(DELIPROM), SMEAN(NEWPRDSE), SMEAN(REPUTATI)

\(^b\) Dependent Variable: Business performance scale

\(^c\) Economic sector = 1

The R\(^2\) value for the manufacturing sector is .618 indicating that the regression model explains 62% of the variability in business performance in the manufacturing industry. Some caution is needed as the difference between the adjusted R\(^2\) values and R\(^2\) values could suggest that some overfitting of the data are occurring because the ratio of variables to observation falls as the data are split along industry type (n=64).

The following ANOVA table shows the function to be significant at alpha = .05.

Table 52: Significance of model

<table>
<thead>
<tr>
<th>ANOVA(^{b,c})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>Residual</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

\(^a\) Predictors: (Constant), SMEAN(BRANDS), SMEAN(OPCHANG), SMEAN(LABEFFIC), SMEAN(WINCUSTO), SMEAN(PRCHRG), SMEAN(DESINNOV), SMEAN(PRODOFF), SMEAN(CAPEFFIC), SMEAN(SUCRATE), SMEAN(CONSITEN), SMEAN(RETENRAT), SMEAN(OPSEFFIC), SMEAN(RATENEWP), SMEAN(CAPUTIL), SMEAN(DELIPROM), SMEAN(NEWPRDSE), SMEAN(REPUTATI)

\(^b\) Dependent Variable: Business performance scale

\(^c\) Economic sector = 1
The variables that are significant within the manufacturing sector are:

- The level of design innovation
- Capital efficiency
- Prices charged

These significant variables were obtained from the following coefficient table.

**Table 53: Independent variable coefficients**

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficient</th>
<th>Standardized Coefficients</th>
<th>5% Confidence Interval for B</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>t</td>
</tr>
<tr>
<td>1</td>
<td>-1.144</td>
<td>.986</td>
<td>-.160</td>
<td>.252</td>
</tr>
<tr>
<td>SMean(DELIPROM 6.991E-03)</td>
<td>.121</td>
<td>.009</td>
<td>.058</td>
<td>.954</td>
</tr>
<tr>
<td>SMean(OPSCICHAN 3.863E-02)</td>
<td>.142</td>
<td>.041</td>
<td>.273</td>
<td>.786</td>
</tr>
<tr>
<td>SMean(PRODOFF)</td>
<td>.181</td>
<td>.128</td>
<td>1.479</td>
<td>.146</td>
</tr>
<tr>
<td>SMean(WINCUSTO4.005E-02)</td>
<td>.102</td>
<td>.045</td>
<td>.392</td>
<td>.697</td>
</tr>
<tr>
<td>SMean(RETENRAT)</td>
<td>-.251</td>
<td>.132</td>
<td>-.256</td>
<td>.064</td>
</tr>
<tr>
<td>SMean(newPRDS-9.297E-02)</td>
<td>.126</td>
<td>-.115</td>
<td>-1.900</td>
<td>.023</td>
</tr>
<tr>
<td>SMean(DESINNOV)</td>
<td>-.237</td>
<td>.100</td>
<td>-.303</td>
<td>-2.360</td>
</tr>
<tr>
<td>SMean(RATENEW 8.970E-02)</td>
<td>.117</td>
<td>.115</td>
<td>.768</td>
<td>.447</td>
</tr>
<tr>
<td>SMean(SUCRAT)</td>
<td>.252</td>
<td>.131</td>
<td>1.931</td>
<td>.060</td>
</tr>
<tr>
<td>SMean(OPSEFFIC)</td>
<td>.175</td>
<td>.129</td>
<td>.183</td>
<td>1.357</td>
</tr>
<tr>
<td>SMean(CAPEFFIC)</td>
<td>.358</td>
<td>.110</td>
<td>.397</td>
<td>3.256</td>
</tr>
<tr>
<td>SMean(LABEFFIC)-5.725E-03</td>
<td>.113</td>
<td>-.006</td>
<td>-.051</td>
<td>.960</td>
</tr>
<tr>
<td>SMean(CAPUTIL)</td>
<td>.166</td>
<td>.120</td>
<td>.197</td>
<td>1.385</td>
</tr>
<tr>
<td>SMean(PRICCHRG)</td>
<td>.218</td>
<td>.107</td>
<td>.224</td>
<td>2.039</td>
</tr>
<tr>
<td>SMean(CONSITEN)</td>
<td>.197</td>
<td>.138</td>
<td>.198</td>
<td>1.431</td>
</tr>
<tr>
<td>SMean(REPUTATI 7.616E-02)</td>
<td>.155</td>
<td>.078</td>
<td>.491</td>
<td>.626</td>
</tr>
<tr>
<td>SMean(BRANDS)</td>
<td>4.449E-04</td>
<td>.141</td>
<td>.000</td>
<td>.003</td>
</tr>
</tbody>
</table>

\[ Y_{\text{Business performance}} = -1.144 + -.237X_{\text{Design innovation}} + .218X_{\text{Prices}} + .358X_{\text{Capital Efficiency}} \]

Capital efficiency has the largest explanatory power (standardized beta coefficient = .397). This could be consistent with large capital investments in the manufacturing sector and the ability to minimize per unit capital input leading to superior business performance. The level of design innovation is negative suggesting that standardization is an importance business-enhancing feature in the manufacturing sector. Superior performing firms are able to charge higher than industry average prices. This may be a result of higher performances in product offering (being able to change product
schedules on short lead times) and consistent quality performances as indicated by the relatively high (but not significant at the .05 level) beta values of these variables.

6.1.10 Estimating the regression model for the service sector

The following results section develops a regression model of business performance for the service sector.

Table 54: Service sector model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.803a</td>
<td>.645</td>
<td>.370</td>
<td>.6612</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), SMEAN(BRANDS), SMEAN(NEWPRDSE), SMEAN(CAPEFFIC), SMEAN(PRICHRG), SMEAN(OPSCChANG), SMEAN(SUCRrate), SMEAN(RETENRAT), SMEAN(LABEFFIC), SMEAN(CONSITEN), SMEAN(WINCUSTO), SMEAN(REPUTATI), SMEAN(RATENEWP), SMEAN(CAPUTILI), SMEAN(OPSEFFIC), SMEAN(PRODOFFE), SMEAN(DELIPROM), SMEAN(DESINNOV)

b. Dependent Variable: Business performance scale
c. Economic sector = 2

The R^2 value for the service sector is .645 indicating that the regression model explains 65% of the variability in business performance in the service industry. Some caution is needed as the difference between the adjusted R^2 values and R^2 values could suggest that some overfitting of the data are occurring because the ratio of variables to observation falls as the data are split along industry type (n=40).

The following ANOVA table shows the function to be significant at alpha = .05.

Table 55: Service sector model significance

<table>
<thead>
<tr>
<th>Mode</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17.44</td>
<td>17</td>
<td>1.62</td>
<td>2.34</td>
<td>.03</td>
</tr>
<tr>
<td>on</td>
<td>9.61</td>
<td>22</td>
<td>.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residu</td>
<td>8</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), SMEAN(BRANDS), SMEAN(NEWPRDSE), SMEAN(CAPEFFIC), SMEAN(PRICHRG), SMEAN(OPSCChANG), SMEAN(SUCRrate), SMEAN(RETENRAT), SMEAN(LABEFFIC), SMEAN(REPUTATI), SMEAN(RATENEWP), SMEAN(CAPUTILI), SMEAN(OPSEFFIC), SMEAN(PRODOFFE), SMEAN(DELIPROM),
b. Dependent Variable: Business performance scale
c. Economic sector = 2
The variables that are significant within the service sector are:

- Customer retention rates
- Success rates of new products

These significant variables were obtained from the following coefficient table.

Table 56: Service sector independent variables coefficients

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Standardized</th>
<th>Coefficients</th>
<th>5% Confidence Interval for</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>t</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>2.344</td>
<td>1.228</td>
<td>1.909</td>
<td>.069</td>
</tr>
<tr>
<td>SMEAN(DELIPROM)</td>
<td>.283</td>
<td>.191</td>
<td>.315</td>
<td>1.479</td>
</tr>
<tr>
<td>SMEAN(OPSCHANG)</td>
<td>-.224</td>
<td>.164</td>
<td>-.265</td>
<td>-1.363</td>
</tr>
<tr>
<td>SMEAN(PRODOFFE-3.937E-02)</td>
<td>.163</td>
<td>.053</td>
<td>-.241</td>
<td>.812</td>
</tr>
<tr>
<td>SMEAN(WINCUSTO)</td>
<td>-.237</td>
<td>.139</td>
<td>-.320</td>
<td>-1.697</td>
</tr>
<tr>
<td>SMEAN(RETENRAT)</td>
<td>.448</td>
<td>.117</td>
<td>.693</td>
<td>3.626</td>
</tr>
<tr>
<td>SMEAN(NEWPROS 3.500E-02)</td>
<td>.168</td>
<td>.046</td>
<td>.209</td>
<td>.836</td>
</tr>
<tr>
<td>SMEAN(DESINNOV)</td>
<td>-.180</td>
<td>.167</td>
<td>-.252</td>
<td>-1.076</td>
</tr>
<tr>
<td>SMEAN(RATENEW)</td>
<td>.166</td>
<td>.144</td>
<td>.216</td>
<td>1.158</td>
</tr>
<tr>
<td>SMEAN(SUCCRATE)</td>
<td>.391</td>
<td>.162</td>
<td>.472</td>
<td>2.417</td>
</tr>
<tr>
<td>SMEAN(OPSEFFIC)</td>
<td>-.155</td>
<td>.167</td>
<td>-.182</td>
<td>-.928</td>
</tr>
<tr>
<td>SMEAN(CAPEFFIC)</td>
<td>.196</td>
<td>.159</td>
<td>.236</td>
<td>1.227</td>
</tr>
<tr>
<td>SMEAN(LABEFFIC)</td>
<td>.7236E-02</td>
<td>-.281</td>
<td>.035</td>
<td>5.83</td>
</tr>
<tr>
<td>SMEAN(REPUTATI)</td>
<td>7.236E-02</td>
<td>-.134</td>
<td>.093</td>
<td>5.83</td>
</tr>
<tr>
<td>SMEAN(OPERID)</td>
<td>7.236E-02</td>
<td>-.155</td>
<td>.167</td>
<td>.236</td>
</tr>
<tr>
<td>SMEAN(BRANDS)</td>
<td>-.294</td>
<td>.167</td>
<td>-.279</td>
<td>-1.755</td>
</tr>
</tbody>
</table>

* Dependent Variable: Business performance scale
* Economic sector = 2

From the above table the service variate of business performance is expressed as follows:

\[ Y_{\text{Business performance}} = 2.344 + 0.448X_{\text{Retention rate}} + 0.391X_{\text{Success rate}} \]

Customer retention rates have the largest explanatory power (standardised beta coefficient = .693). This would be consistent with the cost of recruitment and the advantages of cross product selling in the service sector leading to superior business performance. Superior performing service firms have higher than industry success rates with new products. The strength of the brand and the ability to win new customers as indicated by the relatively high (but not significant at the .05 level) beta
values of these variables appear important to business performance in the service sector.

6.2 Summary of results for Hypothesis H1

The theoretical model is shown below together with the findings from the discriminant and regression variates of business performance and industry type.

FIGURE 26: TO RELATE THE RESULTS OF TESTING H1A AND H1B TO THE THEORETICAL MODEL

H1a – Discriminant analysis
H1b – Multiple regressions

H1a – Discriminant analysis – predictor variables between the manufacturing and service sectors:
- Success rates of new products,
- Level of design innovation
- The ability to win new customers
- Capacity utilisation

H1b – Multiple regressions – The explanatory power of the output, price and efficiency variables to business performance
- Overall $R^2 = .457$
- Manufacturing sector $R^2 = .618$
  - Market advantage variables $R^2 = .395$
  - Cost advantage variables $R^2 = .434$
- Service sector $R^2 = .645$
  - Market advantage variables $R^2 = .608$
  - Cost advantage variables $R^2 = .146$
The above results would suggest support for the proposition:

"H1: There is a positive relationship between output values; efficiency, price and business performance and these relationships vary by industry."

There are output and efficiency variables that discriminate between the manufacturing and service sectors and these variables explain a reasonable proportion of business performance in both sectors. The implications of these findings and their comparison with similar studies are discussed in the conclusions chapter.

6.3 Testing hypothesis H2

This section covers the testing of the second hypotheses, which were derived from the theoretical model. The hypothesis to be tested is:

\[ H2: \text{There is a positive relationship between output values, efficiency, price and functional effectiveness and these relationships vary by industry} \]

Hypothesis 2 is tested in two stages. The first stage is a two-group discriminant analysis where the groups are the manufacturing and service sectors respectively and the significant predictor variables are identified. The sub hypothesis for this first stage is stated as follows:

\[ H2a: \text{There are varied relationships between functional effectiveness and industry types} \]

The second stage is a multiple regression where output values, efficiency and price are related to functional effectiveness. The sub hypotheses for this second stage is as follows:

\[ H2b: \text{If certain functional effectiveness performances increase then the relative effectiveness of market advantage will increase.} \]

And

\[ H2c: \text{If certain functional effectiveness performances increase then the relative effectiveness of performance on cost advantage will increase.} \]

Three multiple regressions are performed: one for the full data set (with validation and hold out samples) and one each for the manufacturing and service sectors. The cost advantage scale is comprised of the items, labour, capital and cost efficiency and capacity utilisation. The market advantage scale comprises the items customer responsiveness, innovation, quality and price.

The relationship of the tests and hypotheses (H1a, H2b and H2c) to the theoretical model are shown below.
FIGURE 27: TO RELATE THE TESTING OF H2 TO THE THEORETICAL MODEL

H2a – Discriminant analysis
H2c – Multiple regressions

Cost advantage
(Firm efficiency)

Customer preferences

Interaction

Competitive advantage
(Firm performance)

Market advantage
(Firm outputs)

Resource Advantage
(Firm functions)

Direction of resource prioritisation by customer preferences (as understood by the firm) via prioritisation of efficiency and firm outputs

Direction of resource, efficiency and firm output congruency with customer preferences (actual) results in firm performance.
6.3.1 Estimation of the functional effectiveness discriminant model and assessing overall fit

The following discriminant tests evaluate if there are functional effectiveness variables, which discriminate between the manufacturing and service sectors. It is a test of the second hypothesis.

\[ H2a: \text{There are varied relationships between functional effectiveness and industry types} \]

Table 57: to show the equality of group means

<table>
<thead>
<tr>
<th>Tests of Equality of Group Means (^a)</th>
<th>Wilks' Lambda</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMEAN(EFFOPS)</td>
<td>0.927</td>
<td>4.752</td>
<td>1</td>
<td>60</td>
<td>0.033</td>
</tr>
<tr>
<td>SMEAN(EFFMRKT)</td>
<td>1.000</td>
<td>0.004</td>
<td>1</td>
<td>60</td>
<td>0.953</td>
</tr>
<tr>
<td>SMEAN(EFFRD)</td>
<td>0.988</td>
<td>0.748</td>
<td>1</td>
<td>60</td>
<td>0.390</td>
</tr>
<tr>
<td>SMEAN(EFFDISTR)</td>
<td>0.869</td>
<td>9.016</td>
<td>1</td>
<td>60</td>
<td>0.004</td>
</tr>
<tr>
<td>SMEAN(EFFASSER)</td>
<td>0.995</td>
<td>2.82</td>
<td>1</td>
<td>60</td>
<td>0.598</td>
</tr>
<tr>
<td>SMEAN(EFFPURCH)</td>
<td>0.983</td>
<td>1.048</td>
<td>1</td>
<td>60</td>
<td>0.310</td>
</tr>
</tbody>
</table>

\(^a\) Validation coding = analysis sample

The groups, which appear to have the greatest difference in means, are the effectiveness of operations and the effectiveness of distribution.

The purpose of this analysis is to determine which variables are efficient in discriminating between firms in the service and manufacturing sectors. As a result a stepwise procedure is used in estimating the discriminant function. The Mahalanobis \(D^2\) is used in the stepwise procedure to estimate the variable with the greatest power of discrimination (Hair, et al, 1998).

The only variable to remain in the analysis was the effectiveness of distribution as shown in the table below.

Table 58: To show the accepted variable

<table>
<thead>
<tr>
<th>Variables in the Analysis (^a)</th>
<th>Step</th>
<th>Tolerance</th>
<th>F to Remove</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMEAN(EFFDISTR)</td>
<td>1</td>
<td>1.000</td>
<td>9.016</td>
</tr>
</tbody>
</table>

\(^a\) Validation coding = analysis sample
The multivariate attributes of the discriminant function are shown in the tables below.

**Table 59: To show the significance of the discriminant function**

<table>
<thead>
<tr>
<th>Test of Function(s)</th>
<th>Wilks' Lambda</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.869</td>
<td>8.330</td>
<td>1</td>
<td>.004</td>
</tr>
</tbody>
</table>

* Validation coding = analysis sample

The above Wilks’ Lambda test shows the function to be significant. In addition the canonical correlation as shown in the table below explains 13% of the variance in the dependent variable, industry type.

**Table 60: To show the canonical correlation of the discriminant function.**

<table>
<thead>
<tr>
<th>Function</th>
<th>Eigenvalue</th>
<th>% of Variance</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.150</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* First 1 canonical discriminant functions were used in the analysis.
* Validation coding = analysis sample

The following table shows the structure matrix of the discriminant loadings by independent variable.

**Table 61: Analysis sample structure matrix**

<table>
<thead>
<tr>
<th>Function</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMEAN(EFFDISTR)</td>
<td>1.000</td>
</tr>
<tr>
<td>SMEAN(EFFASSER)</td>
<td>.511</td>
</tr>
<tr>
<td>SMEAN(EFFOPS)</td>
<td>.478</td>
</tr>
<tr>
<td>SMEAN(EFFPURCH)</td>
<td>.274</td>
</tr>
<tr>
<td>SMEAN(EFFMRKT)</td>
<td>.066</td>
</tr>
<tr>
<td>SMEAN(EFFRD)</td>
<td>.015</td>
</tr>
</tbody>
</table>

* This variable not used in the analysis.
* Validation coding = analysis sample
The above structure matrix shows that there are 3 variables that have a strong effect (above .3) in discriminating between the industry types. They are of interest in explaining group membership. The three variables are effectiveness of distribution, after sales service and operations. On examination of the means of these variables, the services sector is higher in all 3 cases.

The following graphs show the centroids for the manufacturing and service sectors respectively.

**FIGURE 28: CANONICAL DISCRIMINANT FUNCTION – MANUFACTURING**

 Canonical Discriminant Function  
1 Economic sector = Manufacturing

The manufacturing sector has a centroid of -.3 and the service sector has a centroid of .6 as shown in the graph below.
The overall fit of the function is determined by an assessment of the predictive accuracy of the function. The following table shows the classification results.

<table>
<thead>
<tr>
<th>Classification Results</th>
<th>Economic sector</th>
<th>Predicted Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Original</td>
<td>Count</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>36</td>
<td>7</td>
<td>43</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>%</td>
<td>83.7</td>
<td>16.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Cross-validated</td>
<td>Count</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>1</td>
<td>36</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>%</td>
<td>83.7</td>
<td>16.3</td>
<td>100.0</td>
</tr>
</tbody>
</table>

a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
b. 69.4% of original grouped cases correctly classified.
c. 69.4% of cross-validated grouped cases correctly classified.
d. Validation coding = analysis sample

The above analysis sample correctly classified 69.4% of the cases. The holdout sample showed that the function correctly classified 59.5% of the cases. The lower predictive ability of the holdout sample relates to its smaller sample size. The
maximum chance criterion (if all the observations were allocated to the largest group – the manufacturing sector) is 66%.

The calculated proportional chance criterion is calculated as follows:

$$C_{pro} = p^2 + (1-p)^2$$

Where

- $C_{pro}$ = proportional chance criterion
- $p$ = proportion of firms in group 1
- $1-p$ = proportion of firms in group 2

(Source: Hair, et al, 1998)

The value of the proportional chance criterion is $(.307^2 + .693^2) = 57.4\%$

Therefore the discriminant function is marginally (12%) better than chance in classifying industry membership based on functional effectiveness.

A final measure of classification accuracy is Press’s Q as calculated below.

**Press’s Q (analysis sample)**

$$= \frac{((62-(43*2))^2}{60} = 8.6$$

**Press’s Q (holdout sample)**

$$= \frac{((42-(25*2))^2}{42} = 1.52$$

The predictive capability of the analysis sample is statistically significant as Press’s Q value exceeds the critical value of 6.63. The holdout sample does not provide a significant improvement. This is possibly due to the small sample size.

6.3.2 Conclusion to test of hypothesis H2a

The above discriminant analysis shows that there are differences between industry types as measured by functions. The three discriminating variables are effectiveness of distribution, after sales service and operations. This has important resource implications in the formulation and implementation of strategy. The model can therefore provide management with a way of identifying tangible and intangible resources and competencies within each industry. The discussion of the implications for management is found in the conclusions.

6.3.3 Estimating the regression model and assessing overall model fit – market advantage

The purpose of the following regression models is to test the hypothesis that the relationships between functional effectiveness explain a proportion of the variability
of market advantage as predicted by the theoretical model. This hypothesis is stated as follows:

\[ H2b: \text{If certain functional effectiveness performances increase then market advantage will increase.} \]

The management interest in this question is the relative proportions of the independent variables that explain changes in market advantage. These would be reflected in the beta values of the independent variables. In order to place this hypothesis (highlighted) in context, the theoretical model is reproduced below.

**FIGURE 30: TO RELATE THE TESTING OF H2B TO THE THEORETICAL MODEL**

- **H2a** – Discriminant analysis
- **H2c** – Multiple regressions

Direction of resource prioritisation by customer preferences (as understood by the firm) via prioritisation of efficiency and firm outputs

Direction of resource, efficiency and firm output congruency with customer preferences (actual) results in firm performance.
The management objective of this regression analysis is to identify which factors explain the greatest level of change in market advantage. The dependent variable, market advantage is a scale made up of the customer responsiveness, innovation and quality items. The independent variables comprise the functional effectiveness items.

The research design resulted in 104 usable responses. This sample size has an effect on the reliability of the $R^2$ that can be detected. A sample size of 100 with 20 independent variables will detect $R^2$ values explaining 21% of the variance with a power of .80 at a significance level ($\alpha$) of .05 (Hair, et al, 1998). The actual sample of 104 with 6 independent variables could therefore detect $R^2$ less than 12% variance with a power of .80 at a significance level ($\alpha$) of .05. The ratio of independent variables to sample size is (104/6), which is well above the generally accepted minimum of 17:1 (Hair, et al, 1998).

The first regression calculated was based on the total sample and this was analysed for linearity, Homoscedasticity, independence of the residuals and normality. The assumption of linearity is analysed through the following residual regression plot.

FIGURE 31: PLOT OF STANDARDISED REGRESSION RESIDUAL PLOT – MARKET ADVANTAGE SCALE

The above plot does not show any non-linear pattern in the residuals, indicating that the overall equation is linear. The partial regression plots for all the independent variables, significant to the equation, showed well-defined relationships to the dependent variable. The above plot confirms the homoscedasticity of the data. The graph confirms the normality of the error term of the regression variate as the values fall along the diagonal without systematic departures from it (Hair, et al, 1998).
The regression model (calculated using the enter method) was found to be significant and the .01 level as shown in the ANOVA table below.

**Table 63: Significance of market advantage model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8.856</td>
<td>6</td>
<td>1.476</td>
<td>4.528</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>31.617</td>
<td>97</td>
<td>.326</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40.473</td>
<td>103</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFMRKT), SMEAN(EFFRD), SMEAN(EFFDISTR), SMEAN(EFFOPS), SMEAN(EFFASSER)

*b* Dependent Variable: Market advantage scale

The regression had a $R^2$ of .219 and thereby explaining 21.9% of the dependent variable, market advantage.

**Table 64: Market advantage model summary**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.468a</td>
<td>.219</td>
<td>.170</td>
<td>.5709</td>
</tr>
</tbody>
</table>

*a* Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFMRKT), SMEAN(EFFRD), SMEAN(EFFDISTR), SMEAN(EFFOPS), SMEAN(EFFASSER)

*b* Dependent Variable: Market advantage scale

The interpretation of the variate is derived from the following table.
The significant variable from the above table is effectiveness of the R&D function (alpha = .05). Operations effectiveness is significant at alpha = .10

Consequently the regression variate can be formulated as follows:

\[ Y_{\text{Market advantage}} = 2.448 + .160X_{R&D} + .149X_{\text{Operations}} \]

The above regression suggests that there is a positive relationship between the effectiveness of the R&D and operations functions to market advantage. An examination of the beta coefficients of these two variables shows that R&D explains the greatest proportion of market advantage variation.

### 6.3.4 Validation of the regression results

The primary purpose of validating the above regression results is to ensure that the results are generalisable to the population and is not limited to the sample used in the estimation. The two methods used to validate these results are an examination of the adjusted \( R^2 \) value and the use of the split sample technique.

When the adjusted \( R^2 \) value (.219) is compared with the \( R^2 \) value (.170) the difference would indicate that the estimated model is not overfitted to the data and that there are sufficient data observations to the number of variables in the variate (Hair et al, 1998).

The overall results are compared with the split sample results as shown in the table below.
An examination of the adjusted $R^2$ values, $R^2$ values and the standard error of the estimate show high levels of similarity, indicates reasonable generalisation properties in the model.

6.3.5 Estimating the market advantage regression model for the manufacturing sector

To exam the nature of the relationships between functional effectiveness and market advantage at the industry level the data file was split by industry, and the following regression models developed for each industry. The first industry to be analysed is the manufacturing industry.

Table 67: Market advantage model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>Statistic</th>
<th>Overall (n=104)</th>
<th>Sample 1 (n=62)</th>
<th>Sample 2 (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model fit</td>
<td>$R^2$</td>
<td>.219</td>
<td>.168</td>
<td>.310</td>
</tr>
<tr>
<td></td>
<td>Adjusted $R^2$</td>
<td>.170</td>
<td>.077</td>
<td>.446</td>
</tr>
<tr>
<td></td>
<td>Std error of estimate</td>
<td>.571</td>
<td>.583</td>
<td>.534</td>
</tr>
</tbody>
</table>

The $R^2$ value for the manufacturing sector is .264 indicating that the regression model explains 26.4% of the variability in market advantage in the manufacturing industry. Some caution is needed as the difference between the adjusted $R^2$ values and $R^2$ values could suggest that some overfitting of the data are occurring because the ratio of variables to observation falls as the data are split along industry type (n=64).

The following ANOVA table shows the function to be significant at alpha = .05.
Table 68: Significance of the manufacturing regression

### ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>6.869</td>
<td>6</td>
<td>1.145</td>
<td>3.399</td>
<td>.006a</td>
</tr>
<tr>
<td>Residual</td>
<td>19.198</td>
<td>57</td>
<td>.337</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>26.067</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFMRK), SMEAN(EFFRD), SMEAN(EFFDISTR), SMEAN(EFFASS), SMEAN(EFFOPS)

b. Dependent Variable: Market advantage scale

c. Economic sector = 1

The variables that are significant to market advantage within the manufacturing sector are the effectiveness of the R&D and operations functions.

These significant variables were obtained from the following coefficient table.

### Table 69: Manufacturing market advantage coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>3.491</td>
<td>.807</td>
<td></td>
<td>4.323</td>
<td>.000</td>
<td>1.873</td>
<td>5.109</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(EFFOPS)</td>
<td>.202</td>
<td>.123</td>
<td>.263</td>
<td>1.645</td>
<td>.106</td>
<td>-.044</td>
<td>.448</td>
<td>.591</td>
<td>1.693</td>
</tr>
<tr>
<td>SMEAN(EFFMRK4.733E-02)</td>
<td>.099</td>
<td>.075</td>
<td>.478</td>
<td>634</td>
<td>.079</td>
<td>-.151</td>
<td>.246</td>
<td>.618</td>
<td>1.618</td>
</tr>
<tr>
<td>SMEAN(EFFRD)</td>
<td>.139</td>
<td>.078</td>
<td>.237</td>
<td>1.787</td>
<td>.079</td>
<td>-.017</td>
<td>.294</td>
<td>.863</td>
<td>1.158</td>
</tr>
<tr>
<td>SMEAN(EFFDIST1.656E-02)</td>
<td>.161</td>
<td>- .048</td>
<td>- .289</td>
<td>.774</td>
<td>.370</td>
<td>.276</td>
<td>.555</td>
<td>1.802</td>
<td></td>
</tr>
<tr>
<td>SMEAN(EFFASS1.393E-02)</td>
<td>.130</td>
<td>.019</td>
<td>.107</td>
<td>.915</td>
<td>.247</td>
<td>.275</td>
<td>.457</td>
<td>2.189</td>
<td></td>
</tr>
<tr>
<td>SMEAN(EFFPUR4.377E-02)</td>
<td>.127</td>
<td>- .052</td>
<td>- .343</td>
<td>.733</td>
<td>.299</td>
<td>.212</td>
<td>.650</td>
<td>1.537</td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Market advantage scale

b. Selecting only cases for which Validation coding = analysis sample

From the above table the manufacturing variate of market advantage is expressed as follows:

\[ Y_{\text{Market advantage}} = 3.491 + .202X_{\text{Operations}} + .139X_{\text{R&D}} \]

Operations have the largest explanatory power (standardised beta coefficient = .263). This could be consistent with relative importance of the operations function to meet the customer service, innovation and quality needs of customers in the manufacturing sector. The importance of the R&D function may reflect the ability of manufacturing firms to alter their product designs in achieving higher levels of customer service and innovation and hence market advantage.
6.3.6 Estimating the market advantage regression model for the service sector

Table 70: Service sector model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.570a</td>
<td>.325</td>
<td>.203</td>
<td>.5347</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFDISTR), SMEAN(EFFOPS), SMEAN(EFFMRKT), SMEAN(EFFRD), SMEAN(EFFASSER)
b. Dependent Variable: Market advantage scale
c. Economic sector = 2

The R² value for the service sector is .325 indicating that the regression model explains 32.5% of the variability in market advantage in the service industry. Some caution is needed as the difference between the adjusted R² values and R² values could suggest that some overfitting of the data are occurring because the ratio of variables to observation falls as the data are split along industry type (n=40).

The following ANOVA table shows the function to be significant at alpha = .05.

Table 71: Service sector model significance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>6</td>
<td>.758</td>
<td>2.652</td>
<td>.033a</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>33</td>
<td>.286</td>
<td>1.112</td>
<td>.346</td>
</tr>
<tr>
<td>Total</td>
<td>13.982</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFDISTR), SMEAN(EFFOPS), SMEAN(EFFMRKT), SMEAN(EFFRD), SMEAN(EFFASSER)
b. Dependent Variable: Market advantage scale
c. Economic sector = 2

The variables that are significant within the service sector are:

- Research and Development
- After sales service
- Marketing

These significant variables were obtained from the following coefficient table.
Table 72: Service sector independent variables coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.257</td>
<td>1.056</td>
<td></td>
<td>1.189</td>
<td>.243</td>
<td>-.893</td>
<td>3.406</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMEAN(EFFOPS)</td>
<td>.169</td>
<td>.164</td>
<td>.158</td>
<td>1.031</td>
<td>.310</td>
<td>-.165</td>
<td>.504</td>
<td>.870</td>
<td>1.150</td>
</tr>
<tr>
<td>SMEAN(EFFMRKT)</td>
<td>.118</td>
<td>.122</td>
<td>.174</td>
<td>1.051</td>
<td>.301</td>
<td>-.110</td>
<td>.345</td>
<td>.749</td>
<td>1.336</td>
</tr>
<tr>
<td>SMEAN(EFFRD)</td>
<td>.105</td>
<td>.087</td>
<td>.193</td>
<td>1.218</td>
<td>.232</td>
<td>-.071</td>
<td>.282</td>
<td>.817</td>
<td>1.224</td>
</tr>
<tr>
<td>SMEAN(EFFDISTR)</td>
<td>.101</td>
<td>.121</td>
<td>.129</td>
<td>.831</td>
<td>.412</td>
<td>-.146</td>
<td>.348</td>
<td>.850</td>
<td>1.176</td>
</tr>
<tr>
<td>SMEAN(EFFASSE)</td>
<td>.143</td>
<td>.133</td>
<td>.183</td>
<td>1.074</td>
<td>.291</td>
<td>-.128</td>
<td>.413</td>
<td>.707</td>
<td>1.414</td>
</tr>
<tr>
<td>SMEAN(EFFPURC)</td>
<td>9.059E-02</td>
<td>.112</td>
<td>.136</td>
<td>.810</td>
<td>.424</td>
<td>-.137</td>
<td>.318</td>
<td>.725</td>
<td>1.379</td>
</tr>
</tbody>
</table>

a Dependent Variable: Market advantage scale
b Economic sector = 2

From the above table the service variate of market advantage is expressed as follows:

\[
Y_{\text{Market advantage}} = 1.257 + .105X_{\text{R&D}} + .143X_{\text{After Sales Service}} + .118X_{\text{Marketing}}
\]

R&D has the largest explanatory power (standardised beta coefficient = .193). The importance of R&D, after sales service and marketing functions is consistent with the market advantage variables that relate to business performance. The importance of these relationships is discussed in the conclusions chapter.

6.3.7 Estimating the cost advantage regression model and assessing overall model fit

The purpose of the following regression models is to test the hypothesis that the relationships between functional effectiveness explain a proportion of the variability of cost advantage as predicted by the theoretical model. This hypothesis is stated as follows:

\[
H2c: \text{If certain functional effectiveness performances increase then cost advantage will increase.}
\]

The management interest in this question is the relative proportions of the independent variables that explain changes in cost advantage. These could be reflected in the beta values of the independent variables. In order to place this hypothesis (highlighted) in context, the theoretical model is reproduced below.
FIGURE 32: TO RELATE THE TESTING OF H2C TO THE THEORETICAL MODEL

H2a – Discriminant analysis
H2c – Multiple regressions

Resource Advantage (Firm functions)

Cost advantage (Firm efficiency)

Customer preferences

Interaction

Competitive advantage (Firm performance)

Market advantage (Firm outputs)

Direction of resource prioritisation by customer preferences (as understood by the firm) via prioritisation of efficiency and firm outputs

Direction of resource, efficiency and firm output congruency with customer preferences (actual) results in firm performance.
The management objective of this regression analysis is to identify which factors explain the greatest level of change in cost advantage. The dependent variable, cost advantage is a scale made up of the labour, capital and overhead efficiency items as well as the capacity utilisation item. The independent variables comprise the functional effectiveness items.

The first regression calculated was based on the total sample and this was analysed for linearity, homoscedasticity, independence of the residuals and normality. The assumption of linearity is analysed through the following residual regression plot.

**FIGURE 33: STANDARDISED RESIDUAL PLOT – COST ADVANTAGE SCALE**

![Normal P-P Plot of Regression Standardized Residuals](image)

The above plot does not show substantial non-linear patterns in the residuals, indicating that the overall equation is linear. The partial regression plots for all the independent variables, significant to the equation, showed well-defined relationships to the dependent variable. The above plot confirms the homoscedasticity of the data. The graph confirms the normality of the error term of the regression variate as the values fall along the diagonal without systematic departures from it (Hair, et al, 1998).

The regression model (calculated using the enter method) was found to be significant and the .05 level as shown in the ANOVA table below.
Table 73: Significance of the cost advantage model

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>9.080</td>
<td>6</td>
<td>1.513</td>
<td>2.216</td>
<td>.048a</td>
</tr>
<tr>
<td>Residual</td>
<td>66.250</td>
<td>97</td>
<td>.683</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>75.330</td>
<td>103</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFMRKT), SMEAN(EFFRD), SMEAN(EFFDISTR), SMEAN(EFFOPS), SMEAN(EFFASSER)
b. Dependent Variable: cost advantage scale

The regression had a R² of .121 and thereby explaining 12.1% of the dependent variable, cost advantage.

Table 74: Cost advantage model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.347a</td>
<td>.121</td>
<td>.066</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFMRKT), SMEAN(EFFRD), SMEAN(EFFDISTR), SMEAN(EFFOPS), SMEAN(EFFASSERS)
b. Dependent Variable: cost advantage scale

The interpretation of the cost advantage variate is derived from the following table.

Table 75: Cost advantage coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
<th>5% Confidence Interval for B</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>2.464</td>
<td>.791</td>
<td></td>
<td>3.116</td>
<td>.002</td>
<td>.894 4.033</td>
<td></td>
</tr>
<tr>
<td>SMEAN(EFFOPS)</td>
<td>.318</td>
<td>.126</td>
<td>.299</td>
<td>2.524</td>
<td>.013</td>
<td>.068 567</td>
<td>.648 1.544</td>
</tr>
<tr>
<td>SMEAN(EFFMRKT)</td>
<td>4.038E-02</td>
<td>.102</td>
<td>.043</td>
<td>.396</td>
<td>.693</td>
<td>-1.62 243</td>
<td>.788 1.270</td>
</tr>
<tr>
<td>SMEAN(EFFRD)</td>
<td>3.273E-02</td>
<td>.064</td>
<td>.039</td>
<td>.390</td>
<td>.697</td>
<td>-1.34 199</td>
<td>.893 1.120</td>
</tr>
<tr>
<td>SMEAN(EFFDISTR-8.716E-02)</td>
<td>.134</td>
<td>-.075</td>
<td>-.650</td>
<td>.517</td>
<td>.353</td>
<td>.179</td>
<td>.660 1.470</td>
</tr>
<tr>
<td>SMEAN(EFFASSE 3.697E-02)</td>
<td>.125</td>
<td>.035</td>
<td>.295</td>
<td>.769</td>
<td>-.212 286</td>
<td>.643 1.555</td>
<td></td>
</tr>
<tr>
<td>SMEAN(EFFPURCH)</td>
<td>.102</td>
<td>.113</td>
<td>.101</td>
<td>.907</td>
<td>.366</td>
<td>-.121 326</td>
<td>.738 1.355</td>
</tr>
</tbody>
</table>

a. Dependent Variable: cost advantage scale
The significant variable from the above table is effectiveness of the operations function (alpha = .05).

Consequently the regression variate can be formulated as follows:

\[ Y \text{ Cost advantage} = 2.464 + .318X_{\text{Operations}} \]

The above regression suggests that there is a positive relationship between the effectiveness of the operations functions to cost advantage. An examination of the beta coefficients confirms that operations explain the greatest proportion of cost advantage variation.

### 6.3.8 Validation of the regression results

The primary purpose of validating the above regression results is to ensure that the results are generalisable to the population and is not limited to the sample used in the estimation. The two methods used to validate these results are an examination of the adjusted R² value and the use of the split sample technique.

When the adjusted R² value (.066) is compared with the R² value (.121) the difference could indicate that the estimated model is not overfitted to the data and that there are sufficient data observations to the number of variables in the variate (Hair et al, 1998).

The overall results are compared with the split sample results as shown in the table below.

### Table 76: Cost advantage model fit

<table>
<thead>
<tr>
<th>Model Component</th>
<th>Statistic</th>
<th>Overall (n=104)</th>
<th>Sample 1 (n=62)</th>
<th>Sample 2 (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model fit</td>
<td>R²</td>
<td>.121</td>
<td>.138</td>
<td>.232</td>
</tr>
<tr>
<td></td>
<td>Adjusted R²</td>
<td>.066</td>
<td>.044</td>
<td>.101</td>
</tr>
<tr>
<td></td>
<td>Std error of estimate</td>
<td>.826</td>
<td>.887</td>
<td>.714</td>
</tr>
</tbody>
</table>

An examination of the adjusted R² values, R² values and the standard error of the estimate show high levels of similarity and indicates reasonable generalisation properties in the model.

### 6.3.9 Estimating the cost advantage regression model for the manufacturing sector

To examine the nature of the relationships between functional effectiveness and cost advantage at the industry level the data file was split by industry, and the following regression models developed for each industry. The first industry to be analysed is the manufacturing industry.
Table 77: Manufacturing sector model summary of cost advantage

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.23a</td>
<td>.104</td>
<td>.010</td>
<td>.9132</td>
</tr>
</tbody>
</table>

- a. Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFMRKT), SMEAN(EFFRO), SMEAN(EFFDISTR), SMEAN(EFFASSER), SMEAN(EFFOPS)
- b. Dependent Variable: cost advantage scale
- c. Economic sector = 1

The $R^2$ value for the manufacturing sector is .104 indicating that the regression model explains 10.4% of the variability in cost advantage in the manufacturing industry.

The following ANOVA table shows the function not to be significant at alpha = .05. As a result no interpretation of the function was carried out.

Table 78: Manufacturing model significance using enter method

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>5.543</td>
<td>6</td>
<td>924</td>
<td>1.108</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>47.537</td>
<td>57</td>
<td>834</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>53.080</td>
<td>63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- a. Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFMRKT), SMEAN(EFFRO), SMEAN(EFFDISTR), SMEAN(EFFASSER), SMEAN(EFFOPS)
- b. Dependent Variable: cost advantage scale
- c. Economic sector = 1

The reason for the function not being significant for the manufacturing sector could be the high p values of the other independent variables. If the regression is carried out using the stepwise method, the function is significant with operational effectiveness being isolated as significant. The stepwise model summary and ANOVA are shown below.

Table 79: Stepwise model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.306a</td>
<td>.094</td>
<td>.079</td>
<td>.8808</td>
</tr>
</tbody>
</table>

- a. Predictors: (Constant), SMEAN(EFFOPS)
- b. Dependent Variable: cost advantage scale
- c. Economic sector = 1
The variable that is significant within the manufacturing sector is the operations function. This significant variable was obtained from the following coefficient table (enter method).

From the above table the manufacturing variate of cost advantage is expressed as follows:

\[ Y_{\text{Cost advantage}} = 3.530 + .375X_{\text{Operations}} \]

Operations have the largest explanatory power (standardised beta coefficient = .359). This could be consistent with relative importance of the operations function to meet the labor, capital and cost efficiency and capacity utilisation performances that make up the overall cost advantage of a firm in the manufacturing sector.
6.3.10 A cost advantage regression variate for the service industry

Table 82: Service sector cost advantage model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>616\textsuperscript{a}</td>
<td>.379</td>
<td>.267</td>
<td>6321</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFDISTR), SMEAN(EFFOPS), SMEAN(EFFMRKT), SMEAN(EFFRD), SMEAN(EFFASSER)
\textsuperscript{b} Dependent Variable: cost advantage scale
\textsuperscript{c} Economic sector = 2

The R\textsuperscript{2} value for the service sector is .379 indicating that the regression model explains 37.9% of the variability in cost advantage in the service industry. Some caution is needed as the difference between the adjusted R\textsuperscript{2} values and R\textsuperscript{2} values would suggest that some overfitting of the data are occurring because the ratio of variables to observation falls as the data are split along industry type (n=40).

The following ANOVA table shows the function to be significant at alpha = .05.

Table 83: Service sector cost advantage model significance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>8.063</td>
<td>6</td>
<td>1.344</td>
<td>3.363</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>13.187</td>
<td>33</td>
<td>.400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>21.250</td>
<td>39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{a} Predictors: (Constant), SMEAN(EFFPURCH), SMEAN(EFFDISTR), SMEAN(EFFOPS), SMEAN(EFFMRKT), SMEAN(EFFRD), SMEAN(EFFASSER)
\textsuperscript{b} Dependent Variable: cost advantage scale
\textsuperscript{c} Economic sector = 2

The variables that are significant within the service sector are:

- Purchasing
- After sales service

These significant variables were obtained from the following coefficient table.
From the above table the service variate of business performance is expressed as follows:

\[ Y_{\text{Cost advantage}} = 0.869 + 0.328X_{\text{After Sales Service}} + 0.306X_{\text{Purchasing}} \]

Purchasing has the largest explanatory power (standardised beta coefficient = 0.373). The importance of purchasing and after sales service functions is consistent with the cost advantage variables such as operations cost efficiency, labour and capital efficiency and capacity utilisation. The importance of these relationships is discussed in the conclusions chapter.

### 6.4 Summary of results for Hypothesis H2

The theoretical model is shown together with the findings from the discriminant and regression variates of business performance and industry type.
FIGURE 34: TO RELATE THE TESTING OF H2 TO THE THEORETICAL

MODEL

H2a – Discriminant analysis
H2c – Multiple regressions

Cost advantage
(Firm efficiency)

Customer preferences

Interaction

Market advantage
(Firm outputs)

Competitive advantage
(Firm performance)

Resource
Advantage
(Firm functions)

H2a – Discriminant analysis – predictor variables between manufacturing and service
- Effectiveness of distribution
- Effectiveness of after sales service
- Effectiveness of operations

H2c – Multiple regressions – the explanatory power of functional effectiveness to Cost
Advantage
- Overall R2 = .121
- Manufacturing sector R2 = .094
- Service sector R2 = .379

H2b – Multiple regressions – the explanatory power of functional effectiveness to Market
Advantage
- Overall R2 = .219
- Manufacturing sector R2 = .264
- Service sector R2 = .325
The above results would provide support for the proposition:

\[
H2: \text{There is a positive relationship between output values, efficiency, and functional effectiveness and these relationships vary by industry.}
\]

There are functional effectiveness variables that discriminate between the manufacturing and service sectors and that these variables explain a reasonable proportion of both market and cost advantage in both sectors. The implications of these findings and their comparison with similar studies are discussed in the conclusions chapter.

6.5 Conclusion to the testing of hypotheses

The tests have shown that the there is:

1. A positive relationship between certain market advantage variables and business performance
2. A positive relationship between certain cost advantage variables and business performance
3. That cost and market advantages vary between industries
4. A positive relationship between certain functional effectiveness variables and business performance
5. That functional effectiveness varies between industries

6.6 Post survey validation

The purpose of the post survey validation is to evaluate the findings of the research with experienced industry executives to assess the feasibility of the findings. Did the patterns found in the data make sense to those who are professionals at the highest level within their respective firm’s? Six executives were contacted and the interview was held over the telephone. The interview was conducted in the following way:

- Introduction and background to the research
- A open ended question on how they expected the findings to relate to the propositions (dealt with in turn)
- A discussion of the actual result noting any deviations between expectations and actual results, seeking possible reasons for such deviations. These included differences in triangulation of results.
- After each interview the notes were sorted into themes related to the hypotheses tested

The use of executives from the industries studied for pilot and post – survey validation is not new, as the following table of prior studies illustrates:
Table 85: The use of industry executives in pilot and post-survey interviews

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Number</th>
<th>Study type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenz, R., (1980)</td>
<td>Not stated</td>
<td>Environment, structure and performance</td>
</tr>
<tr>
<td>Kim, L., Lim, Y., (1988)</td>
<td>5</td>
<td>Environment, generic strategies and performance</td>
</tr>
</tbody>
</table>

The use of senior executives for the majority of strategy studies in providing both subjective and objective data (Govindarajan and Fisher, 1990) attests to the presupposition that they have expert knowledge of their firms and industries. Similarly senior executives are used widely in pilot surveys in developing variables and in post survey validation to judge the validity of findings.

6.6.1 Comment on the post survey validation results

The pattern, which emerged (after each interview the notes were sorted into themes related to the hypotheses tested) from the senior executives, was that the prioritisation of the output values, efficiency and price variables were consistent with their experience. None of the relationships were considered to be unreasonable. On examination of functional priorities these were seen to be consistent with experience. For example in manufacturing industry, the post survey interviews revealed that customer responsiveness, innovation and quality were important elements of market advantage.

The variables that made up these scales were seen to be comprehensive and valid. Capital efficiency was seen to be a measure of the firm’s cost advantage. Having the right mix of investment in assets was seen as evidence of understanding the requirement of the market and the basis for low investment per unit of output. This was important in an industry where advances in technology can quickly make previous investment redundant. This investment was important because of its high proportion on the balance sheet and consequent impact on return on investment. Bad investment decisions on capital equipment could have disastrous effects on the rate of return.

With respect to resources, operations were acknowledged to be the predominant function. The tangible and intangible resources in this function give rise to the effectiveness of operations, which in turn has the greatest impact on both the cost and market advantages of the firm. What mix of tangible and intangible resources provide the basis for effective operations could be the subject of investigation.
In the manufacturing industry quality and customer responsiveness were confirmed to be important market advantage variables. The reason for this lies in the predominance of JIT logistics and manufacturing systems with manufacturers. Poor product quality is a direct threat to the smooth running of the customer’s manufacturing plant, which incurs losses, once the assembly line is stopped. Similarly the ability to flex production schedules was valued by customers as an additional way to reduce pipeline inventories without increasing the risk of an assembly stoppage.

A cost advantage was confirmed as being most visible in the way overhead costs were managed, together with the efficiency of labour and the efficiency of capital. Resource advantage was less clear in the post survey interviews for the manufacturing industry. There was some support for the operations function, but good support for the distribution function. This function was highlighted in the regression models as important. Its importance possibly derives from the skills required to manage distribution stock levels and avoid obsolescence costs in a volatile assembly industry. Additionally its tangible and intangible resources provide the basis for meeting the demanding JIT requirements of customers.

The discussions lead to questions on underlying functional competencies. These consistently pointed towards investment in skills training – possibly a significant issue for future research into the sources of functional competence.

With respect to anomalies in the triangulation results (as discussed at the beginning of this chapter), market share differences were largely accounted for through differences in definition of market share. The survey question on market share was answered on a definition of a market, which was a niche, local or related to a nearest competitor. Limited use and availability of national market data made this parochial approach in assessing market share the only practicable way to measuring performance.

In addition these “practice” definitions reflect the available market for these firms. Therefore comparing these responses with a market share that is based on industry averages has possibly given rise to the weak relationship in the triangulation data. The question posed therefore is how valid is the market share measurement used in this study? In some ways it could be more valid than other externally derived measures of market share, as the post survey validation gives some insight into just how difficult it is to pre-set the definition of the “market”. If it can be done and communicated to respondents they may have no way knowing how they perform against such a definition as it requires data, which is beyond their on-going experience. Leaving the respondent to relate this question to their own definition of the market may not have decreased the validity or reliability of these responses. This is not a defence of subjective ratings. Pre-calculating rates of market growth and thereby pre-scaling the 7-point Likert scale on the questionnaire is possibly one way around this problem for future research.

With respect to the consistent bias of the difference in customer responses versus supplier responses, the reason to emerge from the post survey validation interviews was that the buyers are under constant pressure to upgrade the performance of suppliers. As a result they consistently negatively rate the suppliers. Therefore it is possible that the suppliers have objectively rated their performance against industry
average because they will possibly be aware of what realistic industry benchmarks are in order not to lose current customers.

In conclusion, the post survey validation has provided support for this study’s findings.

6.7 Conclusion to data analysis

The data analysis chapter set out to test the hypotheses. The overall conclusion is that there are variables that discriminate between the manufacturing and service sectors at each level of the model. In other words certain functions are more important to the service sector than the manufacturing sector and different market and cost advantage variables are important to each industry. In addition the data analysis showed that market advantage variables explained more of business performance than did cost advantage variables. This higher explanatory power of market advantage variables applied to both the manufacturing and service sectors. The implications for management and how these results compare to prior studies are discussed in the final chapter. The model below provides a consolidated picture of the results.

The discriminant analysis of cost and market advantage variables between the manufacturing and service sectors revealed the success rate of new products and the level of design innovation was significantly more important to the manufacturing sector than the service sector. On the other hand the ability to win new customers and capacity utilisation were more important to the service sector. The model provided good explanatory power of business performance (in comparison to other strategic management studies) in both the manufacturing and service sectors (from 61.8% to 64.5%). When business performance is regressed with the cost advantage variables the result shows cost advantage to be more significant to the manufacturing sector (43.4%) than the service sector (39.5%). The reverse is found when business performance is regressed with the market advantage variables when the service sector (60.8%) is higher than the manufacturing sector (39.5%).

The results for the relationships between resources and cost and market advantages show that effectiveness of distribution, effectiveness of after sales service and effectiveness of operations discriminate between the manufacturing and service sectors. Effectiveness of distribution, operations and after sales service was more important to the service sector than the manufacturing sector. When cost advantage is regressed with the functional effectiveness variables that make up resource advantage, these variables explained more of the service sector variability (37.9%) than the manufacturing variability (9.4%). The same is found for market advantage, where the service sector has 32.5% explained and the manufacturing sector 26.4%.

The implications for management of these findings are discussed in the final chapter.
FIGURE 35: TO SHOW THE RELATIONSHIP OF THE HYPOTHESES TO THE THEORETICAL MODEL

H2a – Discriminant analysis – predictor variables between manufacturing and service
- Effectiveness of distribution
- Effectiveness of after sales service
- Effectiveness of operations

H2c – Multiple regressions – the explanatory power of functional effectiveness to Cost Advantage
- Overall $R^2 = .121$
- Manufacturing sector $R^2 = .094$
- Service sector $R^2 = .379$

H2b – Multiple regressions – the explanatory power of functional effectiveness to Market Advantage
- Overall $R^2 = .219$
- Manufacturing sector $R^2 = .264$
- Service sector $R^2 = .325$

H1a – Discriminant analysis – predictor variables between the manufacturing and service sectors:
- Success rates of new products,
- Level of design innovation
- The ability to win new customers
- Capacity utilisation

H1b – Multiple regressions – The explanatory power of the output, price and efficiency variables to business performance
- Overall $R^2 = .457$
- Manufacturing sector $R^2 = .618$
  - Cost advantage = 43.4%
  - Market advantage = 39.5%
- Service sector $R^2 = .645$
  - Cost advantage = 14.6%
  - Market advantage = 60.8%
CHAPTER 7 – FOCUS GROUP CONFIRMATORY DISCUSSION

7.0 Introduction

The question that remains at the end of the quantitative analysis is “Do the findings accord with practice?” Stewart and Shamdasani (1990) have suggested that focus groups can be effectively used to confirm (or contradict) the findings of a quantitative study. Focus groups allow for the emergence of insights within a targeted topic that could otherwise be missed in a structured quantitative study. A directed discussion of the results could create synergy between the participants and a fuller understanding of the results could be obtained. For this reason a group approach was preferred over individual interviews. The quantitative study in this research started with open-ended interviews to develop the questionnaire and refine the research questions. It now concludes by reflecting on the findings through a focus group.

7.1 Focus group methodology

In common with focus group methodology the following was used:

- A presentation of the purpose, methodology and results of the logistics services industry was made. This was done to ensure that there was a clear statement of the research question and to scope the boundaries of the discussion. The research question was framed, as “Do the findings of the main survey accord with your experience?” The relevant factors to be discussed were predetermined from the research by analysing the model at industry level.
- The sampling frame was chosen as a leading company in the logistics services industry. The executives in this company were the respondents in the focus group. The results of the focus group were not to be generalised and consequently the selection of a statistically sound sampling frame was not seen as critical. The results were to be used as confirmatory evidence of the main survey.
- The moderator was the researcher of the main survey. This was seen as appropriate as the best way to keep the discussion focussed. It may have had the drawback of the moderator unconsciously leading the discussion towards confirmatory data rather than exploring areas of difference.
- The discussion was tape-recorded. The discussion lasted 3 hours.
- The transcripts of the discussion were analysed for underlying themes.
- These themes were collated by “cutting and pasting” the transcript.

7.2 Focus group results

A focus group discussion of the results were held with the main board of directors of TNT Express Ltd in March 1999 at the company’s head office in Atherstone. The directors present were:

- Managing Director
- Operations Director
• Finance Director
• Business Development Director
• Automotive Logistics Director

This group of executives represented a combined experience of 75 man-years in the logistics services industry. For example the managing director had been with the company for the last 20 years.

The relative importance of functions was agreed to be as found in the study – namely the overriding importance of operational effectiveness. The prime importance of operational effectiveness to cost competitiveness, as revealed by the study, was agreed to an important factor. Some debate on whether labour efficiency should have the lowest relationship to cost advantage was generated. This arose because the low importance of labour efficiency appeared to be at odds with certain member’s presuppositions. The eventual consensus was that the regression model had correctly revealed the ordinal positions of the efficiency factors.

With respect to the ordinal position of the factors that made up market advantage, innovation was the most significant. Some debate was generated on whether customer responsiveness or the quality variable was the most important. Consensus on the primary importance of the innovation variable was established when interpreted in conjunction with the importance of the operations function. This function contained the Business Development team. This team’s core competence was stated to be the design of supply chain solutions for customers. This core competence was seen to be an important factor in winning new business. If the ability to correctly assess a supply chain problem and provide a unique solution for the customer was interpreted as innovation, then innovation was correctly identified as the most important factor to market advantage. This discussion was based on an assessment of the items that made up the innovation scale, namely, time to market with new services, rate of introduction of new services, success rate of new services and level of design innovation. These measures of innovation were deemed to be appropriate. The emergence of the Business Development Team as a key resource to the firm generated objections from those executives who by implication found their resources of lesser direct importance to the market advantage of the firm.

The elements of cost advantage were considered to be “order qualifying” criteria and the elements of market advantage were considered to be “order winning”. In other words being cost competitive allowed the firm to be in the frame, but it was high levels of effectiveness on market advantage variables that won the order. This distinction between order winning and order qualifying criteria is implied in this research (some factors having a stronger relationship with business performance).

With respect to the main measure of overall competitive advantage, return on sales was agreed to be the appropriate measure for this industry. It was noted that size had an impact on the rate of return. As turnover grew the absolute size of profit increased but at a lower average rate i.e. Return on sales dropped as sales increased. This could be a function of expansion into less profitable segments, in the pursuit of sales growth for its own sake. The consensus was that it was the appropriate measure on which to
classify companies within the industry in terms of their relative competitive performance.

Some discussion centred on the nature of the underlying resources of the Business Development team. The tangible resources were not considered to be significant as a source of market advantage. The main source of advantage was deemed to arise from the skill of the supply chain specialists within the team. This skill was not only in the technical area of logistics, but more importantly in the area of customer relationship management. The company took particular care to ensure that there was a best fit between the logistics specialist and the personalities within the client organisation. The activity, which the company did uniquely within the industry, was to conduct interviews with potential clients where the company had tendered for their business but had been unsuccessful. It was perceived that this activity generated useful operational knowledge and goodwill.

Additionally the discussion of the Business Development team revealed that the company had a strong tradition of promotion from within. External appointments had not been a success. The retention of organisation and industry specific knowledge could be a policy advantage in this industry. Which policies encourage an above industry average accumulation of critical knowledge was posed as an interesting research question.

This discussion indicated that this study’s model could be developed to investigate the nature of the underlying resources (and how they are acquired) on which both cost and market advantages are uniquely created.

The criticisms of the study were that it did not specify functional process in enough detail. For example future research into the logistics services industry could target Business Development in greater detail. This function is particularly important to this industry. The response to this criticism is that the research was designed to cover a number of industries and test a generalised model of firm performance. Having established the general model, future research could refine the model to fit the nuances of particular industries. A second criticism was that the research did not examine the customer relationship dimension. Customer relationship management was seen to be a basic approach in the industry. This extension of the definition of output values to include the indirect elements of the marketing process is a consideration for future research.

7.3 Focus group conclusion

The following conclusions can be drawn from the focus group.

- The patterns of relationships between cost and market advantages and business performance were in general accord with the focus groups experience.
- The relationships of functions to both cost and market advantages were in general accord to the focus groups experience
- The model is useful in targeting areas in the company that are key to the firm’s competitive advantage
• A deeper understanding of which resources support superior performance in the industry will require a focus on the intangible resources of the firm e.g. knowledge, policies and processes
• In the absence of a structured analysis of the relationships presented in the model it would be difficult to generate consensus between executives of different functions on the priority resources of the firm
• In developing an improved understanding of the sources of distinctive competencies within functions, a qualitative case study approach may be required in future research.

It can be concluded that this focus group of participating industry experts agreed that the results of the research did not present any surprises and was in general accord with their experience. A limitation of the quantitative survey was a lack of immediate insight into the nature of the intangible resources that generated either a cost or market advantage. This would have to be taken up in future research. These findings have shown that the main survey has at least met its immediate goal which was to establish whether the relationships between resources, cost and market advantages and business performance could be defined cohesively.
CHAPTER 8 - CONCLUSIONS, SPECULATIONS AND DIRECTIONS FOR FUTURE RESEARCH

8.1 Introduction

This study has been an investigation of the relationships between a firm’s functions, output values, price, efficiency and business performance in one cohesive proposition. The purpose of the study was to test the hypothesis that these relationships vary giving rise to a prioritisation of output values, efficiency and price and a prioritisation of functions based on their relationship to output values and efficiency. The goal was to validate a cohesive theoretical model, which had improved properties in terms of explaining differences in firm performance.

In attempting to achieve this goal this study has made a theoretical contribution, generated new insights into selected UK industries and provided new avenues for future research. There are limitations to this study, weaknesses that are identified and need to be considered in both interpreting the findings and in future research. The purpose of this chapter is to discuss these issues.

In order to ensure that the discussion is focussed, the theoretical model is reproduced here summarising the findings.
FIGURE 36: TO SHOW THE RELATIONSHIP OF THE HYPOTHESES TO THE THEORETICAL MODEL

- **H2a** – Discriminant analysis – predictor variables between manufacturing and service
  - Effectiveness of distribution
  - Effectiveness of after sales service
  - Effectiveness of operations
  - Capacity utilisation

- **H2c** – Multiple regressions – the explanatory power of functional effectiveness to Cost Advantage
  - Overall $R^2 = .121$
  - Manufacturing sector $R^2 = .094$
  - Service sector $R^2 = .379$

- **H2b** – Multiple regressions – the explanatory power of functional effectiveness to Market Advantage
  - Overall $R^2 = .219$
  - Manufacturing sector $R^2 = .264$
  - Service sector $R^2 = .325$

- **H1a** – Discriminant analysis – predictor variables between the manufacturing and service sectors:
  - Success rates of new products,
  - Level of design innovation
  - The ability to win new customers

- **H1b** – Multiple regressions – The explanatory power of the output, price and efficiency variables to business performance
  - Overall $R^2 = .457$
  - Manufacturing sector $R^2 = .618$
  - Service sector $R^2 = .645$
The model shows the relationships that were tested. These were (H1) the relationships between market advantage, cost advantage and business performance and the relationships between functional effectiveness and market and cost advantages (H2).

The first conclusion that can be reached is that in comparison to prior studies, the model accounted for a good level of business performance variability, (Overall $R^2 = .457$) and that the model explained higher levels of business performance as the data were disaggregated (Manufacturing sector $R^2 = .618$, Service sector $R^2 = .645$). The effectiveness of this model is compared with other studies of business performance in the strategy literature and is commented upon later. In addition, discriminating variables between the manufacturing and service sectors were found as predicted by the theory. In addition, the model was found to have generalisability properties.

It can be concluded that the first objective of this study has been met, namely to be able to explain variability in business performance from an output based view. It was shown that these relationships vary between industries.

The second objective of this study was to evaluate the relationships between functional effectiveness and market and cost advantages. In this regard, it can be concluded, that the study was successful, as the models accounted for a reasonable proportion of market advantage variability (Overall $R^2 = .219$, Manufacturing sector $R^2 = .264$, Service sector $R^2 = .325$) and cost advantage variability (Overall $R^2 = .121$, Manufacturing sector $R^2 = .094$, Service sector $R^2 = .379$). In addition, it can be concluded that the importance of certain functions does vary between industries, with implications for the strategic management of resources.

Whether the explanatory power of the model is better than prior studies is discussed next. This section examines the results of testing H1 with other similar studies in the strategy literature. The purpose is to see if the output based view of the firm has improved explanatory power of business performance than prior models. The testing of functional effectiveness (H2) is compared and contrasted with resource-based models. There are fewer resource-based studies in the literature. The studies were selected for their impact on strategic management research and practice and comparability with this study.

8.2 Findings in relation to the literature

This study began by suggesting that the central theme in strategic management research was to explain why some companies outperformed others in the same industry – that is why there are differences in business performance. The basis for critiquing the literature was from this perspective. The theoretical model that was developed was based on arguments that addressed limitations in the existing literature in terms of its explanatory power of differences in firm performance. These limitations were primarily either an emphasis on inward looking variables which suggested that configuration of resources and structure (Miles and Snow, 1978, Jordan and Tricker, 1995, Zahra and Pearce, 1990, Parthasarthy and Sethi, 1993) were the source of performance differences or an emphasis on variables outside of the firm as sources of explanatory power (Powell, 1996, Venkatraman and Prescott, 1990, Rumelt, 1991).
The studies conducted with these perspectives are a source of material in the search for higher levels of explanation of differences in business performance.

The need to combine both an internal and external approach is not new (Veliyath and Srinivasan, 1995, Donaldson, 1987, Snow and Hrebiniak, 1980, Dess, Lumpkin, Covin, 1997, Hunt and Morgan, 1995, 1996). However prior empirical studies have seldom attempted to encapsulate both. This study has attempted to combine both an internal and external perspective in explaining differences in firm performance. The external approach is achieved through market facing factors (Slater and Narver, 1994, Greenley, 1995) rather than environmental factors. Separating responses by industry controlled for these factors.

The literature was categorised into two main themes; namely the contingency approach (Venkatraman and Prescott, 1990, Lenz, 1981, Hambrick and Lei, 1985) and the resource based approach (Barney, 1991, Wernefelt, 1995).

Given the underlying goal of this study to increase explanatory power of why firms have different business performances the following is a comparison of prior studies with this study in terms of that goal. This section is focussed on answering the question “How does this study’s model compare with others in terms of explaining differences in business performance?”

The following table summarises the prior models used for comparative purposes.

<table>
<thead>
<tr>
<th>Model type</th>
<th>Authors</th>
<th>Date</th>
<th>Variables</th>
<th>n</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate</td>
<td>Hitt and Ireland.</td>
<td>1985</td>
<td>Functional competence, strategy type, industry type, market returns</td>
<td>185</td>
<td>The full model explained between 15.8% and 9.1% of business performance across 4 grand strategy types</td>
</tr>
<tr>
<td>Distinctive Competence, Strategy, Industry and Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environments as Moderators of the Relationship Between Strategy and Performance</td>
<td>Prescott, J</td>
<td>1986</td>
<td>Environmental types based on market structures, strategy variables being cost efficiency, asset parsimony, differentiation and scope. Business performance was measured using ROI.</td>
<td>PIMS (1630)</td>
<td>The full model explained 41% of the variance in ROI. Within strategy type the variance explained varied from 57% to 37%.</td>
</tr>
<tr>
<td>Relating</td>
<td>Miller, D</td>
<td>1988</td>
<td>Porter’s</td>
<td>89</td>
<td>The model had a</td>
</tr>
<tr>
<td>Porter's Business Strategies to Environment and Structure: Analysis and Performance Implications</td>
<td>generic strategy types, organisational types, (technocrats, liaison devices, delegation), environmental uncertainty.</td>
<td>range of explanatory power from 14.6% to 21.3% for the environment to structure relationship and 34.4% to 28.3% for the environment/structure to performance relationship.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>---</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment-Strategy Coalignment: An Empirical Test of its Performance Implications</td>
<td>Venkatraman and Prescott.</td>
<td>1990</td>
<td>Seventeen environmental factors based on Porter’s generic strategies resulting in 8 strategic types, 17 strategy variables, dependent performance measured by ROI</td>
<td>PIMS (1638)</td>
<td>Coalignment was defined as distance from an “ideal” configuration. The explanatory power of these regressions ranged from 66% to 46%</td>
</tr>
<tr>
<td>Rivalry, Strategic Groups and Firm Profitability</td>
<td>Dierickx and Cool.</td>
<td>1993</td>
<td>Rivalry index (independent variable) based on proportions of sales in the industry. Measures within and between group rivalries. Performance (dependent variable) was measured by return on sales. These regressions were created for two periods (1963/74 and 1975/82)</td>
<td>22</td>
<td>The intensity of rivalry was found to account for a maximum of 42% of ROS</td>
</tr>
<tr>
<td>Competitive environment</td>
<td>Slater and Narver.</td>
<td>1994</td>
<td>Market, customer and</td>
<td>107</td>
<td>Market orientation was found to</td>
</tr>
</tbody>
</table>
and market orientation

| Ownership structure and economic performance in the largest European companies | Thompson and Pedersen. | 2000 | Ownership type and proportion of shareholding are the independent variables. The dependent variable is market-to-book value of equity, return on assets and sales growth. | 435 | The level of explanatory power ranged from 64% to 7% between MBV and sales growth. It was found that there were significant differences between ownership types on performance. |

8.2.1 Discussion of the Hitt and Ireland (1985) study – distinctive competencies model

In this study the theoretical model related corporate functional distinctive competencies to market performance and tested the effect of industry type on the relative importance of distinctive competency. The model was found to explain 9% to 15% of the variability of firm performance. Functional distinctive competencies were found to vary by industry. The findings of this study would generally confirm the Hitt and Ireland study. Functional effectiveness (competence) was found to vary by industry type and explained a proportion of business performance variability. The Hitt and Ireland study did not include efficiency (cost advantage) and output values (market advantage) variables. The model tested in the current study appears to be more cohesive in this regard and the overall model explains 45.7% of business performance and 61.8% and 64.5% of the manufacturing and service sectors respectively. Functional effectiveness to cost (12.1%) and market advantages (21.9%) are similar to the Hitt and Ireland (1985) study. This result suggests that when business performance is the dependent variable, a more cohesive model, that contains both cost and market advantage variables, is required.

8.2.2 Discussion of the Prescott (1986) study – environmental model

Using the PIMS database, this study examines the relationship between 8 types of environments and certain strategy variables. It develops a regression for each environmental type, where ROI is the dependent variable and the 9 independent
variables are split between 7 cost and 2 market related variables. There is little theoretical justification for their selection other than availability from the PIMS database. The 8 environmental types were constructed using cluster and factor analysis. The model is constrained by what is available in the PIMS database and it is questionable whether a predominance of cost variables actually measures market structure. The Prescott model's overall explanatory power of ROI is 41%, which compares with the 46% of this study's model. This could suggest that use of market advantage variables might have improved the Prescott model. Conversely it suggests that the output-based view could have its explanatory power increased by the inclusion of environmental types.

8.2.3 Discussion of the Miller (1988) study – environmental/structure model

The model in this study was a combination of environmental and structure types to explain business performance. A regression model of each strategic type was developed first with the independent variables being organisational structure types. The explanatory power of these variables ranged from 21% to 14%. The second set of regressions related business performance to organisation and environmental type independent variables. The resulting explanatory power ranged from 28% to 34%. The Miller model did not include market or cost advantage variables in the regressions to enhance the explanatory power of the model. Conversely the output-based view of the firm could best perform (in explaining differences in firm performance) where it is used within industries. The results of this study would confirm this by highlighting the differences between industries and showing higher values of R² where the data are disaggregated. For example the R² increased from 46% for the aggregated data to 62% and 65% when the data were disaggregated to the manufacturing and service sectors respectively.

8.2.4 Discussion of the Venkatraman and Prescott (1990) study – Coalignment model

Venkatraman and Prescott developed a model of strategic coalignment that compared an "ideal" structure of environment to strategy to generate highest business performance. The expectation was that the greater the deviation of actual coalignment from the ideal the lower business performance would be. The highest R² = .66 at the specific environmental level with R² = .42 for the aggregated data. This compares with this study's aggregate R² = .46 and a maximum R² = .65 for disaggregated data. The independent variables and data were taken from the PIMS database and as a result there were 13 cost variables and 4 market related variables. The Venkatraman and Prescott model could have possibly been improved by using independent variables along cost and market advantage dimensions. The results of the output-based model suggest the existence of an "ideal" configuration of cost and market advantage and resource effectiveness variables for each industry setting. Demonstrating the importance of coalignment could be a consideration for future research.
8.2.5 Discussion of the Cool and Dierickx (1993) study – The rivalry model

In this longitudinal study of the US pharmaceutical industry companies were grouped based on the intensity of rivalry. Intensity of rivalry was in turn made up of relative market share. Return on sales was then regressed with the intensity of rivalry within and between groups across two time periods (1963/74 and 1975/82). The findings were $R^2 = 0.18$ for the earlier period and $R^2 = 0.42$ for the later period. A consideration that arises from the Cool and Dierickx study is that the output-based model has not included intensity of rivalry as a factor on business performance. This project has controlled for environmental factors by limiting the data to specific industries. Given the limited number of variables used in the Cool and Dierickx study it has produced good levels of $R^2$. As a result intensity of rivalry could be considered as a direct inclusion as an independent variable to the output-based view to improve its explanatory power of differences in business performance.

8.2.6 Discussion of the Slater and Narver (1994) study – The market orientation model

This study attempted to use environmental types to suggest whether managers could use the customer or competitor in deciding their market orientation. The study showed that a market orientation could explain 34% of return on assets. The Slater and Narver study uses broad measures of market orientation. Their model could possibly have been improved by using specific visible market output variables. The output-based view of the firm concurs with the Slater and Narver study in advocating a market orientation as an improved approach in creating above average economic performance.

8.2.7 Discussion of the Thomsen and Pedersen (2000) study – The ownership model

This study related firm performance to ownership type and ownership concentration. The authors found that institutional ownership concentration resulted in high market to book values. A negative premium was associated with high concentrations of family, another company or government ownership. They found that ownership affected the profit or growth emphasis in firms. Ownership type and concentration could be included in the output-based model to account for differences in strategic performance. This study has not controlled for this variable.

8.2.8 Conclusion to analysis with prior studies of business performance

The above discussion indicates that the output-based view of the firm developed in this study has been able to explain higher levels of business performance than other models. This is noticeable where the model is regressed at an industry level. Some of the prior models have not considered a number of market visible firm outputs in their selection of independent variables. This is noticeable where PIMS data has been used and this has resulted in cost and capital intensity variables dominating these models.
The output-based view of the firm could benefit from including ownership type and competitive intensity as contingent variables.

The next section compares and contrasts functional effectiveness to cost and market advantages, with prior studies. Here the literature is thin in empirical studies.

The following table summarises the studies of the relationship of resources to outputs, efficiency or business performance.

### Table 87: Prior studies of resources

<table>
<thead>
<tr>
<th>Model type</th>
<th>Authors</th>
<th>Date</th>
<th>Variables</th>
<th>n</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Firms Grand Strategy and Functional Importance: Moderating Effects of Technology and Uncertainty</td>
<td>Hitt, Ireland and Palia.</td>
<td>1982</td>
<td>Independent functional variables are, general administration, operations, R&amp;D, marketing, finance, personnel, and public relations. The grand strategy types were stability, internal growth, external acquisitive growth, and retrenchment. The study included type of production system</td>
<td>249</td>
<td>This study found that functional importance varied with grand strategy type.</td>
</tr>
<tr>
<td>Production Competence and Business Strategy: Do They Affect Business Performance</td>
<td>Vickery, Droge and Markland.</td>
<td>1993</td>
<td>Independent variables were cost and differentiation strategies and 31 production competence variables. The dependent variable was business performance was ROI</td>
<td>65</td>
<td>The model accounted for 31% in the variability in return on investment. The output based view explained 12% of cost advantage and 22% of market advantage. Operations are a discriminating variable between cost and market advantage.</td>
</tr>
</tbody>
</table>
8.2.9 Discussion of the Hitt, Ireland, Palia (1982) study – The grand strategy model

This study showed that functional importance varies by grand strategy type. The study was examining relative importance and did not measure the relationship of functional impact on firm performance. The output-based view of the firm does model functional impact on both cost and market advantage and in line with the Hitt, Ireland, Palia (1982) study shows that certain functions are more important than others and that this relationship changes by industry type.

8.2.10 Discussion of the Vickery, Droge, Markland (1993) study – The production competence model

The comparison between the Vickery, Droge and Markland (1993) study and this study is tenuous as the Vickery, Droge and Markland (1993) study was measuring only one function whereas this study was measuring the effectiveness of 6 functions. In addition this study was measuring the relationship between functional effectiveness and cost and market advantages. The Vickery, Droge and Markland (1993) study measured the relationship of operations effectiveness with return on investment. What is comparable is that there is a significant difference in the importance of operations effectiveness between a cost and differentiation strategy and this is confirmed by the output-based view when the discriminant function is used. Here operations are a discriminating variable between cost and market advantage.

8.2.11 Discussion of the Dean and Snell (1996) study – The integrated manufacturing model

One of the difficulties in providing a complete discussion of the output-based view of the firm in terms of resources is the lack of research in this area and what research is available is normally limited to one function. The Dean and Snell study is a case in point. In this study advanced manufacturing technologies, TQM and JIT are related to business performance, which is measured in terms of productivity, quality, lead-time etc. This makes it difficult to compare with the output-base view because that model distinguishes between factors, which affect cost, and factors that affect revenues. Dean and Snell have mixed both. They develop a series of regression models, which

| The Strategic Use of Integrated Manufacturing: An Empirical Examination | Dean and Snell | 1996 | The independent variables were advanced manufacturing technologies, JIT, TQM and strategy type. The dependent variable was a mix of cost and market related outcomes. | 92 | The model accounted for 51% to 44% of the performance measure. |
combine the independent variables in stepped combination and relate it to the mixed dependent performance variable. These models explain between 51% and 44% of business performance. The Dean and Snell (1996) study could possibly be improved by defining performance in terms of cost and market advantages. The study lacks comparison with other function’s contribution to performance.

8.2.12 Conclusion of analysis of functional effectiveness to cost and market advantage with prior studies

The number of studies that specifically examine the impact of functions on performance is limited. The most cited study, which examined a range of functions simultaneously, was that of Hitt, Ireland and Palia (1982). There have been a few studies that have studied single functions, and in this group of single function studies, operations predominate. The output-based model would suggest that it is important in formulating and implementing strategy that understanding the relative impact of functions on both cost and market advantages is important to overall business performance. A prioritisation of functions can lead to the prioritisation of existing and future resource investment.

The following section broadens the discussion of this study’s findings to the two themes from which the output-based view of the firm was developed.

8.2.13 Findings in relation to contingency theory

One definition of the contingency theory suggested that it was the “it depends” theory (Hambrick and Lei, 1985). This study suggests that there are some “rules” which appear to be uniform across industries in explaining differences in firm performance. In this regard the study shows some limited support for the extreme universal view. The rule, which appears to be generalisable but only at a high level of abstraction, is the varied nature of the relationship between output values, efficiency, price and business performance as well as the varied nature of the relationships between firm resources and performance on the output value, efficiency and price variables. Beyond this the research approach, which is cross-sectional, does not allow for extrapolation of the relationships found. This study can only comment on the associations found at the time they were found and cannot predict future outcomes. This limitation applies to all the interpretations in this section.

Variability of factors making up cost and market advantage and resource importance appears to be a consistent theme irrespective of industry setting. With respect to the other end of the contingency spectrum, which claims that performance is entirely dependent on the unique contingencies facing the firm, this study would suggest that certain “patterns” of relationships are discernible within industry settings. These patterns however cannot be used for predictive purposes as this study has only identified a particular set at a particular time. The existence of patterns even at a cross-sectional level means that this study could not go as far as the extreme situation specific perspective. It would argue instead that there is validity in attempting to understand differences in firm performance through understanding patterns of competitive behaviour within industry settings. This study has suggested that these patterns may be usefully constructed from the priorities of relationships between...
output values, efficiency, price, and resources and business performance. Understanding how durable they are would require a longitudinal research strategy.

With respect to the congruency sub-set of contingency theory, this study has tentatively identified patterns of variables that could be aligned in order for superior performance (Venkatraman, and Prescott, 1990). It gives support to the Venkatraman, and Prescott, (1990) study suggesting that the alignment of certain variables “has systematic implications for performance” (p18). This study has extended their investigation, which was primarily based on environmental and resource deployment variables, to include output value, efficiency and price variables. Firms, which gave certain output values, efficiency and price priorities tended to perform better in a systematic fashion at the point which this study was performed.

In relation to the competency approach (Hitt and Ireland, 1986), this study could give support to their study that competencies arise within functions and that they arise on a differential basis. This study does not directly evaluate the sources of differential competencies. It does provide a prioritisation mechanism for future study into the sources of varied distinctive functional competence.

8.2.14 Findings in relation to the resource-base view of the firm

This study provides evidence of the varied nature of resources in relation to business performance. It suggests that the resources that underpin functions have a differential impact on cost and market advantages. This is reflected in the varied nature of future investment plans of firms, the skill levels embedded in functions and the imitability of functions. It extends prior studies of the resource based-view by linking the value of the outputs of the firm to resources. It suggests that resources underpin the varied nature of functional effectiveness and impact, which in turn support cost and market competitiveness. This study highlights the importance of not treating resource types as equal (Venkatraman and Prescott, 1990).

In conclusion this study is confirmatory of a number of models, which are however narrower in scope than this one. It has highlighted the need for studies to identify relationships within industry contexts and to build cohesive models in the search for improved explanatory power of the differences in firm performance. It adds to other studies by including simultaneously business performance, market and cost advantage and resource advantage. It is like a large but still incomplete jigsaw puzzle, which confirms a number of prior pieces and relates them within a cohesive framework.

8.3 Implications for policy

This study has provided some evidence for the notion that the relationships of business performance to output values, efficiency and price are varied. Additionally the effectiveness of resources is variously related to cost and market advantages. What causes superior functional performance is potentially related to the imitability of the underlying tangible and intangible resources connected to some common orchestrating theme. As Miller (1996) observes,
"The quality of configuration can have important normative implications. The heart of distinctive competence and competitive advantage may lie not in possession of specific organisational resources or skills; these can usually be imitated or purchased by others. Rather competitive advantage may reside in the orchestrating theme and integrative mechanisms that ensure complimentarity among a firm's various aspects" (p509).

This study has provided some evidence that the outcome of any such orchestrating theme is varied. In other words the orchestrating theme has "favourites" when it comes to output values, efficiency, price and functions. These favourites are not consistent across industries, but the principle of variability apparently is. What then are the policy implications of these findings?

8.3.1 Policy implications in relation to market advantage

The first implication is that firms could identify from among a potentially large number of output values, which of those are most associated to business performance. In particular these output values directly influence market place performance i.e. total revenues and price levels. Consequently executives attempting to enhance the revenue generating capabilities of the firm need to focus (e.g. marketing, R&D and operations policies) on the relatively few output values that will generate superior performance. For example this study has shown that the success of new product launches and customer retention rates are associated with business performance in the financial services industry and the level of design innovation and prices are associated to business performance in the manufacturing industry. Before committing to a particular set of output values and resources as a means to superior business performance, executives should check the stability of these relationships over time. This study cannot comment on the issue of pattern stability.

Understanding the relative importance of these output values to business performance could create a prioritisation mechanism for the acquisition and development of underlying resources. It could provide for a "health check", as noted by Miller (1996)

"When the orchestrating theme of a configuration becomes too obsessive a preoccupation then an organisation loses its resilience and relevance. It becomes too narrowly focussed and too simple to match the complexity of its environment" (p510).

In other words firms, which have understood past priorities and focussed on the capabilities needed to succeed on those priorities, should continually assess the relevance of those capabilities for the future. (Prahalad and Hamel, 1994)

8.3.2 Policy implications in relation to cost advantage

The findings suggest that the efficiency factors that make up a firm's overall cost advantage vary between industries and that the role that cost or market advantage plays in determining business performance is not equal or the same between industries. The implication for policy is the need for strategy to be formulated in a
way that emphasises strategy implementation issues such as motivation, control and reward systems that focus human performance on those efficiency factors that matter the most to business performance. In this way the appropriate distinctive competencies could be developed over time that yield sustainable competitive cost advantage. The stability of these relationships should be understood before commitment to a set of cost effective resources.

8.3.3 Policy implications in relation to functional resources

The resource advantage to cost advantage between industries varies from 9% (manufacturing industry) to 34% (service industry). The importance of underlying resources to cost advantage varies between industries. The importance of this to policy is that certain industries may find that focussing on efficiency related resource development could have a greater impact on competitive advantage than others.

At a corporate strategy level, understanding the nature of these relationships could influence the investment policies of diversified conglomerates. It could influence the investment strategies of individual SBU's as they develop either a cost or market related SBU level strategy. Finally these relationships could influence the type of machinery, skills and other fixed assets and their geographic location acquired by functions. Certain functional asset types may provide a trade-off in favour of cost or market advantage.

For example the regression model for the manufacturing industry suggests that operations effectiveness is important to cost advantage ($R^2 = .094$). With respect to the service industry two functions appear as significant to the cost advantage. These are the effectiveness of after sales servicing and purchasing with ($R^2 = .379$). The policy implications would suggest that investment in the development of operations resources and distinctive competencies could be appropriate for the manufacturing sector. Investment in after sales service and purchasing resources and competencies could be appropriate for the service industry.

The policy question of "Would the greatest return come from investment in resources that generate a cost advantage or investment in resources that generate a market advantage?" can possibly be answered. By examining the impact of resource investment to business performance goes some way to answering this question. The following reproduction of the model illustrates this point.
FIGURE 37: TO ASSESS PREFERENTIAL INVESTMENT PATHS

<table>
<thead>
<tr>
<th>Path</th>
<th>Manufacturing industry</th>
<th>Service industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources to cost advantage</td>
<td>.094</td>
<td>.379</td>
</tr>
<tr>
<td>Cost advantage to business performance</td>
<td>.434</td>
<td>.146</td>
</tr>
<tr>
<td>Overall preference index</td>
<td>.041</td>
<td>.055</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Path</th>
<th>Manufacturing industry</th>
<th>Service industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources to market advantage</td>
<td>.264</td>
<td>.325</td>
</tr>
<tr>
<td>Market advantage to business performance</td>
<td>.395</td>
<td>.608</td>
</tr>
<tr>
<td>Overall preference index</td>
<td>.104</td>
<td>.198</td>
</tr>
</tbody>
</table>
An examination of the preference indexes in the above diagram would suggest that resource investment, which is biased towards market advantage, could have a bigger impact on business performance than investment in resource investment that is focussed on cost advantage. This is consistent for both the manufacturing and service sectors. It not possible, however, to use the cross sectional findings of this project to imply causality or suggest that the relationships are stable enough for future investment decisions to occur according to this model. The findings suggest that these were the ratios that applied at the time of the data were collected.

In conclusion by understanding the relationships between resources, output values, efficiency, and price to business performance may be a useful logic behind competitive policy formulation.

8.4 A summary of this study's contribution

This study has made a contribution in two areas, namely to the development of theory, which is predominantly confirmatory, (but it contains theory development elements i.e. one cohesive-proposition from other free-standing models), to the application of theory through improved understanding of the UK manufacturing and service industries.

In the first area of theory, the results have built on prior work, which stems from two lines of investigation. These are the contingency and resource based theories. The literature review has attempted to combine these two approaches into a cohesive theoretical model, which utilises the explanatory capabilities of both prior types. It has argued that a comprehensive theoretical model of the differences in business performance should simultaneously include an outward and inward perspective. In addition it has suggested that the theory must allow for the varied nature of relationships between the outward looking variables and the inward looking variables.

It is the combination of the contingency and resource theories along the dimensions of market orientation and variability, which is the theoretical contribution. In the process the theoretical model developed has provided the basis for confirmation of the prior theoretical approaches and the injection of an element of theory development.

The UK industries chosen have not been examined in relation to output values, efficiency, price and resources in a cohesive way before. The findings indicate that these relationships vary significantly between the manufacturing and service sectors. The results have given rise to additional insights into the nature of these relationships in these UK industries.

In the area of methodology a contribution has been made by using a range of internal and external validation methods in an attempt to ascertain the degree of reliability and validity of the measures used. This methodology has been largely confirmatory of prior study’s findings in regard to the use of subjective measures (Dess and Robinson, 1984). Whilst financial performance gave the best validation results when measured as ratios, absolute measures such, as market share were the least reliable. A suggestion for the improvement in the use of subject measures made. The following diagram, (which is taken from the beginning of the study – Figure 1), is adapted to show the findings and contributions of this study.
FIGURE 38: THE LOGICAL FLOW OF THIS STUDY AND ITS CONTRIBUTION

PRIMARY RESEARCH OBJECTIVE:
To develop and test an explanatory model of business performance

CONCLUSIONS/FUTURE RESEARCH
- Innovation and efficiency
- Quality and customer responsiveness
- Contingency theory

ROOTS IN THE LITERATURE
- Contingency theory
- Resource-based theory

DISCUSSION IN TERMS OF THE LITERATURE
- Model fit
- Variability of functions, efficiency, output values

DEVELOPMENT OF A NEW MODEL
- The output based view of the firm

DISCUSSION IN TERMS OF THE MODEL
- Relationship of output values and efficiency to functional effectiveness
- Relationship of output values and efficiency to business performance
- Analysis of relationships with and between industries

MODEL TESTING
- Hypotheses
- Data collection
- Data analysis
- Model fit

HYPOTHESIS
The relationships between output values, efficiency, price, resources, and business performance, vary positively. These relationships will vary as the level of industry aggregation is decreased.

DATA COLLECTION
- Survey based
- 4 industries
- Pre-survey
- Pilot test
- Main survey
- Validation
- Post survey validation

DATA ANALYSIS
- Multiple Regressions
- Discriminant analysis

- Functional analysis of unique resources
- Industry specific studies

- Validation methods
- Pilot study
- Post survey validation
- Multi-industry study
The headings in the dotted boxes in the above diagram are the areas where this study has made a contribution. The contribution is the definition and testing of a model, which establishes the varied nature of the relationships between resources, efficiency, output values and business performance. It demonstrates the varied nature of these relationships between industries and that the model explains improved amounts of business performance variability as the level of industry aggregation decreases.

These findings are important as they bring out a useful prioritisation mechanism that links the resources of the firm to the market and cost advantages of the firm. As a search for a cohesive model, it links the resource and contingency theories via market and cost advantages to business performance. This has not been attempted before and the model shows promise as a theoretical direction in explaining differences in firm performance. As an investigation it has examined four UK industries and the findings have shown a degree of generalisability. As a piece of research it has validated the theoretical model and provided results that can be used as benchmarks for measurement against other explanatory models of business performance.

8.5 The limitations of this study

The limitations of this study arise from the research approach and strategy choices. It is a positivistic study employing a survey strategy and collecting cross-sectional data using a postal survey. These methodological choices mean that the interpretation of the findings is limited to the correlational aspects of the data. The findings cannot be used for causal or predictive purposes.

With respect to the reliability of the data, one of the compromises that had to be made in this study was the trade-off between the objective and subjective nature of the data collected. In an ideal world only objective data could have been collected. This was in fact attempted in the pilot phase of this study, with specific measures for the output value and efficiency variables. The outcome was unambiguous - it was practically not feasible.

First, executives could not answer the questionnaire due to the time required to collect the data and the range of personnel involved. Secondly whilst they developed and maintained a good overall appreciation of how the firm was performing on these variables, actual operational records were kept on a transitory basis and consequently would not be available for direct inspection.

This does not reduce the onus on the need for objective measures - it does highlight the need for new ways to access this data. This may include pre-calculation of industry averages for use in the survey instrument as midpoints. An added benefit of using pre-calculated industry averages is that it may reduce the level of skewness in the data.

The second limitation of this research was the low response rate, particularly for the financial services industry. How could this be improved in future research? In the first instance, for inter industry comparative studies such as this; the questionnaire could be tailored to the language familiar to each industry. Care would have to be taken to ensure that the underlying intent of the question was not changed and validity compromised. The design of the questionnaire could be improved with a consistent
question layout. All these factors may result in a shorter questionnaire, which in turn may help improve the response rate. New ways of accessing senior executives, who have to deal with increasing numbers of research requests, need to be found. Perhaps the co-operation of industry representative bodies is one way forward. Research which is attempting to investigate issues that are non trivial, which are simultaneously broad and in-depth and require the co-operation of senior executives represents a challenge in terms of response rates.

The population of interest in this study were those companies that accounted for at least 75% of their industry’s market share. Random sampling of this population was not seen as necessary as each member of the population was accessible at a cost, which was not prohibitive. A question therefore remains as to what influence the “tail” (those companies which collectively account for less than 25% of market share) could have had on the results of this study. The cost of accessing all these companies would possibly require a random sampling procedure.

8.6 Future research

This research could be expanded in a number of ways. In the first instance the source of resource advantage could be sought. This study has suggested a priority list of output values, efficiency outcomes and underlying functions and resources, which could be the starting point. The research question could be “why are certain functions effective in generating the required market and cost advantage performances?” What combinations of tangible and intangible resources facilitate this performance? In addition what configuration and co-ordination mechanisms are used to facilitate high performance across functional boundaries? This could mean that new variables could need to be introduced into the model. For example, variables that identified intangible resources such as knowledge, skill, coordination, integration and innovation processes could be required. These new variables may require an investigation of cross-functional as well as functional processes.

There is a developing body of empirical evidence in this area (Corbett and Van Wassenhove, 1993, Powell, 1992, Javidan, 1998, Ferdows and De Meyer, 1990). These studies are largely done independently of a prioritised view of functions and their resources. Understanding the varied nature of these top-level relationships has only been a first step in a process of searching for patterns that will give an improved view of the sources of competitive advantage. This route could contain a higher element of theory development than this study and could possibly use a greater degree of qualitative research in the form of in-depth case studies as the level of existing theory at this level of detail is limited (Yin, 1994).

Future research could look at confirming this study’s findings by expanding the number of industries investigated in the UK and internationally. For example do the same industries in the USA give the same priorities on output values and functions as the UK? How important is the national environment as an intervening variable?

Additionally the level of operationalisation of variables that make up the cost and market advantage could be extended. In this way a sensitive picture of these industries could be constructed. For example variables that measure customer relationship management variables and competitive intensity could be included.
In conclusion, this study has provided a cohesive theoretical framework within which advances could be made by improving the search for sources of superior competitive ability, and expanding this framework across industries and national boundaries.
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APPENDIX 1 - Main survey questionnaire
The Financial Director  
MAT Group Ltd  
Arnold House  
36/41 Holywell Lane  
London  
EC2P 2EQ  

29th October 1997

Dear Sir

Background

I am a lecturer in Corporate Strategy at Surrey European Management School and I am carrying out research into a number of UK industries. This research will emphasise the link between your ability to deliver value to your customers, which of your internal functions impact most on those values and your business performance.

I would be most grateful if you would complete the enclosed questionnaire. Others within the logistics industry have already participated and will be receiving a management summary of the research findings. Initial results indicate that the most successful firms in the logistics industry do indeed emphasise certain functions and customer values.

I know that you get many such requests. I would like to think that in this case you will receive a substantial return for the small amount of time it will take you to complete this questionnaire. If I have not had your response within the next few days I will be in touch by telephone to confirm your participation.

Research Objectives

The questions I am seeking to answer include:

- Do firms with higher levels of value creating competence generate superior economic returns?
- Is there a significant difference in ranking and performance between supplier and customer views of the delivered value?
- Which delivered values are the most important?
- Which functions have the greatest impact on delivered value?
Michael Woolley  
Managing Director and Company Secretary  
MICAL-DATA LTD.  
7 Saufland Place  
Christchurch  
Dorset  
BH23 4QP

16th September 1997

Dear Mr Woolley

Enclosed please find a copy of a questionnaire I sent you recently. This study will be identifying some of the key strategic characteristics of the more successful firms in your industry.

I am aware that you get many such requests, but I would like to think that you would find the benefits well worth the effort in this case. If you have not returned the original questionnaire, I would be delighted if you would complete and return this one to me.

**Others in your industry are participating in this study on the basis that the findings will be of value to them. Initial findings show that the successful companies in your industry do indeed emphasise certain functions and customer values.**

In return for completing the questionnaire, I promise to send you a copy of the findings plus the academic papers that will flow from this research. You will then have valuable information against which you can compare your own company’s strategic approach. With your help this research will also make an impact on the study of Corporate Strategy in the UK.

Please do not hesitate to contact me should you have any queries.

With kind regards  
Yours sincerely

Jonathan Wilson FCMA MBA MPhil  
Lecturer- Corporate Strategy
Strategic Competency Questionnaire

Section 1

Measuring Your Company’s Demographics

Note: - This questionnaire is designed to measure strategic competency at the operating (i.e. strategic business unit) level and not group or corporate level. The reason for this is to have greater focus on a specific industry. This focus is often lost in the consolidation process of group accounts and performance measures. If your company is a portfolio of SBU’s then use that SBU which best represents your core business as the basis for completing this questionnaire.

Your information will be treated in the strictest confidence

1.1 What is the industry in which the main business activity is conducted by the operating unit? (e.g. Clothing, Electronics, Automotive, Financial Services)

....................................................................................................................

1.2 What is the main product/service of the operating unit? (e.g. Manufacturing men’s shirts, application software development, manufacturing automotive parts)

....................................................................................................................

1.3 Into which of the two following broad industry categories would you place your company?

(Tick one box)

<table>
<thead>
<tr>
<th>Manufacturing Industry</th>
<th>Service Industry</th>
</tr>
</thead>
</table>

1.4 How many employees has the operating unit had on average over the last 12 months?

........................................
Section 2

Measuring your Operating Units Financial Performance

2.1 How would you rate this operating unit’s sales performance against its last annual internal budget?

(Tick one box to rate this operating unit’s sales performance against budget for the last fiscal year)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>On Budget</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

2.2 Which of the following attributes had the greatest impact on your last annual internal sales budget? Allocate the total score of 100 across the attributes to reflect their individual impact on your last annual internal sales budget.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer responsiveness</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td></td>
</tr>
<tr>
<td>Product/service Innovation</td>
<td></td>
</tr>
<tr>
<td>Product/service Quality</td>
<td></td>
</tr>
<tr>
<td>TOTAL SCORE</td>
<td>100</td>
</tr>
</tbody>
</table>

2.3 How would you rate this operating unit’s market share performance against the average market share performance for the industry over the last 12 months?

(Market share performance being defined as your increase or decrease in market share over the last 12 months)

(Tick one box to rate this operating unit’s market share performance against the industry average for the last 12 months)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

2.4 Which of the following attributes had the greatest impact on your market share performance against the average market share performance for the industry over the last 12 months? Allocate the total score of 100 across the attributes to reflect their individual impact on your market share performance against the average market share performance for the industry over the last 12 months.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer responsiveness</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td></td>
</tr>
<tr>
<td>Product/service Innovation</td>
<td></td>
</tr>
<tr>
<td>Product/service Quality</td>
<td></td>
</tr>
<tr>
<td>TOTAL SCORE</td>
<td>100</td>
</tr>
</tbody>
</table>
2.5 How would you rate this operating unit's return on sales performance against its last annual internal budget?

(Tick one box to rate this operating unit's return on sales performance against budget for the last fiscal year)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>On Budget</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

2.6 Which of the following attributes had the greatest impact on this operating unit's return on sales performance against its last annual internal budget? Allocate the total score of 100 across the attributes to reflect their individual impact on your last annual internal return on sales budget.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer responsiveness</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td></td>
</tr>
<tr>
<td>Product/service Innovation</td>
<td></td>
</tr>
<tr>
<td>Product/service Quality</td>
<td></td>
</tr>
<tr>
<td>TOTAL SCORE</td>
<td>100</td>
</tr>
</tbody>
</table>

2.7 How would you rate this operating unit's return on sales performance against the average for the industry over the last 12 months?

(Tick one box to rate this operating unit's return on sales performance against the industry average for the last 12 months)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>
2.8 How would you rate this operating unit's return on investment performance against its last annual internal budget?

(Tick one box to rate this operating unit’s return on investment performance against budget for the last fiscal year)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>On Budget</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

2.9 Which of the following attributes had the greatest impact on this operating unit's return on investment performance against its last annual internal budget?

Allocate the total score of 100 across the attributes to reflect their individual impact on your budgeted return on investment.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer responsiveness</td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td></td>
</tr>
<tr>
<td>Product/service Innovation</td>
<td></td>
</tr>
<tr>
<td>Product/service Quality</td>
<td></td>
</tr>
<tr>
<td>TOTAL SCORE</td>
<td>100</td>
</tr>
</tbody>
</table>

2.10 How would you rate this operating unit’s return on investment performance against the average for the industry over the last 12 months?

(Tick one box to rate this operating unit’s return on investment performance against the industry average for the last 12 months)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>6 5</td>
<td>4</td>
</tr>
</tbody>
</table>

J. Wilson
Strategic Competency
University of Surrey
Section 3
Measuring the Operating Unit’s value outputs

3.1 **To what degree** do the following functions impact on the attributes of Customer Responsiveness, Price, Product Innovation and Product Quality? Allocate the total score of 100 across the functions to reflect their **individual impact** on each attribute.

<table>
<thead>
<tr>
<th>Functions</th>
<th>Customer Responsiveness</th>
<th>Price</th>
<th>Product Innovation</th>
<th>Product Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing of input services / products</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and Development on products/services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations / Manufacturing of services/products</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution of service or product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing/Sales of Products/services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After sales customer support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

3.2 If a **new competitor** had to enter your market which of the following functions would they find most difficult to establish? Allocate the total score of 100 across the functions to reflect their **relative difficulty** to establish.

<table>
<thead>
<tr>
<th>Functions</th>
<th>Relative difficulty to establish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing of input services / products</td>
<td></td>
</tr>
<tr>
<td>Research and Development on products/services</td>
<td></td>
</tr>
<tr>
<td>Operations / Manufacturing of services/products</td>
<td></td>
</tr>
<tr>
<td>Distribution of service or product</td>
<td></td>
</tr>
<tr>
<td>Marketing/Sales of Products/services</td>
<td></td>
</tr>
<tr>
<td>After sales customer support</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

J. Wilson  
Strategic Competency  
University of Surrey
3.3 Which functions are you planning to invest in most heavily over the next 12 months? Allocate the total score of 100 across the functions to reflect their relative importance to your investment plans.

<table>
<thead>
<tr>
<th>Functions</th>
<th>Investment importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing of input services / products</td>
<td></td>
</tr>
<tr>
<td>Research and Development on products/services</td>
<td></td>
</tr>
<tr>
<td>Operations / Manufacturing of services/products</td>
<td></td>
</tr>
<tr>
<td>Distribution of service or product</td>
<td></td>
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<tr>
<td>Marketing/Sales of Products/services</td>
<td></td>
</tr>
<tr>
<td>After sales customer support</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

3.4 To what degree do the following functions contain your most advanced skills when compared to the rest of the industry? Allocate the total score of 100 across the functions to reflect their relative level of skill.

<table>
<thead>
<tr>
<th>Functions</th>
<th>Skill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing of input services / products</td>
<td></td>
</tr>
<tr>
<td>Research and Development on products/services</td>
<td></td>
</tr>
<tr>
<td>Operations / Manufacturing of services/products</td>
<td></td>
</tr>
<tr>
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<td>Marketing/Sales of Products/services</td>
<td></td>
</tr>
<tr>
<td>After sales customer support</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>
Customer Responsiveness

Note: In answering all the following questions you will need to first think about and judge what the industry average performance on the attribute is and then assess what your operating units performance is against this judgement.

4.1 Your ability to **consistently** meet delivery/service promises to your customers

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating Your Operating Unit</td>
<td>7 6 5 4 3 2 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2 Your ability to **change your operations** to meet changed customer volume requirements

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating Your Operating Unit</td>
<td>7 6 5 4 3 2 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3 Your ability to **change your major product/service offering** to meet changed customer product/service specifications

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating Your Operating Unit</td>
<td>7 6 5 4 3 2 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.4 The effectiveness of your pre-sale activities in **winning new customers**

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating Your Operating Unit</td>
<td>7 6 5 4 3 2 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.5 The **customer retention rates** of the operating unit

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating Your Operating Unit</td>
<td>7 6 5 4 3 2 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.6 The time taken to introduce new products/services to the market

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

4.7 The level of design innovation in major products/services

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

4.8 The rate at which new products/services are introduced to the market

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

4.9 The success rate of new products/services introduced to the market

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>
### Cost, Productivity and Price

#### 4.10 The unit output costs of the operations processes i.e. operational efficiency

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

#### 4.11 The level of output to capital employed i.e. capital efficiency

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

#### 4.12 The level of labour cost to output i.e. labour efficiency

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

#### 4.13 The level of capacity utilisation

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

#### 4.14 The prices charged for your products/services

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Well above Industry Average</th>
<th>Industry Average</th>
<th>Well below Industry Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>
## Product/Service Quality

4.15 **The consistency of product/service conformance to customer specifications**

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

4.16 **The quality reputation of the operating unit in the industry**

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

4.17 **The strength of the operating units' brands on the quality dimension**

(Tick one box to rate yourself against the industry average)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>
3.18 Your major customer

This questionnaire has been constructed for ease of completion and confidentiality of your objective data. Consequently only self-rating scales have been used. The major academic criticism of this approach is that the results could be too subjective. In order to have a strong cross reference of your data, and thereby counter this criticism, I would be most grateful if you would let me have the name of a major customer who we could approach to rate you independently on questions 4.1 to 4.17 only.

Customer Name ....................................................................................................

Your co-operation in completing this questionnaire is much appreciated. Your information will be treated in the strictest confidence. If you would like a management summary of the research findings please provide the following information: -

Person to whom the report is to be sent: -

Position in company: -

Company Name: -

Company Address: -

Company Address: -

Company Address: -

Post code: -

Telephone Number: -

Please Return This Questionnaire to:-

Jonathan Wilson
FREEPOST
Surrey European Management School
University of Surrey
Guildford
Surrey
GU2 5XH

Tel:- (UK) 01483 259347
Fax:- (UK) 01483 259511
E-mail:- j.wilson@surrey.ac.uk

J. Wilson Strategic Competency University of Surrey
APPENDIX 2 – Customer questionnaire
Mr David Rogers  
Case Communications  
Kaxton Way  
Watford  
WD1 8ZD  

12th March 1998  

Dear Mr Rogers  

I am a lecturer in Corporate Strategy at Surrey European Management School and I am carrying out research into a number of UK industries. This research will emphasise the link between the supplier’s ability to deliver value to the customer and the supplier’s business performance.  

Many suppliers to your industry have been very supportive of this study. They have completed a questionnaire in which they have self-rated themselves against their understanding of the industry average performance on certain service and product attributes which their customers purchase from them.  

To cross validate these ratings I would be most grateful if you would evaluate one of your supplier’s (Unipower Europe Ltd) performance to you based on the questionnaire enclosed. The items in the questionnaire are exactly the same as those completed by your supplier.  

**Feedback to Participating Firms**  

In return for your co-operation in completing the attached questionnaire I will make the results available to you in summary report form. To help me do this efficiently, I would be most grateful if you would supply me with your e-mail address. This will also help me keep you informed of our planned industry conferences. Your e-mail address will be kept strictly confidential and will only be used for communications between our business school and you. It is normally sufficient to attach your business card to the returned questionnaire.  

I greatly appreciate your taking the time to assist me with this research. If there is any aspect of this research you would like to discuss, please do not hesitate to contact me.  

With kind regards  
Yours sincerely  

Jonathan Wilson. FCMA, MBA, MPhil.  
Lecturer - Corporate Strategy
Monday, 11 May 1998

Dear Mr Rogers

Please find attached a copy of a questionnaire that I sent you recently.

I would be most grateful if you would complete and return it to me as soon as possible.

I am attempting to cross validate performance ratings provided by (Unipower Europe Ltd), one of your suppliers. The items in the questionnaire are exactly the same as those completed by your supplier.

**Feedback to Participating Firms**
In return for your co-operation in completing the attached questionnaire I will make the results of this industry-wide study available to you in summary report form.

Please attach your business card to the returned questionnaire.

I greatly appreciate your taking the time to assist me with this research. If there is any aspect of this research you would like to discuss, please do not hesitate to contact me.

With kind regards
Yours sincerely

Jonathan Wilson.  FCMA, MBA, MPhil.
Lecturer - Corporate Strategy
Customer Responsiveness

Note: In answering all the following questions you will need to first think about and judge what the industry average performance on the attribute is and then assess what the supplier’s (named in the covering letter) performance is against this judgement.

4.1 Their ability to *consistently* meet *delivery/service promises* to you

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
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</thead>
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<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

4.2 Their ability to *change their operations* to meet your changed *volume requirements*

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Operating Unit</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

4.3 Their ability to *change their major product/service offering* to meet your changed *product/service specifications*

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
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</thead>
<tbody>
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<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

4.4 The effectiveness of your supplier’s pre-sale activities in *initially attracting your business*

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
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<td>7</td>
<td>6</td>
<td>5</td>
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</tbody>
</table>

4.5 The ability of your supplier to *retain your loyalty*

<table>
<thead>
<tr>
<th>Rating</th>
<th>Excellent</th>
<th>Industry Average</th>
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</thead>
<tbody>
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<td>7</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>
Cost, Productivity and Price

4.10 The unit **output costs** of the operations processes i.e. **operational efficiency**

(Tick one box to rate your supplier against the industry average)

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>7 6 5 4 3 2 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your Operating Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.11 The **level of output** to capital employed i.e. **capital efficiency**

(Tick one box to rate your supplier against the industry average)

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Industry Average</th>
<th>Poor</th>
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<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.12 The **level of labour cost** to output i.e. **labour efficiency**

(Tick one box to rate your supplier against the industry average)

<table>
<thead>
<tr>
<th></th>
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<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Your Operating Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.13 The **level of capacity utilisation**

(Tick one box to rate your supplier against the industry average)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Your Operating Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.14 The **prices charged** for your suppliers products/services

(Tick one box to rate your supplier against the industry average)

<table>
<thead>
<tr>
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<th>Well above Industry Average</th>
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Your co-operation in completing this questionnaire is much appreciated. **Your information will be treated in the strictest confidence.** If you would like a management summary of the research findings please provide the following information:

Person to whom the report is to be sent (attach business card):


Person to whom the report is to be sent (attach business card):

Position in company:

Company Name:

Company Address:

Company Address:

Company Address:

Post code:

Telephone Number:

E-mail address:

Supplier name:

**Please Return This Questionnaire to:**

Jonathan Wilson
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University of Surrey
Guildford
Surrey
GU2 5XH

Tel:-(UK) 01483 259347
Fax:-(UK) 01483 259511
E-mail: -j.wilson@surrey.ac.uk
APPENDIX 4 – Bloomberg results
COMPARATIVE RETURNS

<table>
<thead>
<tr>
<th>Securities</th>
<th>Crncy</th>
<th>Prc Appr</th>
<th>Total Ret</th>
<th>Difference</th>
<th>Annual Eq</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFC LN Equity</td>
<td>GBP</td>
<td>-37.97 %</td>
<td>-37.97 %</td>
<td>-160.47 %</td>
<td>-9.26 %</td>
</tr>
<tr>
<td>NMX Index</td>
<td>GBP</td>
<td>86.17 %</td>
<td>122.50 %</td>
<td>17.68 %</td>
<td></td>
</tr>
<tr>
<td>FTTRAN Index</td>
<td>GBP</td>
<td>44.34 %</td>
<td>44.34 %</td>
<td>-78.15 %</td>
<td>7.76 %</td>
</tr>
</tbody>
</table>

(* = No dividends or coupons)