Henley Management College/
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The Impact of Activity-Based Costing Techniques on Firm Performance

by

Tom Kennedy

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ABSTRACT

As management accounting has undergone a renaissance in the past decade, there is a need to understand more about the emerging role of activity-based costing in modern organisations. The evolution (Bromwich and Bhimani, 1989) versus revolution (Johnson and Kaplan, 1987) debate has enriched management accounting literature and practice without addressing if a clear and measurable benefit exists following on the adoption of an activity-based costing system.

This study focuses on that question. Its main purpose is to empirically investigate if the adoption of the activity-based costing set of techniques impacts a firm's relative performance. Previous research has tended to concentrate on either assessing the integrity of the ABC assumptions or on examining its application in a single case study situation.

The study was undertaken in the context of developments in market based accounting research. It incorporates a synthesise of the attributes/characteristics of the activity-based costing techniques with the shareholder value analysis framework.

The research model adopts a positivist quasi-experimental research approach. It was operationalised by way of an association study with control exercised through a rigorous matching process. Data was gathered using a questionnaire from the top *1,000* publicly quoted firms in the UK. The analyses involved compiling three different data sets and assessing their performance using a range of market and accounting based measures.

The results indicate strong support for a positive causal link between the adoption of the activity-based costing techniques and firm performance. The activity-based costing techniques were seen as the driving force behind the superior performance of the firms that adopted them. Their contribution is interpreted in terms of enhanced product cost accuracy, more comprehensive cost data and information for managerial decision-making. The results are remarkably robust across all data sets and measurements methods used.

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CHAPTER 1

1. Introduction

1.1. Background to Study

Given a number of years of senior management experience in the application of sophisticated costing systems and a subsequent career move to an academic environment, the author was interested in pursuing a research issue that would attempt to link the theory and practice of management accounting. This interest in management accounting and, in particular, the role of costing systems in modern organisations was also developed through the completion of a graduate dissertation (Kennedy, 1992) on the influence of selected organisational variables on the management accounting function. That research study evaluated the application of management accounting activity in a large number of organisations. The conceptual framework used was contingency theory (Gordon and Miller, 1976; Wooten, 1977; Keeley, 1978; Mealiea and Lee, 1979; Goodman and Sandberg, 1981) and led to the conclusion that two generic types of management accounting systems were evident: one which is highly bureaucratic and control oriented and one which is more organic, flexible and task oriented.

Extensive academic debate continues to take place on the origin and usefulness of contemporary management accounting techniques and the role of costing systems in a constantly changing modern environment. In particular, the birth of activity-based costing (ABC) in the mid 1980s and the subsequent evolution versus revolution debate (Bromwich and Bhimani, 1989) enriched management accounting literature and practice. This debate focused on the contribution that activity-based costing techniques (ABCTs) make to the performance of the organisation. Consequently this research study is firmly located in the contemporary management accounting literature and ABC in particular.

1.2. Importance of Study

As management accounting has undergone a renaissance in the last decade, there is a need to understand more about the emerging role of ABCTs in modern organisations. Much of this change has been attributed to the pioneering work of Robert Kaplan and Robin Cooper in a U.S. based series of case studies in the mid 1980s. The core of this renaissance has involved the deployment of a new costing system called ABC and the application of the ABCTs. It is based on "a methodology that measures the cost and performance of activities, resources and cost objects" (Raffish and Turney, 1991).

Despite this renaissance many firms continue to use traditional volume based allocation methods as a fundamental part of the design and operation of their costing systems. The application of these systems affects inter alia, inventory valuation, product mix, pricing and make or buy decisions to mention just a few. Consequently many of today's firms are trying to manage current manufacturing processes with 1940s accounting systems (McIlhattan, 1988).

There is an ongoing debate as to the contribution the ABCTs can make to the management of the organisation. On the one hand, they can be seen to make a minor contribution in a narrow and ad hoc fashion. On the other, they have the potential to be totally integrated with other management information systems and to be central to all strategic thinking within the organisation. The author believes that this study is the first one to develop a quantitative model of the relationship between the adoption of the ABCTs and firm performance. Its prime purpose is to empirically test the nature of that relationship in the context of the underlying finance and management accounting literature. It is hoped that it will serve as a benchmark for future research activity and better inform the link between theory and practice in this area.

The question of whether there is a causal link between a significant management accounting initiative such as ABCTs and firm performance is of paramount importance. This is due to the lack of empirical evidence in this area and the conflicting results of the conceptual and field studies undertaken to date. Previous research

has tended to concentrate on either assessing the integrity of the ABC assumptions, or on examining its application and implementation in a single case study situation. Consequently, there is a need to understand if this new system of cost accumulation and analysis has a positive impact on firm performance, given that its proponents contend it can provide more accurate information than the traditional volume based costing systems. This understanding will allow research to move beyond the descriptive stage to that of hypothesis testing. It will determine if the ABC process can stand up to rigorous academic analysis.

Further, this study should contribute to the development of ABC as a framework and address a number of criticisms raised about the logic of ABC and its underlying philosophy. The results of this study should better inform choice amongst alternative costing and information systems. In time it should help to bridge the gulf between current theory and practice in management accounting generally.

There is also a need to see if firms are adopting the ABCTs and what was their experience with the process. Related questions, outside the scope of this study, such as the ability of the ABC approach or philosophy to become a promoter or enabler of change in the organisation or indeed a catalyst for industrial survival, growth or employment are worth considering. Ultimately, the question of whether ABC is a better metric for capturing the true financial health of the organisation or if it improves significantly the quality of its information system should be on the agenda. Allied to that is the need to understand why certain organisations are more receptive to new systems of cost accumulation and the consequences these systems have on their performance.

On a broader dimension, the question of whether the ABC approach represents a truly innovative technique that is made possible by the advent of cheap computational resources or was simply in the right place at the right time is worthy of consideration. This contrast has been suitably described as the progressive technical model of accounting versus the historically contingent model debate. Finally, there is a need to articulate clearly the attributes of this new phenomenon and to put them in context with the other developments taking place in organisations generally.

In summary, therefore, this research study should contribute to a better overall understanding of the contribution or otherwise of the ABCTs in modern organisations. In the process it seeks to confirm the academic credibility of the phenomenon and facilitate the discovery of its "real" potential. Finally, it contributes to an assessment of whether the adoption of the ABCTs gives genuine and lasting benefit to a wide range of organisations.

On a personal basis this study is inextricably linked to the decision to seek and then accept a place on the Henley Management College D.B.A. programme. Those decisions were driven by a desire to complete a rigorous research process under expert supervision and culminating in a thesis of doctoral standard. The subject of this study is based on an area of personal interest and is particularly prominent in the literature. It is also of growing importance in the practice of management accounting and should give the author the opportunity of undertaking further research studies as part of a long term academic career development programme.

1.3. The Key Research Problem and Hypothesis

Underlying most business decisions is the availability and relevance of accounting information. In recent years traditional volume based costing systems have been the subject of much criticism, especially in relation to the accuracy of product costing. The emergence of ABC is seen by many as a response to the needs of management for a management accounting process which is supportive of the organisation's strategy of being highly competitive in an international business environment.

The evolving framework of activity-based management is the term which has developed from the earlier approaches to ABC and is designed to denote its much wider use than just for product costing. Given the fact that activity-based approaches have received significant attention and appear to influence the development of new performance measurement frameworks, it is important to move beyond the descriptive stage and conduct rigorous academic analysis. Further, as ABC is still in its infancy very little empirical testing has been done to date. There is the added danger that one

could get caught up in "flavour of the month" techniques marketed by well meaning but mercenary organisations with obvious self interests to pursue. This is of special importance, since otherwise ABC may be dismissed as yet another management fad.

This study concentrates on asking the general research question: "is the introduction of ABCTs associated with significantly improved or increased firm performance?". This leads to the null hypothesis of interest:

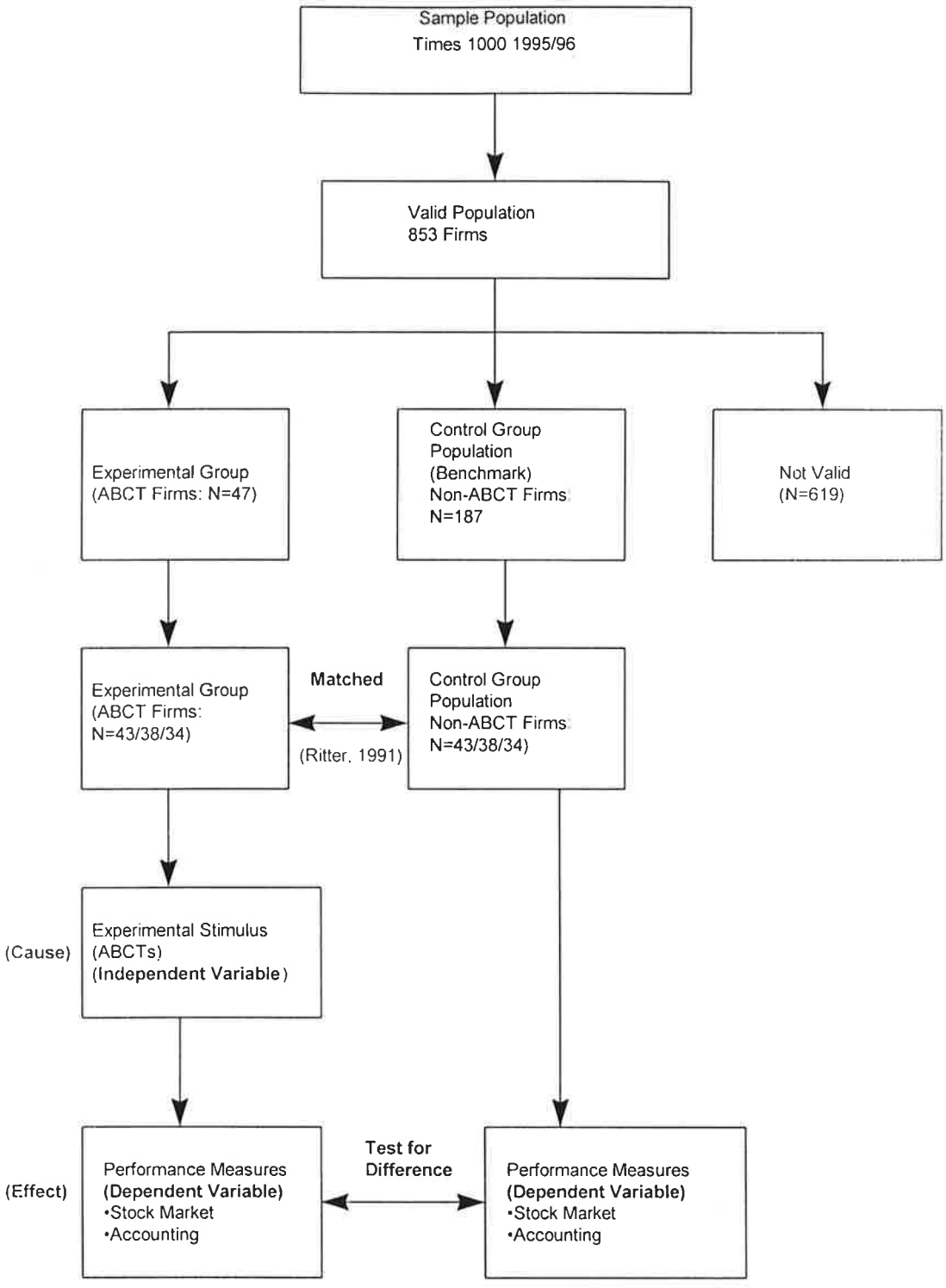
> H_o: *The adoption of ABCTs does* ***not*** *significantly improve a firm's relative performance.*

This is then expanded into a statistical hypothesis and tested by using a quasi-experiment association study methodology within a positivist and empiricist research framework. The research model is presented graphically in Figure 1.1.

The research approach adopted is in keeping with the dominant research focus in management accounting of *a priori reasoning* or deductive analysis. It involved using market and accounting based measures to compare the performance of a set of matched firms drawn from the top 1000 UK firms in 1995 and 1996. The basis for the hypothesis is shown in Chapter 3 and the detailed research methodology in outlined in Chapter 4.

This approach is deemed to be objective, precise, logical and not context bound. It is free from individual values and beliefs. It has the potential to impute causality to an existing theory. The study involved the testing of well defined concepts and propositions (ABCTs). It was possible to isolate the experimental variable (ABCTs) through a survey instrument. It is easily replicated with the added confidence in terms of validity and generalisability of the findings. The author recognises that the methodology would not be acceptable to some cultures and interpretative researchers in the context of the overall epistemological debate.

Figure 1.1. The Research Model



1.4. Theoretical and Contextual Framework

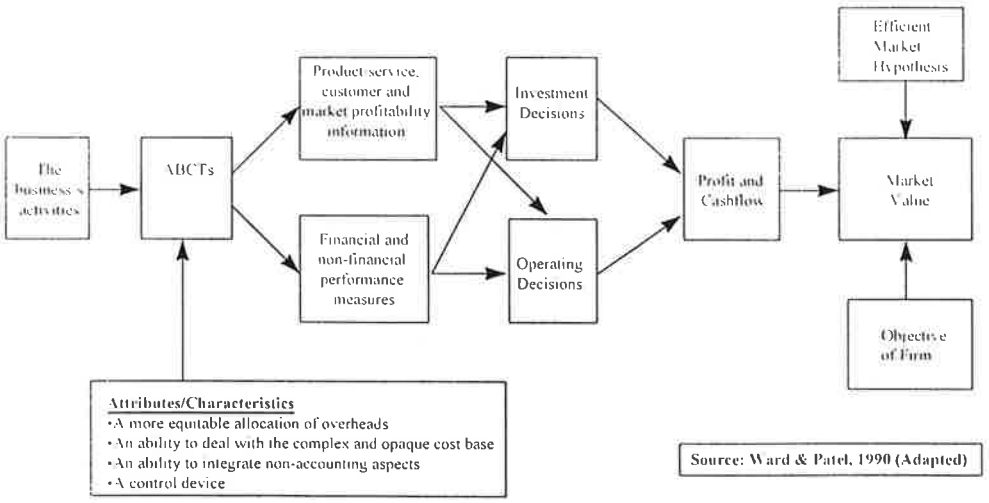
This study was undertaken in the context of developments in market based accounting research and the assumption that capital markets react rationally to the release of information. The framework in which the users of this information interact with the capital markets is operationalised in market terms by the firm's stock price. The stock price is considered to be the ultimate arbiter of managerial performance. This relationship between publicly available information and capital markets has been well documented since the seminal work by Ball and Brown (1968) and Beaver (1968). Subsequent empirical research in the US by Rayburn (1986), Wilson (1986, 1987), Bowen et al. (1987) and others confirmed the explanatory power of earnings and cash flow information on stock returns. Recent research by Madani (1995) documents the complementary signals given by accrual earnings and cash flows relative to stock valuation in the UK market. From another perspective a wide range of information is provided for internal decision-making purposes. Its value and quality should contribute to the operational and investment decision making processes of the firm. This, in turn, should impact on the overall value of the firm.

Specifically this study examines the relationship between internally generated information through the adoption of activity based costing techniques (ABCTs) and overall firm performance. It is in keeping with the Cooper and Kaplan (1992) view that "the goal of ABC is to increase profits, not to obtain more accurate costs". A model of this relationship is presented in Figure 1.2. It is an extension of Ward and Patel`s (1990) model of competitive advantage. It falls within the behaviour-of-the-market paradigm in attempting to assess the explanatory power of an additional or alternative information variable or process. It incorporates the widely accepted finance paradigm, that the objective of the firm is to maximise shareholders` wealth (Copeland and Weston, 1988) with developments in capital market theory, such as the efficient market hypothesis (Fama, 1970).

In this study, the author views ABC as another new 'technology', a new way of thinking with the potential to offer insights into how to better manage the organisation. According to Yoshikawa et al (1993) "it can provide information relevant to the control and monitoring of

operations,.....it can provide guidance at the tactical level of managerial policy, ...and it can also benefit management in the establishment of strategic policy". It is just one of the many cost management systems that the firm could adopt in the context of the dynamics of its environment and management style. Therefore, the ABCTs are another set of techniques or tools that a firm can choose to use in order to achieve best practice in cost management systems and strategies. This, in effect, means that the application of the ABCTs are seen in a broad and flexible manner consistent with the findings of Friedman and Lyne (1995). The ABCTs have the potential to inform the judgement of the firm's management in a real way and become a fundamental part of the decision making philosophy of the firm. They could be the basis upon which critical investment and operating decisions are made in furtherance of the firm's goal to maximise shareholders wealth or value. These decisions have a direct impact on the firms profit and cash flow results. Recent research has established the relevance of both profit and cash flow for stock valuation. This aspect is shown graphically in Figure 1.2. together with the author's view of the key attributes or characteristics underpinning the ABCTs.

Figure 1.2. The Link between ABCTs and Market Value



Finally as the introduction of the ABCTs is not a discernible event, like an acquisition decision or an earnings announcement, an instantaneous response to their introduction would not be expected. Therefore an "optimal" performance assessment window of three

years was used to capture the effect, if any, their introduction had on firm performance. This recognised the potential "lag" effect of introducing a new set of techniques or tools and the anomalies that have been empirically evidenced in capital market literature. It was based on the growing evidence of long-term trends in stock market prices. While most empirical evidence of this phenomenon is from the U.S., Levis (1993) has shown similar evidence for the U.K. stock market.

1.5. Description of Research Tasks

In carrying out this study the following key tasks were undertaken and are presented in chronological order as follows:

⇒ An extensive review of the contemporary management accounting literature and, in particular, that in regard to activity-based costing, and the related concepts of activity-based management and shareholder value analysis.

⇒ Development of theoretical and contextual argument underpinning the link between ABCTs and Market Value as depicted in Figure 1.2.

⇒ Synthesis of key attributes or characteristics of the ABCTs as a basis for the generation and statement of the hypothesis.

⇒ Arriving at a decision on the appropriate research approach and strategy after a discussion of the "set of dilemmas to be lived with". This gave rise to the Research Model depicted in Figure 1.1.

⇒ Deciding on the best research instrument and sampling frame for a study of this type.

⇒ Preparation and pilot testing of the research instrument chosen.

⇒ Compiling and editing the 1995 and 1996 *Times 1000* top UK firm listings.

⇒ Preparation and mailing of the final questionnaire and cover letter, under Henley Management College headed paper, to 853 firms. This included a pre-paid reply envelope facility and setting up of fax response point.

⇒ Monitoring of postal responses and carrying out commitment to telephone all non-respondents within the stated timeframe, together with follow-up documentation, as appropriate.

⇒ Detailed analysis of firm responses, using both *SPSS* and *Excel* software.

⇒ Matching the ABCT firms with the non-ABCT firms under three different headings using *Excel* and *Access* software.

⇒ Writing macros to access the market and accounting based measures of performance for the ABCT and non-ABCT matched firms.

⇒ Running macros to download the empirical data from the *Datastream* database.

⇒ Calculation of long-run market based performance of the ABCT firms and the non-ABCT firms for three years after the adoption of the techniques by the ABCT firms, using the average returns (AR) and average holding period returns (AHPR) methods. This was done for three different data sets, namely market capitalisation, market to book and net total assets.

⇒ Calculation of long-run accounting based measures of performance for the ABCT firms and the non-ABCT firms. This was done for the three different data sets and under a number of conventional accounting ratio headings.

⇒ Conducting a number of robustness tests on the market based measures of performance. This involved using the cumulative average returns (CAR) method, the FTSE all share index as a benchmark and calculating the two year pre-adoption performance of the ABCT and non-ABCT firms.

⇒ Carrying out a wide range of statistical analysis and tests on all the market and accounting based performance measures, using *Excel* software.

⇒ Writing up of thesis document for submission.

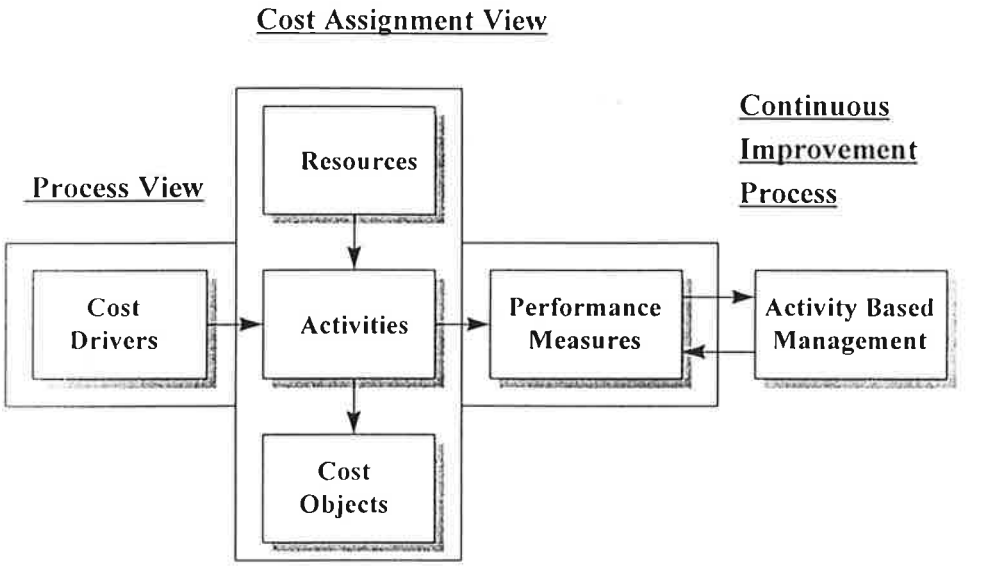
1.6. Definitions - What is an ABC system ?

ABC, by focusing on the activities required to produce each product or service, purports to correct the shortcomings of the over-generalised cost systems of the past. It has been defined by the USA Institute of Management Accountants (1993) as "a cost-accounting concept based on the premise that the products and services provided by an organisation require that organisation to perform activities and that those activities require the organisation to incur costs". Cost drivers are then used to calculate the cost of each activity as a basis for calculating the cumulative cost of each product or service.

The USA Institute of Management Accountants (1993) define activities as " processes or procedures that meet a particular work need of the organisation" and cost drivers as the "measurable factors used to assign costs to activities, products, or services".

ABC evolved out of the perceived inadequacy of traditional volume based product cost systems in an environment of increased competition, product mix diversity and manufacturing automation. Its aims are to determine the underlying "driver" of the activities, to establish cost pools related to individual "drivers", to develop costing rates, and to apply costs to products on the basis of resources consumed (drivers). It is presented in this study from a process rather than a cost assignment perspective as depicted in Figure 1.3. This views processes as consisting of a number of activities that are performed to satisfy customer requirements and ultimately are reflected in market and accounting based performance measures.

Figure 1.3. Two Views of ABC



Source: Turney, 1992

1.7. Structure of Thesis

The structure of the thesis is as follows:

Chapter 2 reviews the contemporary management accounting literature by way of presenting a broad contextual framework for this thesis. It includes a presentation of the empirical work to date in regard to the subject matter of this thesis, namely activity-based costing.

Chapter 3 provides a discussion of the theoretical argument underpinning the efficient market hypothesis and a number of anomalies. It synthesises the key attributes or characteristics of the activity-based set of techniques in the context of developing the hypothesis to be tested.

Chapter 4 summarises the research methodology and strategic/design issues that were considered in carrying out this research study. It includes a description of the research approach adopted.

Chapter 5 details the process of data collection and summarises the questionnaire response data.

Chapter 6 presents a detailed analysis of the market and accounting measures of performance for the firms matched by market capitalisation. It concludes with an interpretation of these results.

Chapter 7 presents a detailed analysis of the market and accounting measures of performance for the firms matched by market to book. It concludes with an interpretation of these results.

Chapter 8 presents a detailed analysis of the market and accounting measures of performance for the firms matched by net total assets. It concludes with an interpretation of these results.

Chapter 9 presents the major research findings of this study and its contribution to the development of the ABC concepts in practice. The limitations of this study are then addressed before concluding with recommendations for future research in this area.

CHAPTER 2

2. LITERATURE REVIEW

2.1. Introduction

A review of the contemporary management accounting literature confirms the view that it has undergone a renaissance in the last decade or so. While much of this has been attributed to the pioneering work of Professor Robert Kaplan and his colleagues there is a lack of unanimity on the nature and substance of these developments. What is not in dispute is the fact that the business environment and its management information needs have changed dramatically during that period. This has led to the generally accepted view that management accounting systems have not kept pace with these changes.

The literature presents an evolutionary or revolutionary approach, depending on your perspective. Either approach has seen the ABC framework as the core and given rise to other developments such as activity based management (ABM) and shareholder value analysis (SVA). These developments are part of a wider framework which has facilitated the acceptance and adoption of the ABCTs such that it is now appropriate to move from the descriptive stage to that of hypothesis testing.

The core of this renaissance has involved the deployment of new costing systems in organisations of which activity-based costing (ABC) is but one approach. The purpose of this section is to review the contemporary management accounting literature and ABC, in particular. It is being done in order to organise the theoretical and empirical material in this area, to evaluate the contributions of others, to identify trends and to define areas of theoretical weakness. The review forms the background theory to the general research question "is the introduction of ABCTs associated with significantly improved or increased firm performance"?

This section is structured as follows. It will deal with the question of definitions at the outset and offer a traditional paradigm as a reference framework. That is followed by a brief review of the historical development of management accounting and the changing business environment generally. This is deemed appropriate in order to provide a contextual framework for what is to follow. The fundamentals of a traditional volume based costing system are then summarised as a basis for addressing the question of its perceived obsolescence and the process of change taking place in the management accounting literature. The next section will focus on the emergence of ABC and its recent popularity. That is followed by a review of the subsequent development of the ABC concept into the more all embracing framework of ABM and related initiatives. Given the assertion that ABC can provide the basis for making sound investment and operating decisions, the concept of SVA as part of the process of achieving long-term sustainable competitive advantage is then reviewed. Finally, as ABC is not without its critics this aspect is summarised before concluding with a summary of the significant prior research that has been undertaken.

2.1.1 Definition and Traditional Framework

In order to understand management accounting it is necessary to understand the assumptions and reasoning behind the various frameworks that have driven research in that area over the past two decades. There is no one prescription as to which is best. The problem begins with trying to agree on a "true" definition of management accounting. Puxty (1993) offers the first two possibilities and Arnold and Hope (1983) the third;

1. "Management accounting is a set of social practices that delineate the space within which the activity of the workforce might be made visible and susceptible to rational calculation".

2. "Management accounting is an instrument within an enterprise that facilitates the exploitation of, and extraction of surplus value from, its employees by the capitalist interests that, through management, control the accounting system".

3. "Management accounting is concerned with the provision of information to those responsible for managing businesses and other economic organisations to help them in making decisions about the future of the organisation and in controlling the implementation of the decisions they make".

None are self-evidently right or free of the values held by those who propose them nor are they assumed to be mutually exclusive. Different writers adopt different approaches and are the outcome of different traditions. Some adopt the London School of Economics tradition, others take an organisational control perspective while others adopt the conventional approach of the professional management accountant. Notwithstanding these differences there is considerable consistency in the content of management accounting literature such that it is possible to categorise them under one general framework or paradigm. This has been labelled the traditional paradigm with a number of common characteristics best summarised by Puxty (1993). These include the view that management accounting is framed from the perspective of the organisation, it tends to treat the organisation as effectively a closed system, it has a technical orientation, it is prescriptive, it is ahistorical, it is apolitical, it is rationalistic, it is functionalist, it is reductionist, it is positivist and it is problem-centred.

This is in contrast with what many authors see as the main focus of management accounting research. They see it as an attempt to understand what is happening outside the traditional confines of the economic-based framework and work from the assumption that management accounting is important in its ramifications and social impact and is not just a collection of techniques. Perhaps as a compromise and in the interests of clarity throughout this study one can adopt the normative definition put forward by Wilson and Chua (1993):

> "Managerial accounting encompasses techniques and processes that are intended to provide financial and non-financial information to people within an organisation to make better decisions and thereby achieve organisational control and enhance organisational effectiveness."

2.1.2 Historical Development of Management Accounting

The historian E. H. Carr writes, "The past is intelligible to us only in the light of the present; and we can fully understand the present only in the light of the past." However, until recently, management accountants have shown little awareness of the relevance of historical understanding to current issues. The history of management accounting, if considered at all, was seen as being concerned with how management accounting progressed from meagre beginnings in nineteenth-century factories to playing an important role in the running of twentieth-century business enterprises (Loft, 1991). Interest in the history of management accounting has been growing since the publication in 1987 of Johnson and Kaplan's provocatively titled "*Relevance Lost: The Rise and Fall of Management Accounting*".

Historians have demonstrated that accounting reports have been prepared for thousands of years. Book-keeping records, dating back to ancient civilisations have been found engraved on stone tablets. Five hundred years ago, a Venetian monk, Fra Pacioli, described the basis for a well functioning double-entry book-keeping system. The demand to record information on commercial transactions has existed for as long as people have traded with one another in market exchanges. However, the demand for management accounting information - information about transactions occurring within organisations - is a much more recent phenomenon. Before the early nineteenth century, virtually all exchange transactions occurred between an owner - entrepreneur and individuals who were not part of the organisation: raw material suppliers, labour paid by piecework, and customers. Transactions occurred in the market and measures of success were easily obtained. The owner - entrepreneur needed to collect more cash from sales to customers than was paid out to suppliers of the production inputs, primarily labour and material.

Before the coming of the factory, all intermediate components going into a manufactured product were market priced outputs. Market prices provided the necessary information that the merchant needed to conduct business - to decide what to sell and at what price. The double-entry bookkeeping which developed was merely a way of keeping records of money owing and owed (Johnson, 1983). Take

the textile industry as an example, nearly every process was sub-contracted and a market based price paid for the output, i.e. spinners were paid per pound for yarn, weavers paid per yard of cloth and assemblers paid per unit. The merchant - entrepreneur co-ordinated the flow of the output from raw fibre to finished fabric or garment. They did not have to motivate employees to improve efficiency or productivity. Workers had a natural inclination to use their time efficiently when paid in the market for each unit they produced; however, they had no automatic incentive to pursue the same goal when paid a fixed wage per period. Managers in the new factories thus had to monitor employee performance. Cost information was used to evaluate internal processes and encourage workers to achieve company productivity goals.

As a consequence of the Industrial Revolution and the ability to achieve gain through economies of scale, it became efficient for nineteenth century owners to commit significant sums of capital to their production processes. In order to gain maximum efficiency from their capital investment, owners hired workers on a long-term basis, rather than bearing the cost and risks of continual spot contracting. The long term viability and success of these "managed" organisations revealed the gains that could be earned by managing a hierarchical organisation, as opposed to conducting all business through market transactions. Early examples of successful, hierarchical organisations in the United Kingdom are the textile mills and the railway and steel companies.

A new demand for accounting information arose in order to be able to determine the "price" of output from internal operations which had previously been purchased from outside the organisation. Owners devised measures to summarise the efficiency by which labour and materials were converted to finished products and which would also serve to motivate and evaluate the managers who supervised the conversion process. These measures were especially important since the factories were frequently located a considerable distance from the central office of the owners.

These early management accounting measures were simple and seemed to serve well the needs of owners and managers. They focused on conversion costs and produced summary information

such as costs per hour, or cost per pound produced for each process and for each worker. The measured costs included labour and material and involved some allocation of overhead. The objective was to identify the different costs for the intermediate and final products of the firm and to provide a benchmark for measuring the efficiency of the conversion process. The information was also used as a basis of developing productivity incentives for workers.

By the middle of the nineteenth century, great advances in transportation and communication (railway and telegraph) provided further opportunities for gain to large organisations. These enterprises could bulk buy raw materials and distribute finished products over much larger geographical areas. None of this could have been achieved without effective management accounting systems which co-ordinated the logistical, conversion and distribution activities of these enterprises. The railway companies invented new procedures to control the receipt and disbursement of cash and developed extensive summaries of their internal operations and performance. Measures such as cost per ton-mile were created and reported for each major segment of operations. The operating ratio, i.e. the ratio of revenues to operating costs, was developed both to measure the profitability of various segments of business-passenger versus freight and to evaluate the performance of managers.

Improved transportation and communication permitted the growth of large distribution enterprises, particularly retail stores such as Sears and Woolworth's. These organisations required information on the effectiveness and efficiency of their purchasing, pricing and retailing activities. For these activities, measures such as gross margin by department, selling revenues less purchasing and operating costs and inventory turnover were created. These measures existed to evaluate the efficiency of internal processes and not to measure the overall "profit" of the enterprise. As a result management and financial accounting systems operated independently of each other.

By the beginning of the twentieth century manufacturing cost systems provided information relevant to a wide range of decisions about economies of scale (efficiency) and opportunities for scope (product differentiation). Some of the systems which were designed to trace costs accurately to diverse lines of products disappeared

after 1910, perhaps due to their high cost-to-benefit ratio. Existing information processing technology at that time made it costly to trace accurately the resources used to make each diverse product in a complex manufacturing plant. This must be seen against the background of an increasing diversity of products and complexity of manufacturing processes. Thus the need for more accurate product costs and effective process control should have imposed new demands on the organisations management accounting systems. The failure of these systems to keep pace with the evolution of product and process technologies eventually led to their "lost relevance" according to Johnson and Kaplan (1987).

Two new management accounting techniques called budgeting and return on investment (ROI) were developed in the early years of the twentieth century to assist the top managers of large multi-activity firms in dealing with the problems of control and motivation. Budgeting is primarily a planning process with the primary objective of co-ordinating the various segments of the organisation. It started out as essentially a technical process and was operated as a formal rational means of communication and control. It later developed a behavioural dimension as a result of a number of studies that set out to explain the impact it had on the individual and the organisation. This aspect views budgeting not just as a rational allocation and control model but as a form and source of power with a strong political perspective.

ROI focuses the attention of managers on the productivity and performance of capital. Nineteenth century single-activity firms had tended to ignore how well capital was being used once it had been purchased. With the growth and diversity of firms and the development of the capital markets generally, the efficient management of capital became a driving force in the firm. Just as the calculation through cost accounting systems of such figures as cost per labour-hour drove the search for labour-saving efficiencies, the calculation of ROI drove a search for more productive opportunities to use capital. These mechanisms were designed to harmonise the actions of individual departments with the overall goals of the firm.

By the mid 1920s American industrial firms had developed virtually every management accounting procedure known today; cost

accounts for labour, material, and overhead; budgets for cash, income, and capital, flexible budgets, sales forecasts, standard costs, variance analysis, transfer pricing and divisional performance measurement. It is around that time that Johnson and Kaplan (1987) contend that the pace of innovation seemed to stop. Up to that point managers invariably relied on information about the underlying processes, transactions, and events that produced the financial numbers. About 1925 a subtle change occurred in the information used by managers to direct the affairs of complex hierarchies. Product costing in manufacturing firms was replaced by a cost accounting system which did not attempt to trace each products consumption of resources for cost management purposes (Loft, 1991). Thereafter, managers came to rely more and more on the inventory cost information prepared for financial statements as their basic information source and used them, irrelevant or misleading as they were, for strategic management purposes. In assigning responsibility for this change Johnson and Kaplan (1987) suggest, rather provocatively, that it was due to the dominant influence of the American university departments in advocating "management by numbers". To a somewhat lesser extent they mention the role played by the auditing profession in its search for objective, auditable, verifiable and conservative inventory valuation figures, and the often cited perceived negative cost versus benefit trade-off scenario.

The history of cost accounting in the United Kingdom during the First World War and the years immediately following, when the practice of cost accounting spread rapidly, was examined by Loft (1986, 1988). This analysis highlights the important role played by government action due to the scale of production needed to support the war effort. The Ministry of Munitions became the biggest buying, importing, selling, manufacturing and distribution business in the world and in effect controlled over three and a half million workers. Some factories were taken over by the government, but in most cases it allowed the original owners to run the business while controlling in detail what went on. The problem was what price should manufacturers be paid for what the government directed them to make, given that there was no normal market price? A regulation was laid down, that the price should be what it cost to make plus a margin for profit. Suddenly, the measurement of costs became far more important; manufacturers were forced to examine their costing

systems and the government set in process procedures for checking and analysing costs. Chartered accountants were employed by the government to administer this new law. This new emphasis on cost plus pricing and costing systems gave clerks involved a whole new importance. After the war high ranking clerks formed an association called the Institute of Cost and Works Accountants which was later to become the Chartered Institute of Management Accountants. Its aims were to be accepted as a professional accountancy body and to further the spread of scientific costing techniques.

Under the heading "management accounting: managed managers managing" Hopper (1988) looked at the development of management accounting during the present century. He wrote that Johnson and Kaplan's puzzlement with accounting developments post 1925, the period in which relevance was "lost", is due to the inadequacy of their analysis. He talks about the importance of the "control of labour" and sees this as the decisive factor that led to the introduction of internal accounting controls. These controls came to dominate American and United Kingdom industry in the post Second World War period. Management itself grew to such an extent that it needed managing. Accounting, through budgets and related controls, was crucial to this, hence the title "managed managers managing". The ensuing bureaucracy was not an inevitable consequence of efficiency but rather an extension of the separation of knowledge from production, leading to a division of labour between management and production workers. Management accounting controls such as budgets and ROI, Hopper (1988) argues, arose because of the need to exercise corporate control over the "managerial labour processes". The bureaucracy that this brought was not sought by capitalists because they were more efficient than market co-ordination. It was a cost which they had to suffer because of the need to control the labour process and gain more knowledge of the process in so doing.

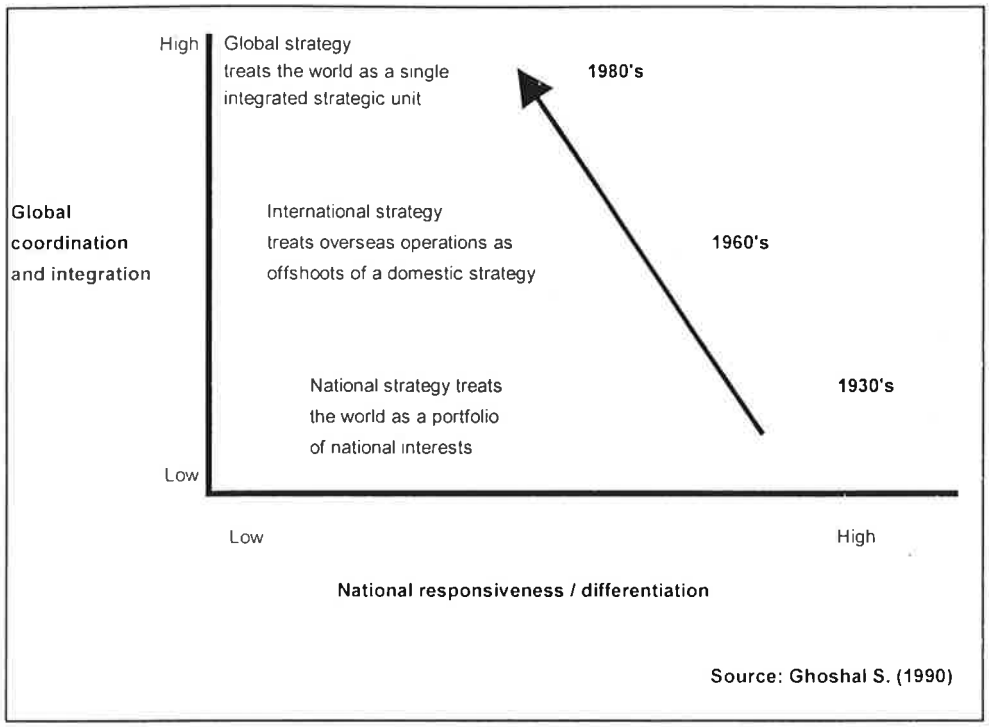
In the sixty year period to 1987 the main innovations in management accounting practice have been the adoption of discounted cash flows for evaluating capital investment projects and the development of the concept of residual income (RI), i.e. an extension to the ROI criterion. Against that background Johnson and Kaplan (1987) believe that management accounting systems have failed in their

responsibility to provide the appropriate information required to effectively manage the organisation through the changing manufacturing environment. They contend that in some instances the information reported by existing systems not only inhibited good decision-making, but may have encouraged bad decisions. Their history is written with a clear message. Management accounting had a golden age from the late nineteenth century to the early twentieth century; but lost its relevance from then onwards for organisations that had to survive in competitive world markets.

2.1.3 The Changing Business Manufacturing Environment

Traditional cost accounting systems are criticised today on the grounds that they do not provide useful information for internal decision-making. These systems have failed to keep up with increasing demands imposed on them by the ever changing manufacturing environment (Morgan and Bork, 1993). Global competition has intensified in the last ten years and is likely to escalate at an increasing rate in the future. The pattern is not new, but the rate of change is. The late twentieth century is a time in which the number of companies taking an ever-more global perspective has risen steadily. Now companies must compete with the best in the world, even in their own domestic markets. Ghoshal (1990) in Figure 2.1. presents the trend towards globalisation, as organisations have worked towards a situation in which today, the world must be treated as a single, integrated market (Morrow, 1992). With globalisation, profits are coming under increasing pressure. The explosion in the rate of technological innovation means that product life cycles are collapsing. Shorter product life cycles affect every industry as companies must make decisions more quickly and speed up the rate at which they introduce new products to the market.

Figure 2.1. The Trend of Globalisation



To effectively compete in the global marketplace, organisations must completely understand the business processes required to support their goods and services in order to meet customer needs. Activities are the common denominator in the business process analysis. World class competitors will find it increasingly essential to understand how their business processes and therefore their activities perform against the "best in class" globally (Campi, 1992).

Kaplan (1988) believes that one cost system is not enough in today's competitive environment. Present cost systems have been designed to value inventory for financial, tax and statutory purposes. These systems have not provided management with the relevant, accurate and timely information they need to promote the operating efficiencies and measure product costs. Today, product lines and marketing channels have proliferated. Direct labour represents a small fraction of corporate costs, while expenses covering factory support operations, marketing, distribution, engineering and other overhead functions have exploded. The use of computer-aided design (CAD) and computer-aided manufacturing (CAM) techniques, just-in-time (JIT) manufacturing environments, flexible manufacturing systems (FMS) and advanced manufacturing technology (AMT) all require much more overhead expenditure and less direct labour.

Accurate knowledge of product costs, excellent cost control and coherent performance measurement are more important than they have been in the past (Johnson and Kaplan, 1987). Not every firm finds it desirable to compete by being the low cost producer, but even those firms that want to play a differentiation strategy by offering special features or services valued by their customers, need to know that the price premium they received for their special features more than covered their incremental cost to provide these features. Porter (1985) emphasises the importance of thoroughly understanding costs as the significance of any strength or weakness a firm possesses is ultimately a function of its position on relative cost or differentiation.

Advances in computer technology, especially personal computers, permit less costly analysis of cost data in different ways (Roth and Borthick, 1989). The challenge for today's competitive environment is to develop new and more flexible approaches to the design of effective cost accounting, management control and performance measurement systems (Johnson and Kaplan, 1987). The pace of change in manufacturing techniques and philosophies shows no sign of abating. For organisations competing in this dynamic global environment, the pursuit of continuous improvement in all aspects of their business will be necessary to remain competitive. This will include the development of world class approaches to performance measurement and cost management.

2.1.4 Fundamentals of Traditional Volume Based Costing Systems

The product costing technique used by most organisations is standard costing. This method uses standards for material and direct labour and then adds an allocation of overhead. The cost of any product therefore consists of the cost of material and direct labour, based on the standard amounts of each of these resources being used, plus an allocation for indirect expenses or overhead. The scientific manner in which traditional standard costing measures the materials and direct labour components of a product cost give an accurate measure of this element of cost. However it is the allocation

of overheads to particular products that has been subject to questioning in recent years.

Under traditional methods, overhead is usually charged to individual products using a "two-stage" allocation process (Drury, 1989). The first stage allocates overhead costs to production departments based on an appropriate measure of activity (such as floor space for rent or rates or number of employees for human resource costs). This stage is usually accurate, provided the activity measure used reflects the amount of overhead resources consumed by each production department. Once allocated to the production department, overhead costs must be assigned to individual products based usually on some measure of output of the production departments. The most commonly used allocation bases are direct labour hours or direct labour cost. Simple volume of product output and machine hours are also used widely. It is this aspect of overhead allocation that has caused so much debate. Another factor in the debate is that in many organisations overhead costs are not allocated at all and therefore not included in product costs.

2.1.5 Perceived Obsolescence of Traditional Volume Based Costing Systems

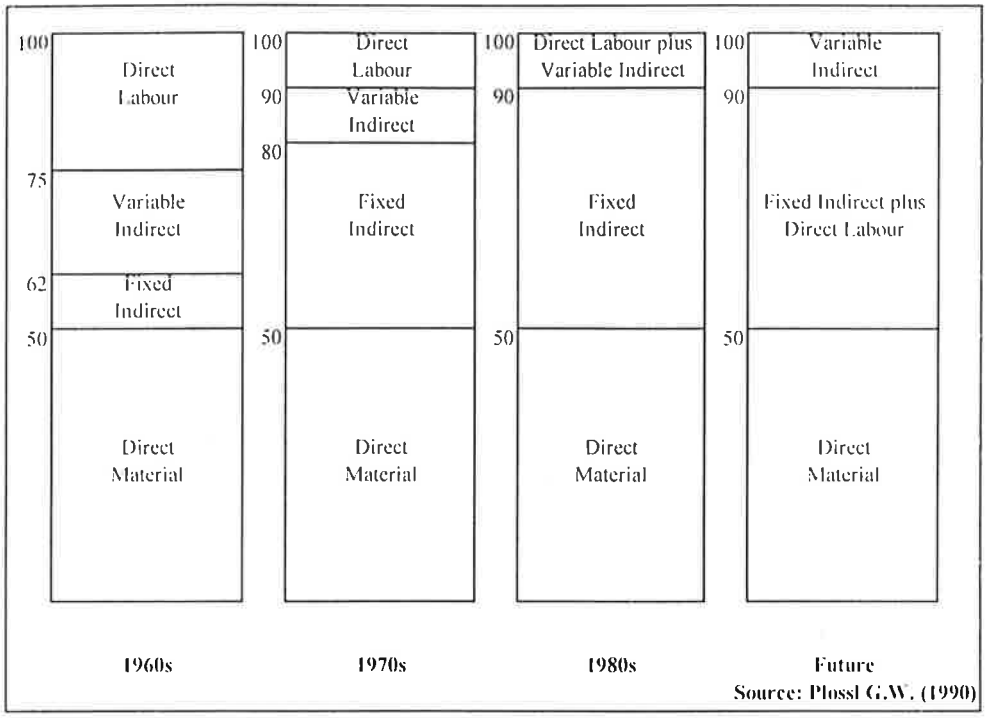
The flood of publications and seminars on activity costing in the last few years suggests that companies suddenly encountered a need for better management accounting information in the 1980s. Both academics and practitioners argue that contemporary management accounting techniques have become somewhat obsolete in stating that "continued use of conventional cost systems can have serious dysfunctional consequences for cost information that is used within the firm" (Innes and Mitchell, 1990a). It has been shown that these conventional techniques, which originated in the late 1800s have not kept pace with the continuous changes in industry that have occurred during the past number of decades and that present day management accounting techniques are essentially the same as those which existed during the 1930s. These conventional techniques are not suited to the advanced manufacturing environments that exist today. Sheridan (1989) in commenting on Western management accounting practice noted that:

> "Tragically many companies spend their time on the sheer mechanics and arithmetic of allocations, building up cost cascades that are a wonder to behold but which are not easily understood by the recipients and add little to the decision process."

Kaplan (1985) argues that the traditional cost system treatment and understanding of overhead cost has become obsolete. He finds the approach of categorising indirect or overhead expenses into fixed and variable costs as erroneous. He states that most overheads are not fixed at all, but actually vary in the longer term, not with changes in output, but with changes in activity levels caused by changes in "the design, mix and range of a company's products and customers". Together with Cooper he refers to these costs as the "costs of complexity" and they conclude that only a very small proportion of costs in the modern manufacturing environment are really fixed (Cooper and Kaplan, 1988). Using volume related allocation bases alone to trace costs to products distorts repeated product costs if some of the product related activities are unrelated to volume. To accurately trace this volume unrelated cost, requires a system that costs activities and not products. Finally, they assert that this flawed conventional understanding of cost behaviour results in very little management attention being given to indirect costs, because they are perceived as fixed and therefore uncontrollable.

The simplified traditional measures of allocation were suited to the less complex manufacturing environments of the 1900s where direct labour accounted for a greater proportion of total costs and where distortions in product cost caused by the allocation of overheads was insignificant. Plossl (1990) reported on the changes in cost relationships in manufacturing industry in the USA and this is summarised in Figure 2.2. It is evident from his report that direct labour is now much less significant than hitherto; direct material costs have not changed much as a proportion of full cost and remain a significant element; while fixed indirect costs have increased markedly.

Figure 2.2. Cost Composition - Changes Over Time



The essential feature of the traditional method of product costing is to use volume as a basis for assigning production overheads to products. Clarke (1994) states "initially, production overheads are generally accumulated by department (cost centres) and are, in turn, assigned to products using, typically, direct labour hours. Such a system is that overhead costs are assigned in proportion to volume".

When this system was being developed, the manufacturing environment was characterised by throughput rates of production that were controlled by direct labour, slowly changing technology that resulted in long product life cycles and infrequent major design changes. Consequently, the managerial focus was on labour efficiency and resources other than labour were used to enhance the direct labour effort (Wilson and Chua, 1993). As labour was such a prominent cost to the organisation and varied according to throughput, labour hours or labour costs were consequently the most popular method of overhead absorption. The most striking difference with today's manufacturing environment has been the reduction in labour and the rise of indirect overheads as equipment replaces people in the manufacturing process.

In today's environment direct labour is now in the range of 5% to 15% of total manufacturing costs with overheads as high as 55% (Kim, 1994). This obviously gives rise to problems with the use of labour as a credible overhead absorption rate. Grady (1988) identifies four problems with using direct labour as an allocation basis, viz.,

1. Rapidly changing technology increases support costs and depreciation expenses while decreasing direct labour.

2. Little correlation exists between general price increases and the cost of labour.

3. Automation reduces direct labour but does not ensure a corresponding reduction in overhead expenses.

4. Using direct labour as an overhead allocation basis will result in labour intensive products receiving a disproportionate share of overhead.

Drucker (1990) reiterates this by describing how in a factory where 10% of costs are direct labour, "the remaining costs are allocated by ratios - that everyone knows are purely arbitrary and totally misleading - in direct proportion to a product's labour costs". He continues by highlighting a further problem with this system, namely that any process improvements are measured in terms of labour cost savings or on "some arbitrary allocation by which costs other than labour are accounted for". This he argues has the following effect: "traditional cost accounting can hardly justify a product improvement let alone a product or process innovation".

Wilson and Chua, (1993) indirectly support this view by stating that the bulk of cost reduction efforts are focused at savings in direct labour costs. Consequently, direct labour has become an insignificant portion of total cost and therefore an inappropriate base for recovering indirect costs. Despite this labour based overhead rates continue to predominate in manufacturing industry and is evidence of the failure of organisations to keep pace with the changing manufacturing environment. Wilson and Chua (1993) in discussing the consequences of using simple, traditional methods for

assigning indirect costs to products summarise their concerns as follows:

- Indiscriminate indirect cost recovery using a single base (e.g. direct labour hours) generates misleading relative product cost data, hence profitability data. They refer to the findings drawn from the comprehensive case study on Ajax Manufacturing Company, adapted from Shank and Govindarajan (1988), to support this view.

- Failure to understand either the activities being carried out by an enterprise and the costs that are created by those activities can lead to an unfocused approach to cost control.

According to Shank and Govindarajan (1993), there is little doubt that volume-based approaches represent a very serious shortcoming of most cost systems today. They state that approaches that assign large portions of total cost (overhead) using direct labour or machine hour allocation rules are inaccurate and strategically useless in complex line environments. That being said most companies now recognise that their cost systems are inadequate or inappropriate for today's competitive environment.

Traditional cost accounting systems are also criticised on the grounds that they do not provide useful information for internal decision-making (Roth and Borthick, 1989). Morgan and Bork (1993) talk about the failure of cost accounting systems to keep up with the changing manufacturing/service environment and Shank and Govindarajan (1993) stress the need to develop superior strategies en route to gaining sustainable competitive advantage. Contemporary management accounting cost systems aim to address three fundamentally different functions. In doing so they need to provide according to Kaplan (1988):

- Accurate inventory valuations for financial reporting purposes;

- Information on operational performance in order to ensure the optimal use of the organisations resources and

- Accurate product costs for strategic decision making and planning purposes. Product cost information is used to make strategic decisions on product pricing and product mix which have immediate effect on the revenues and hence the profitability of organisations.

To provide information for cost management, accounting systems need to be flexible enough to analyse data in different ways. This is not the case with most current cost accounting systems (Roth and Borthick, 1989). The traditional cost accounting techniques used by most organisations today address the function of inventory valuation for financial reporting quite well by providing accurate aggregate figures. Historically senior management have insisted on a single cost system and when compromises have to be made the demands of the financial reporting function (inventory valuation orientation) invariably triumph (Kaplan, 1988).

The second function of the cost system that of performance evaluation and operational control is addressed by traditional practice, through the use of budgets and variance analysis. Kaplan (1988) believes that the use of elaborate variance analysis often defeats its purpose. This is due to spending too much management time on explaining, sometimes irrelevant, variances over which the manager in question may have no control and by looking backwards with a negative and potential punitive orientation. Operational control is often supplemented by other non-financial measures of performance evaluation such as timely reports on yields, throughput times, quality and customer's satisfaction. These conventional methods achieve the aim of operational control much better and bring with them a more balanced and forward looking perspective.

The third function of the cost system is to provide accurate product costs for strategic decision making and planning purposes and this is where the real difficulty lies. In reviewing this aspect it is useful to present a historical perspective. After the first World War, managers came to rely more and more on the financial numbers themselves as their basic information source. Management by numbers became the norm (Loft, 1991). Product costing in manufacturing firms was replaced by cost accounting which did not attempt to trace each product's consumption of resources for cost management purposes.

This according to Loft (1991) is the crux of the problem of the "lost relevance" of management accounting. She asserts that the cost information that apparently aids financial reporting is misleading and irrelevant for strategic product decisions. How did this happen? The responsibility for the use of management accounting for valuing inventory was placed in the hands of auditors eager to produce objective, auditable, verifiable and prudent inventory figures so as to satisfy the capital market need for reliable financial reporting. Moreover the needs of the federal tax authorities to determine the tax liability of a corporation was a dominant consideration. Public accountants, as auditors, demanded that information in audited financial reports came from double-entry books that "integrated" all cost and financial accounts. All amounts reported in financial statements, whether they were period expenses or end-of-period assets, had to be traceable to the original (i.e., historical) costs of recorded transactions. Auditors were less interested in the relevance of product cost information for management decisions (Johnson and Kaplan, 1987).

The manufacturing environment that currently exists is much different to that of sixty years ago. Information technology and improved communications have created globally competitive industries. In order to remain competitive, firms are moving towards systems of 'world class manufacturing' (WCM). The achievement of this aim depends on the successful implementation of initiatives such as total quality management, reduced inventories (through the use of just-in-time), increased automation and advanced management systems (AMS) (Wilson and Chua, 1993). AMS is defined by Kim (1994) as;

> "a very complex system of machines, computers and people, developing and producing products with great efficiency."

For companies to be effective under the AMS environment as a whole, their manufacturing and organisational structures must become significantly different, both physically and functionally from those of the past (Kim, 1994).

The traditional costing systems have struggled to cope with the different demands placed on them by the development of new

management philosophy's such as total quality management (TQM). This management philosophy was first introduced in Japan by statisticians W.E. Deming and J.M. Juran soon after World War II. It is defined by Brimson (1991) "as a management strategy in which all business functions work together to build quality into their products and services". It aids competitive advantage by eliminating the work (and cost) of discovering and correcting errors. According to Pohlen (1993) the new information requirements that TQM places on management accounting systems create the greatest challenge to management accountants. Non financial data, such as defect rates, number of reworks, frequency and duration of machine breakdowns and number of customer complaints, are now being used by management as a means of operational control, a traditional role of costing systems. Management accounting must now look to supply this information to senior management as part of traditional operational control reporting mechanisms.

A separate means of relating cost systems to quality, is the area of quality costing. While Buzzell and Gale (1987) have shown how profits are a result of market share, they continue by establishing that market share is primarily the result of quality. However, the financial analysis of the factors that contribute to quality, quality costing, is rarely used, even though, according to Dale and Plunkett (1995), this could be as high as 25% of turnover. Juran (1985) advocates the use of a four part model to discern the elements of quality costs:

1. Prevention Costs	The costs of trying to prevent mistakes being made.
2. Appraisal Costs	The costs of checking whether mistakes have in fact been made.
3. Internal Failure Costs	The costs of putting right mistakes discovered in-house.
4. External Failure Costs	The costs of putting right mistakes discovered by the customers.

In addition to the new information requirements on costing systems, some academics have highlighted that traditional management

accounting systems and TQM are inherently conflicting. Drury (1996) proposed that variance analysis has caused managers to focus on higher output and lower purchasing prices irrespective of quality so that they can report favourable volume, efficiency and price variances. Furthermore, traditional cost systems include an allowance for "normal losses". This cost is then absorbed by "good" production and not reported as a separate item. Maskell (1988) also develops this point by saying:

> "A traditional Western company would budget for 8 per cent scrap with an aim to get no variances – if you come in on target, then that's fine. But it's not fine, the target should be zero scrap and the actual scrap rate will work as a constant reminder that improvement is required continuously until perfection is reached".

Grant et al (1994) describe how traditional accounting "hides" the cost of downtime due to poor quality parts in normal operating expense items. They contend that the system focuses on materials and labour and state that "typically these items are the least affected by TQM" while performance improvements made by TQM go undetected, including direct savings arising from lower inspection and maintenance.

In summary, therefore, the 1980s and the early part of the 1990s have been characterised by a dramatic change in the way that manufacturing companies operate. The far more competitive environment has had profound implications for cost management systems. Johnson and Kaplan (1987) state that "accurate knowledge of product costs, excellent cost control and coherent performance measurement are more important than they have been in the past". Traditional cost accounting has been unable to meet all the requirements of modern manufacturing and the various criticisms that have been voiced include:

1. Reduced labour and increased overheads have created unrealistic absorption bases. This generates misleading product cost data and is likely to lead to poor management decision making.

2. The role of costing has become more and more subservient to the requirements of financial accounting and tax reporting, where highly aggregated product costs are acceptable.

3. Process improvements that are not reflected in labour related savings are not recognised by traditional systems. This often leads to a lack of management support for new manufacturing techniques/capital expenditure.

This issue is not just confined to the manufacturing industry. The service industry, by adopting the traditional product costing techniques, is using techniques which maybe inappropriate for its information needs (Dearden, 1978). This sector is "not easy to define and includes a range of activities from dentist to dustman, policeman to publican and train driver to tax collector" (Mills and Cave, 1990). The factors of perishability, simultaneity, intangibility, heterogeneity and customer presence make the service product very different from its manufacturing counterpart. Allied to this is the increased dependence on non-manufacturing for growth and the inherent problems large organisations in that sector face in dealing with large fixed cost bases. That being said the service industry has characteristics very similar to those found in manufacturing. These include a highly competitive market, diversity of products and customers, and significant overhead costs not easily assigned to products or customers. It needs an accounting system that will help it understand how its competitive advantage is generated (Ward and Patel, 1990) and improve the management of the business as a whole (Clark and Baxter, 1992).

In contrast, the management accounting systems of Japanese organisations have contributed "mightily to Japanese competitiveness in global markets" (Hiromoto, 1988). The difference may be explained by the fact that the Japanese management accounting systems seem to be used mainly for control purposes while the Western management accounting systems are used far more for decision-making purposes. Consequently, the value of management accounting data is perceived to be greater to Western manufacturers as is the need to adopt a more strategic management accounting perspective. The dominant market focus on the other hand in the Japanese environment can be seen through the use of

target costing. This is the mechanism used to ensure long run profitability and maintain a competitive position (Morgan, 1993). It is appropriate at this stage to put this discussion in context by reviewing the process of change taking place in the last decade or so in the Management Accounting area.

2.1.6 Process of Change in Management Accounting

An insight into the forces underlying management accounting change is apparent from a contingency theory perspective. It attempts to provide an explanation as to why management accounting systems may differ from one organisation to another and why the design of the system may depend on its contextual and structural setting. It is based on the general premise that "... the particular features of an accounting system will depend upon the specific circumstances in which the organisation finds itself", (Otley, 1980). It is well summarised by Dermer`s (1977) explicit statement that:

> "The design of any planning and control system is situationally specific. The extent of this text is not to tell a system designer what should be done; rather it is to convey the fact that there are a number of possibilities that might be used in any particular situation....This text squarely faces the uncertain and contingent application of most of the activities and techniques which make up the planning and control system".

The "specific circumstances" comprise a set of contingent variables such as the firm's environment, its technology and its organisational structure. The contingency theory approach is, however, subject to several limitations and has many critics. It is primarily a static comparative analysis model and, as such, does not adequately identify or explain the factors that drive change. There is also no unanimity in defining the contingent variables and a lack of research in understanding the causes of management accounting change.

In addition, the role of strategic management accounting in relation to business strategy has been put forward in response to the universal cry that firms must become more competitive if they are to

survive on a global basis. Simmonds (1981) defines strategic management accounting as the "provision and analysis of management accounting data about a business and its competitors for use in developing and monitoring the business strategy". He emphasises the particular importance of relative levels and trends in real costs and prices, volume, market share, cash flow and the proportion demanded of an enterprise's total resources. The key notion here is that of an enterprise's position relative to competitors' positions. This suggests that there is a need to release management accounting from the factory floor to allow it help enterprises meet global challenges in product markets. Such a reorientation would permit management accounting additionally to focus on the firm's value added relative to its competitors. It could also aid in monitoring the firm's performance in the market place using a whole range of strategic variables over a decision horizon sufficiently long for strategic plans to come to fruition. Managers wishing to safeguard their organisations strategic position must know by whom; by how much and why they are gaining or being beaten. Conventional measures, such as profit, will not suffice. The emergence of a strategic cost management framework has also been appropriately summarised by Shank and Govindarajan (1993) under the themes of value chain analysis, strategic positioning analysis and cost driver analysis.

These concepts form the core of strategic management accounting and have been developed out of two economic theories. The first of these theories is concerned with the underlying attributes or characteristics of enterprise products Lancaster (1966, 1979). It suggests that there is a need for accountants to consider the cost structure of not only their own firm but of all enterprises in the relevant market and of potential entrants. It also suggests that the accountant might play a more important role in strategic decisions by costing these attributes or characteristics and monitoring their performance over time. This perspective provides a clear role for strategic management accounting in that the costs of the attributes of the enterprise's product strategies are often crucial to their sustainability and are intertwined with the other market characteristics.

The second novel economic perspective that is used to support a wider role for management accounting is a recently synthesised body of knowledge in the economics of industrial organisations. This theory of contestable markets presents the conditions for a firm's price and output strategy to be sustainable in the face of potential competition, concentrating on cost conditions (Baumol, 1982; Baumol et al., 1988). Advocates of contestable markets theory argue that the fear of potential competition can, under certain conditions, be relied upon to regulate the exercise of monopoly power by incumbent firms. Manes et al. (1985) provide a very clear introduction to this theory from an accounting perspective. The essence of contestable market theory is the need for maintainable cost advantages over rivals if the enterprise's strategies are to be sustainable. This finding provides additional support for strategic management accounting because it requires that the accountant extends cost analysis beyond the firm and reports on the cost structure of rival enterprises in order to help management make sensible decisions in competitive markets.

These two theories complement each other; one emphasising product characteristics other than cost and the other being concerned with product costs. They both stress the need for market oriented information for decision-making and provide a new focus that allows management accounting to contribute directly to what Porter (1985) has called the three generic strategies of product differentiation, cost focus and leadership in order to ensure sustainable competitive advantage. Child (1987) has also identified these strategies, though he sees them rather as strategic challenges which require the use of looser structured organisations in order to achieve greater flexibility in organisational response. He sees these organisational structures as relying heavily on developments in information technology, including wider and more detailed access to information external to organisational units.

Finally, the concept of SVA and the value-driver approach put forward by Rappaport (1986) is an attempt to ascertain how a firm is achieving long-term sustainable competitive advantage. This concept merits a more in-depth analysis and is dealt with separately later.

2.2. The Emergence of ABC and its Recent Popularity

2.2.1 Introduction

In their book, "Relevance Lost: The Rise and Fall of Management Accounting", Johnson and Kaplan (1987) identify problems associated with traditional management accounting techniques, particularly those in the area of product costing. The title of their publication is an allusion to Milton's *Paradise Lost* from which they use the following quotation to describe the current state of management accounting as they saw it; "Others apart sat on a hill retir`d in thoughts more elevate, and reason`d high.....in wand`ring mazes lost". Their work was based on a number of case studies in the U.S. and they argued that management accounting was in a major crisis by stating that;

> "Today's management accounting information, driven by the procedures and cycle of the organisation's financial reporting system, is too late, too aggregated, and too distorted to be relevant for manager's planning and control decisions".

They were supported in this view by a number of writers. Lewis (1993) summarised the main problems which many companies had with management accounting information in the following way: information does not support business priorities; important information hidden in a maze of detail; information too late to be useful; information expressed in financial terms; information supplied is often inaccurate due to simplistic and arbitrary cost distribution measures; information supplied is period based rather than strategically organised and information structured to reflect the organisational structure not the activities and processes. In an attempt to remedy the situation Robin Cooper (1988 a, b) developed, along with Robert Kaplan (1989), a new approach to product costing known as ABC. Later ABC was broadened to include Activity Based Cost Management (ABCM) by Turney (1992a) and Clark and Baxter (1992), and was the basis of a number of other frameworks.

ABCM uses the information supplied by ABC in order to yield continuous improvement. It sets out to support, enhance and extend

ABC and by so doing contributes to better business management. Its proponents talk about it as a great new technique which helps America to compete and to recognise the increasing role of indirect costs. Campi (1992) also talks about the all embracing framework of ABCM with its cultured focus on excellence throughout the total organisation. The concept has been further developed by the application of activity based budgeting (ABB) (Morrow and Connolly, 1991) and its integration into the business process re-engineering framework (Brimson and Fraser, 1991). Developments are ongoing with the activity concept been further used as a basis for analysing the efficiency of using your computer and appropriately named Activity Based Computing (Bentley, 1993).

The birth of the "balanced scorecard" concept (Kaplan and Norton, 1992) and its subsequent refinement (Kaplan and Norton, 1993; Hoffecker and Goldenberg, 1994) as the organisations central management system contextualises the application of ABC. The balanced scorecard concept suggested four perspectives, i.e. financial, customers, internal and innovation/learning which were seen to have the ability to unify strategic planning and operational budgeting. Its central theme was how could one create, measure and improve value for the organisation's shareholders, customers, employees and suppliers. Kaplan (1994) saw it as allowing companies to specify objectives that balanced short-term financial performance with the drivers of long-term growth opportunities for future financial performance.

Although it is only in recent years that ABC has become popular, Kim (1994) documents the use of an ABC-like system by the General Electric Company in the early 1960s. A costing system outlined by Staubus (1971) could be seen as another early version, while Morgan and Bork (1993), talk about the use of cost drivers by Kilger (1981) in Germany over a decade ago. That being said it is widely accepted that it was only when Professors Cooper and Kaplan from the Harvard Business School and a number of American manufacturers came together to develop the concept and write a number of teaching case studies that the world took note. The Schrader–Bellows (Cooper and Weiss, 1985), John Deere Component Works (Kaplan, 1987) and Tektronix cases (Cooper and Turney, 1988) were the original ABC systems to be described. The

system that has been advocated by Cooper and Kaplan has been described as "an evolutionary extension of the two stage procedure that underlies most modern cost systems" (Cooper, 1988a).

2.2.2 What is ABC?

ABC has been defined by Raffish and Turney (1991) as;

> "a methodology that measures the cost and performance of activities, resources and cost objects. Resources are assigned to cost objects. ABC recognises the causal relationship of cost drivers to activities".

Its objective is to allocate activity costs to the lowest meaningful level and in so doing treats as many costs as is possible variable (Stephen and Ward, 1990). It is a system that attempts to identify the causal relationship between the incurrence of cost and activities. In summary it seeks to determine the underlying "driver" of the activities, establishes cost pools related to the individual drivers, develops costing rates and applies cost to the products on the basis of the resources consumed. It has evolved out of the perceived inadequacy of the traditional volume based product cost systems in an environment of much greater competition, expanding product mix, diversity and increased manufacturing automation. A more succinct explanation of the concept is shown in Table 2.1. with the essential ABC terminology summarised in Table 2.2.

Table 2.1. ABC Basic Concept

- Resource consumption incurs costs.
- Activities[1] consume resources
- Activities incur costs
- Products consume activities

Source: Innes and Mitchell, 1990a

[1] An activity is defined by Turney, (1992b), as "A unit of work performed within the organisation."

Table 2.2. Essential ABC Terminology

- **Activity**
  A unit of work performed within the organisation: includes issuing invoices, performing a machine set-up and quality inspection.
- **Activity Cost Pool**
  Total cost of an activity.
- **Activity Driver**
  Measure of the use of the activity by cost object: used to allocate activity cost from the activity cost pool to the cost object. Examples are number of machine set ups, number of test inspections and number of cheques generated.
- **Cost Centre**
  Conventional overhead cost, which can contain a number of activities: in some cases a cost pool may equate to an activity.
- **Cost Driver**
  The factor which determines the work load and effort required by an activity and the resources needed: can be viewed as the resource required by the level of the driver activity, but more simply is the allocation basis from the existing resource in the cost pool to the activity cost pool.
- **Cost Object**
  The final point to which the cost is traced: can be a product, service, project, contract or customer.

Source: McBride, 1993

In traditional systems, a company's resources are first assigned to cost centres and then the accumulated costs in the cost centres are allocated to products using production volume–driven allocation methods i.e. direct labour/ materials cost, machine hours, etc. Morrow (1989) an advocate of ABC points out that "activities cause costs not products (cost objects);[2] and it is products which consume activities". This in effect is the underlying assumption of an activity based system. Cooper (1988a) describes ABC systems as a manufacturing system that identifies and then classifies the major activities of a facility's production process into one of the following

[2] Turney. (1992b). defines a cost object as the "reason for performing an activity. Cost objects include products. services. customers, projects and contracts"

four categories: unit-level, batch-level, product-sustaining and facility-sustaining activities. He elaborates by saying that costs in the first three categories of activities are assigned to products using activity drivers that capture the underlying behaviour of the costs that are being assigned. The costs of facility-sustaining activities, however, are treated as period costs or allocated to products in some arbitrary manner. These issues will be developed further under the section headed outline of an ABC system.

2.2.3 The Cost Driver Concept

Romana (1990) describes a cost driver as "the cause and effect relationship between a specific activity and a set of costs" and "as the central concept in any activity based costing system". In Strategic Cost Management (SCM) it is acknowledged that cost is caused, or driven, by many factors that are interrelated in complex ways. Understanding cost behaviour means understanding the complex interplay of the set of cost drivers at work in any given situation (Shank and Govindarajan, 1993). Compare this to present management accounting practice, where cost is a function, primarily of only one cost driver, output volume.

If output volume is a poor way to explain cost behaviour, what is a better way? Porter (1985) and Riley (1987) sought to create a comprehensive list of cost drivers and categorised them into two types, structural and executional. Structural drivers underlie a firm's economic structure and involves a choice between a number of cost groups. These cost groups are summarised under the following headings;

- Scale: How big an investment to make in manufacturing, in R&D, and in marketing resources.
- Scope: Degree of vertical integration. Horizontal integration is more related to scale.
- Experience: How many times in the past has the firm already done what it is doing now.

- Technology: What process technologies are used at each step of the firm's value chain.

- Complexity: How wide a line of products or services does it or should it offer to its customers.

Executional cost drivers (Riley, 1987) are those determinants of a firm's cost position that hinge on its ability to execute successfully. Unlike the structural drivers, for each of the executional drivers, more is always better. Basic executional drivers include;

- Work force involvement (participation of workforce to continual improvement).

- Total quality management (beliefs and achievement regarding product and process quality).

- Capacity utilisation (given the scale choices on plant construction).

- Plant layout efficiency. (How efficient is the layout?)

- Product configuration. (Is the design or formulation effective?)

- Exploiting linkages with suppliers and/or customers, per the firm's value chain.

2.2.4 Outline of an ABC System

The first stage of an ABC system allocates overheads to activity–based cost pools. The choice of these cost pools depends on the identification of the major activities which the company undertakes. For example, in a customer relations department, the activities identified may include making quotations, pricing orders, checking creditworthiness, issuing invoices or expediting orders (Bromwich and Bhimani, 1994). Obviously, these various activities create different demands on resources. The attribution of costs to activities should be a result of empirically tracing the resource requirements of that activity, but, in practice, it is often the result of judgement,

interviews and imperfect knowledge. The term "cost driver" refers to events or forces that are significant determinants of the cost of activities. For example, "if production scheduling cost is generated by the number of production runs that each product generates, then the number of set–ups would represent the cost driver for production scheduling" (Drury, 1996). Once established, these cost drivers are aggregated into cost pools. Drury (1996) continues his example by aggregating "the total cost of all set–ups ...to constitute one cost centre for all set–up related costs".

The second stage of the cost assignment process traces the cost of activities to cost objects according to the cost object's demand for activities (Drury, 1996). This is achieved by using the cost drivers identified earlier as a measure of the cost object's demand for activities.

Therefore, mechanically, ABC is a two stage cost allocation process. The first stage is necessary because overhead cost centres are maintained in traditional groupings, such as finance, personnel, purchasing or materials. The second step then takes each activity and allocates its cost to the cost objects which consume it (McBride, 1993). Costs are then traced to products from the individual products demand for these activities throughout the process of converting raw materials, energy and human enterprise into the finished article (i.e. the cost object).

Using a two stage allocation base requires measuring some unique attribute of each product. For example, using set-up hours as the allocation base requires measuring the number of set-up hours consumed by each product. Measuring these attributes can be expensive and there is no guarantee that the cost of the additional measurements required by an activity based costing system will be off-set by the benefits (Cooper, 1988b). However, with the recent advances in computer technology and the availability of inexpensive, easy to use software specifically designed for ABC applications, the computing cost has been significantly reduced.

2.2.5 Which Activities should be Used?

In attempting to answer this question it is helpful to look at how activities are categorised. Bellis-Jones and Develin (1992) talk about three types of activities. These are core, support and diversionary activities.

Core activities are the main activities which provide the cost object to the customer and include designing, producing the product/service and selling. Support activities do not add any value directly to the output, but are essential in sustaining that output. Examples include the accounting and personnel functions. Diversionary activities also do not add any value to the end output, but are divergent to the whole process of providing the providing/service. Such activities might include dealing with customer complaints and explaining why orders are late.

In contrast, Cooper and Kaplan (1991) divided activities into four strata. The first three they claimed should be incorporated into the ABC process and therefore product cost. The fourth should not be used in ABC as it was likely to be too far removed from the activities identified. Consequently, it would not have a strong causal link and therefore should be treated as a period cost. These classifications are summarised as follows and shown graphically in Figure 2.3.

(i) Unit–Level Activities
These are performed for every unit of product or service produced. Traditional cost systems rely exclusively on unit-level cost drivers such as labour hours/ machine hours.

(ii) Batch–Level Activities
These are performed for every batch of goods produced. The costs are independent of the number of units in the batch and include such items as set–ups. Traditional systems treat these costs as fixed, whereas ABC systems can now assign these to the object that triggered the activity.

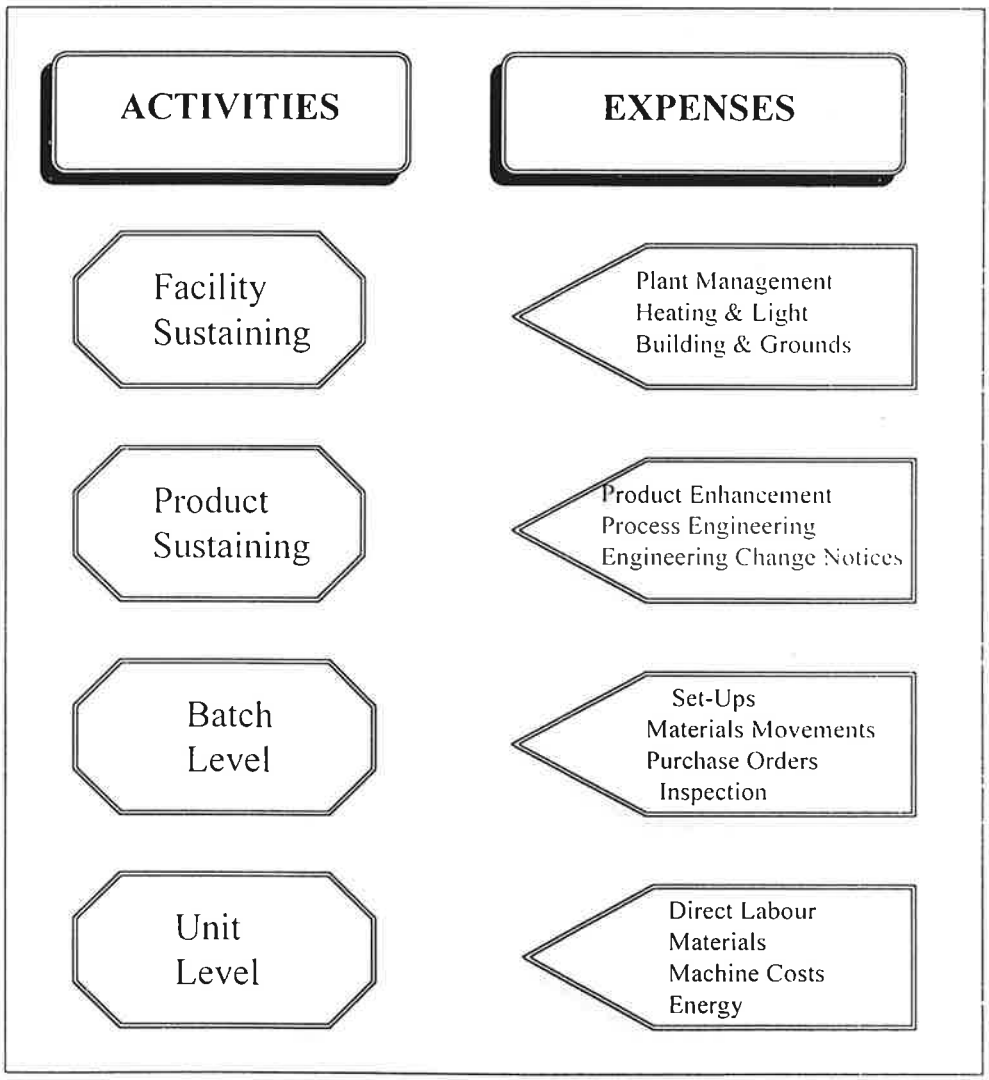
(iii) Product-Sustaining Activities
These are performed to enable individual products to be produced and sold, but are independent of the volume of goods produced.

Examples of these type of activities are product testing and enhancements, and technical support. Like in the case of batch-level activities traditional cost accounting systems categorise these as fixed costs.

(iv) Facility-Sustaining Activities

These cannot be causally traced to individual products. They are necessary to sustain the manufacturing process, and are common to all products manufactured in the plant (Drury, 1996). They are treated as period costs under an ABC system and are deducted as a lump sum from all product lines.

Figure 2.3. The Hierarchy of Factory Operating Expenses



Source: Cooper and Kaplan, 1991, p132

2.2.6 Why is ABC Needed?

The following quotation from *The Emerging Theory of Manufacturing* by Peter F. Drucker (1990) is a useful basis from which to attempt to address the above question:

> "Bean counters do not enjoy a good press these days. They are blamed for all the ills that afflict US. manufacturing. But the bean counters will have the last laugh. In the factory of 1999, manufacturing accounting will play as big a role as it ever did and probably even a bigger one. But the beans will be counted differently".

He goes on to claim that limitations in the traditional costing systems were beginning to appear in the years immediately following World War II. However, it was not until the 1980s that these limitations became widely discussed. Porter (1985) further developed this theme when he said; "managers recognise the importance of cost; and many strategic plans establish 'cost leadership' or 'cost reduction' as goals. However, the behaviour (of costs) is rarely understood" (by managers).

The main aspects of the discussion is centred around the changing manufacturing environment and the associated cost profile. This allied to the inappropriate use of volume based systems to determine product costs and the need to come up with a better system of assisting in the strategic decision making process forms the basis of the answer to the question.

2.2.7 When is ABC Needed?

An ABC system is justified when the costs of installation and the operation of such a system are more than off-set by its long term benefits. Cooper (1990) identifies three issues which should be considered. These are measurement costs, the cost of errors and product diversity. In regard to measurement costs computerised production systems currently provide much of the information needs of an ABC system and advances in software technology facilitate operational efficiency. The cost of errors refers to the making of poor

strategic decisions in the absence of accurate data. The consequence of these errors depends to a large extent on the level of competition facing the firm and their cost structure. As product diversity increases the ability of traditional costing systems to produce accurate costs decreases, and *vice versa*.

In an attempt to quantify these issues Cooper (1990) suggests serious consideration of the implementation of an ABC system if the existing cost system was designed:

- When measurement costs were high; but now measurement costs are low.
- Competition was weak; but now competition is fierce and
- Product diversity was low; but now product diversity is high.

Firms, therefore, should monitor how well their existing cost systems are performing and how much the three factors noted above have changed over time. They should then be able to assess the actual or anticipated obsolescence that has taken place or about to take place in regard to their current costing system. This should form part of an ongoing strategy to update their costing system before it causes major problems (Cooper, 1988b).

2.2.8 How to Design and Implement an ABC Cost System ?

In order to satisfy the objective of ensuring the most benefit at the lowest possible cost Cooper (1990a) outlines five steps that the designers of an ABC system should take. These are aggregate actions into activities, reporting the cost of activities, identifying activity centres, selecting first-stage cost drivers and selecting second-stage cost drivers. Aggregation is necessary as it is not economically feasible to use a cost driver for each action while the selection of first and second stage cost drivers are a reflection of the degree of product diversity in each case.

Cooper and Kaplan (1988) contribute to that process by outlining some general principles that should be followed. These are the need to focus on expensive resources, an emphasis on resources whose consumption varies significantly by product and product type and a

concentration on resources whose demand patterns are uncorrelated with traditional allocation measures like direct labour, processing time and materials. They further believe that only two types of costs should be excluded from a system of ABC and therefore not charged to individual products. They are the costs of excess capacity and research and development expenditures for entirely new products.

As regards implementation the five most common practical problems identified by Cobb, Innes and Mitchell (1992) were the amount of resources required, the difficulty in ensuring accurate data collection, how to cope with the fact that activities cross existing departmental boundaries and areas of responsibility; the fact that other changes were given a higher priority within the organisation and the heavy demands made by ABC design and implementation on the accountants' time.

2.2.9 What ABC Accomplishes?

Sharman (1990) states that "activity based costing provides a relatively accurate product cost because it captures many dynamic variables". Consequently, many companies have reduced their dependency recently on traditional accounting systems by developing Activity Based Cost Management (ABCM) systems. The main motivation in taking an activity view is that, in order to control and influence something, you have to understand it (Booth, 1992). In the past, in particular, overhead costs, have not been fully understood. Initially, managers viewed the ABC approach as a more accurate way of calculating product costs. According to Cooper and Kaplan (1988) ABC has emerged as an extremely useful guide to management action that can translate directly into higher profits. ABC systems use direct cost information in the same way as traditional systems, which are detailed engineered bills of material and labour. Where ABC systems differ, is that they create a bill of activities for overhead (Sharman, 1990). In essence the basic premise of ABC is that activities not products cause costs. Instead of allocating overhead cost centres to products on fairly arbitrary bases, the activities undertaken are first identified and costed, then charged to products on a consumption basis (McBride, 1993).

In an ABC system, therefore, the cost of a product is the sum of the cost of all activities required to manufacture and deliver the product. The allocation bases used in ABC are the quantification of the activities performed. When viewed across functions, activity cost information offers managers a snapshot view of costs from an entirely different perspective than the view presented in traditional cost reports and budgets (Johnson, 1991). Dugdale (1990b) adds to this view by stating that "using ABC techniques results in cutting across conventional departmental boundaries". The key to understanding ABC is to recognise that cost causality relates to activities rather than volume throughput.

One of the main advantages cited in early ABC cases was its ability to provide more accurate product costs. Cooper (1990a) summarises this by saying that it had the ability to achieve "more accurate product costs, an improved understanding of the economics of production and a picture of the economics of activities performed by a company". The distortions associated with traditional cost systems, relating to the absorption of non–volume related overheads on a volume related basis, are avoided using an ABC system. This is due to the use of activities to trace resource consumption and the use of cost drivers to assign costs to cost objects. Johnson (1988) states that activity-based costs eliminate distortions and cross-subsidies caused by traditional cost allocations. These cross-subsidies will make low-volume, high cost consuming items appear profitable and high-volume ones seem less profitable i.e. the 'Lilac Pen Case' (Cooper and Kaplan, 1988).

Further advantages include the treatment of long run variable costs and its input into cost reduction programmes. In the case of long run variable costs by attributing these to products, ABC overcomes one of the pitfalls of traditional costs system, whereby all costs which cannot be traced directly to units produced are included in what Kaplan terms the 'overhead blob' and treated as below the line expenses.

As regards cost reduction programmes the best way to reduce cost, one of several focal points of activity based management discussed later, is to change the way resources are consumed or the way activities are performed. The conventional approach to cost cutting

favours across the board solutions. Such efforts work in the short term but usually fail in the long run because resources, often staff, are eliminated without regard to the underlying activities. Turney, (1992a) outlines five guidelines on how to reduce costs by managing activities:

1. Reduce time and effort needed to perform an activity. This is usually done by process or product improvement;

2. Eliminate unnecessary activities that may not be valued by customers or are not essential to the efficient running of the organisation;

3. Select low cost activities when there are choices in the product or process design stage;

4. Share activities whenever possible unless there are unique needs; and

5. Re-deploy unused resources. Costs can only be reduced if the freed resources are re-deployed elsewhere in the organisation or removed altogether from the organisation.

The flexibility of ABC has also been promoted as one of its major advantages. It allows customers, distribution channels or any other cost object and not just production to be analysed. Armed with this information, management are able to make better strategic decisions, such as pricing, product mix, customer profitability analysis and product redesign. These can be elaborated upon as follows:

- Pricing Decisions:
  Those products which, under the traditional cost accounting systems were under-absorbing overheads, can now be repriced in line with the new cost data. Similarly, products which are less resource consuming under ABC can be sold for less, maintaining margins, but improving competitiveness.

- Product Mix Decisions:
  By promoting, demoting or discontinuing products according to their profitability, management can gradually replace less profitable product lines with more profitable ones. Cooper and Kaplan (1991) argue for the discontinuance of low volume, highly complex products under an ABC system.

- Customer Profitability Analysis:
  Customers can be used as cost objects as stated earlier. By understanding the profitability of clients more profitable market segmentation and target marketing is possible.

- Product Redesign:
  In an effort to reduce resource consumption, products can be designed under an ABC system which use more common parts. This is part of the growing need for 'design for manufacturing' and shorter lead times i.e. Tektronix case study (Cooper and Turney, 1988).

The process of activity identification forces management to analyse the minutiae of the company's production in a comprehensive manner and within an economic frame of reference. This analysis should highlight areas within the process where waste and/or non-value adding activities occur and establish how much influence management can exert over these activities (Innes and Mitchell, 1990a). ABC "could also mean implementing continuous improvement programs in order to enhance quality, reduce set-up time and improve factory layouts" (Cooper and Kaplan, 1991). The detailed analysis of the production process and the allocation of an easily understandable measure to activities in the process, (i.e. costs/ pounds), helps workers see exactly how specific improvements affect the bottom line. Bhimani and Pigott (1992) in following this theme describe how ABC "made it possible to identify the economic impact of any changes within manufacturing at individual points of the production process".

2.2.10 Adoption of ABC

ABC has generated widespread interest amongst managers and accountants from service and manufacturing companies in both the private and public sector. The issue has also featured prominently in the contemporary management accounting literature and has been the basis of a significant consultancy business extolling its virtues and potential capabilities. It has been popularised by a number of prominent case studies and has assumed a momentum that has seen its implementation grow significantly year on year. The following is a review of the findings of a number of surveys that have been done in order to assess practice in this area.

Cobb, Innes and Mitchell (1992) as noted earlier, in a study based on thirty telephone interviews found that the delay in adopting ABC was "..commonly attributed to the perceived problems of the amount of work in installing an ABC system, the existence of higher work priorities than ABC, lack of time and resources (accountants, computer staff and managers) and the difficulty of selecting appropriate cost drivers". This was obviously due to an initial reluctance by a number of organisations to change and was at a time when ABC was still in its infancy in practical terms.

By the time Innes and Mitchell (1994) surveyed the top *1,000* United Kingdom firms the position had radically changed. Their study found that 20% of those surveyed currently use the ABC techniques and another 27% were considering their adoption. This was extremely positive given its relative age and the potential barriers to implementation. In the case of the latter issue, the survey highlighted a somewhat erroneous view that ABC was not particularly applicable to the service sector and that it was a major, complex and costly system change. Further the survey captured the need by most organisations for some improvement in their current system and this should continue to drive the momentum for change. Outright rejection was recorded at 13% and within that number there were some who expressed an information deficit about its deliverable benefits. Finally, the study highlighted the extent and mix of management accounting applications that ABC offered firms. It concluded that the use of ABC for cost management applications

outweighs the product costing attributes which were central to its initial development.

Even though the ABC concept was initially developed in a manufacturing context, it could be applied equally well in the service sector (Rotch, 1990; Antos, 1992). Cooper and Kaplan (1992) and King et al (1994) document successful applications in telecommunications, transport, wholesale and distribution, marketing, health and information services. Innes and Mitchell (1997) document its successful application in the U.K.'s largest financial institutions.

Friedman and Lyne (1995) undertook a project to look at how activity-based techniques were used and the consequences of their implementation. They visited eleven firms in the U.K. on a number of occasions and interviewed both management accountants and operational managers. They found evidence that activity-based thinking had led to a new way of talking about problems. It provided a new language and improved communication between accountants and operational managers. The process of implementation forced them to work together and in this way it helped to resolve long-standing tensions and problems. This change in attitudes and relationships was the most important organisational consequence of implementing activity-based techniques and they concluded that the activity-based techniques worked best as part of a general culture change programme.

Other findings of Friedman and Lyne (1995) included the view that there is no one best way to implement activity-based techniques, that firms benefit best from a gradual approach to implementation and that the timing of their introduction was important. In analysing the varied "implementation paths" they identified three categories. These were "one-off operational, on-going operational and organisational consequences". These could be associated to varying degrees with their classification of the uses of the activity-based techniques into product costing, resource allocation and cost management. There was strong support for all these three uses across the firms visited and confirmation that the techniques do not form part of the formal monthly accounting reporting system. This latter aspect is discussed in more detail later.

A study of practice in Irish manufacturing firms by Nulty (1992) showed that Irish practitioners were using ABC in order to achieve a number of objectives. The findings showed the following variations in use; improved product profitability (42%); improved cost control (42%) and more timely and relevant information (35%). This confirmed its potential flexibility which has already been noted.

However a study by Clarke (1996) of the 500 largest manufacturing firms in Ireland found that the concept had not gained wide acceptance in Ireland with only 12% having implemented it. In addition, a surprisingly large 54% had not considered its adoption, 21% were currently assessing it and 13% having considered it had decided not to implement it. The study was consistent with previous research in regard to the common implementation problems of cost, activity identification, lack of top management commitment and on-going resource needs generally. As expected, it found that the most important benefit to those that implemented it was more accurate product cost information with rather less use made of it in the area of cost management.

Finally, given the wide acceptance of ABC as a concept and its development into the more all embracing framework of ABM and related initiatives such as SVA, it is appropriate to review these developments at this stage before discussing the criticisms of ABC.

2.3. Activity Based Management (ABM)

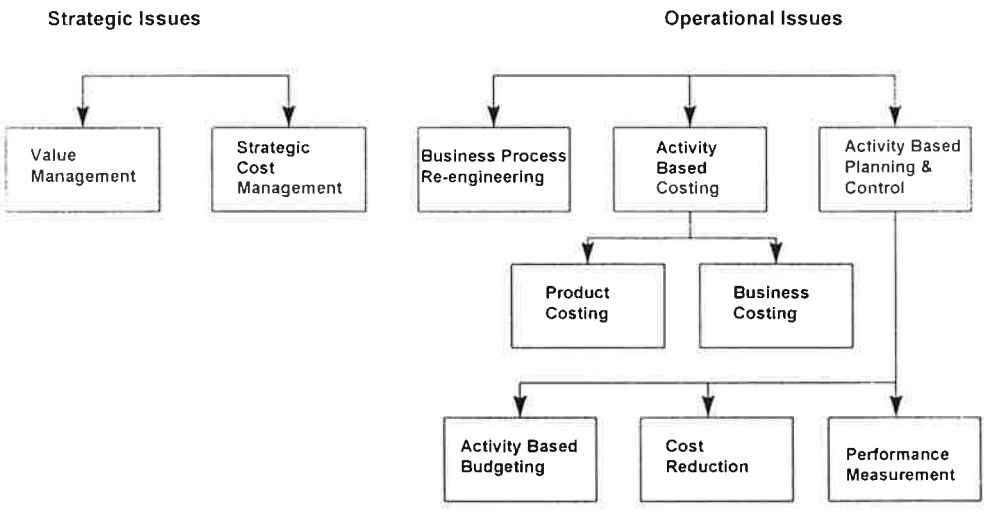
2.3.1 Introduction

There is increasing emphasis on the usefulness of the ABCT for purposes other than product costing. These include the identification and elimination of non value-added activities, the analysis of customer profitability and the potential to access supplier performance. These developments have led to the expanded framework of Activity Based Management (ABM) or Activity Based Cost Management (ABCM) (Clarke, 1994). ABM is an umbrella structure that seeks to bring together cultural changes of which ABC is but one. In doing so it helps to prepare businesses for today's

global competition (Campi, 1992). These changes include issues such as TQM, JIT, total customer satisfaction, time-based competition, employee empowerment; focused factories, continuous flow process and cellular manufacturing.

ABM involves gaining a view of an organisation's entire business practice. It is moving away from the traditional functional view of an organisation structure to one that facilitates a cross-functional view of the effectiveness of activities and business process (Johnson, 1991). ABM should affect the culture of the entire organisation. It requires the re-education of the organisation, from the executive suite to the shop floor. It seeks to create a culture focused on excellence and by its very nature must be an ongoing process. It cannot be simply a one time pilot project or a re-allocation of costs (Pryor, 1992). ABM is not a cost system. It is also not a new software package that will run on a personal computer and is available off the shelf. It is presented by Hally (1994) in Figure 2.4. as a capstone framework encompassing strategic and operational issues. Some of the operational issues are dealt with later as components of ABM with the strategic aspect included in the SVA section below.

Figure 2.4. Activity Based Management



Source: Hally, 1994

2.3.2 Objectives of ABM

ABM aims at two goals, both common to any company: Firstly, it aims to improve the value received by customers. Secondly, by improving value to its customers it should increase its profits and, as a consequence, shareholder value. These goals are achieved by focusing on managing activities (Turney, 1992a). Customers have simple wants. They want products and services that fit a specific need. They want quality, service, an affordable price and they want it now. Meeting these wants is one thing, meeting them profitably is another. It is no good telling shareholders that your products or services have the highest quality in the industry or that customers consistently rate you the highest in customer satisfaction. You must also provide an adequate return on shareholder investment.

There should be no conflict between these two goals as it is in both parties interests to achieve them in the long run. The company's profitability is important to the customers because they want you around for the long term, which you won't be if you are unprofitable. Managing activities is a process of relentless and continuous improvement of all aspects of a business. It involves an ongoing search for opportunities to improve. This search involves a careful and methodical study of which activities should be performed and how they should be carried out. Activity based management encompasses all aspects of a company's value chain: purchasing and procurement, operations, marketing and selling, distribution and general and administrative expenses (Cooper and Kaplan, 1992).

If companies that decide to adopt advanced cost management initiatives fail to understand the need for other initiatives, implementations of ABC are unlikely to succeed. Many organisations have embarked on disjointed and uncoordinated management initiatives such as narrow focuses on ABC, JIT, TQM or employee empowerment without paying attention to the wider context in which these initiatives must be viewed. These initiatives are deemed essential for world-class performance and only ABM can provide such a framework (Campi, 1992). Achieving global competitiveness means reducing activities that constrain the company's ability to be responsive to customer needs.

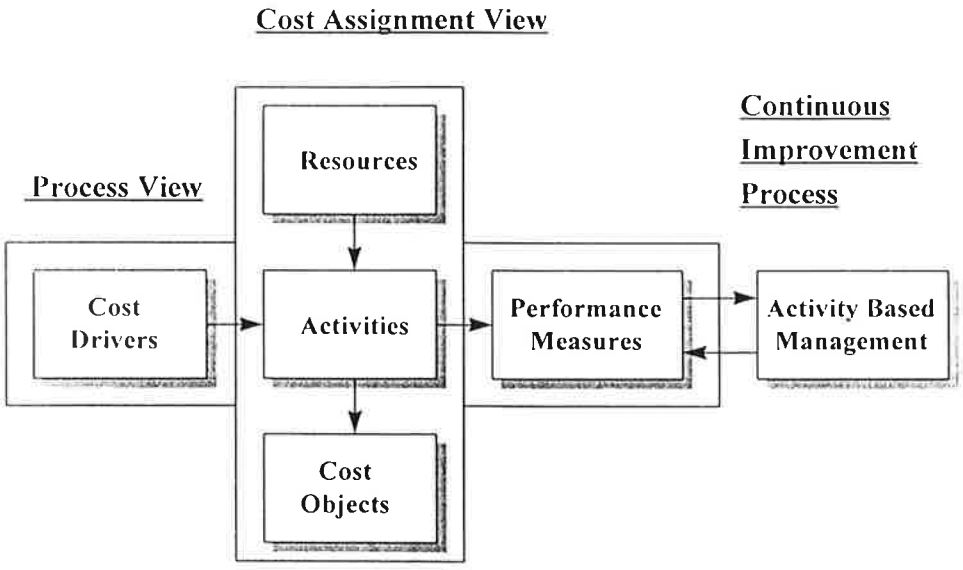
2.3.3 Relationship between ABM and ABC

Unlike ABC, ABM is not viewed as an accounting exercise concerned with the development of better cost data (Campi, 1992). Turney (1992a) sees ABM as having a wider perspective with a dynamic continuous improvement philosophy linked to a cost assignment view through the use of the cost driver concept. This view is presented in Figure 2.5. He also summarises the link between ABM and ABC by using the following comparison:

> "One analogy that comes to mind when comparing ABC to ABM might be that ABC is to advanced cost management what a windshield is to an automobile. It allows us to see our surroundings and our direction, but it is not the vehicle itself. ABC supplies some of the information and ABM uses this information in various analyses designed to yield continuous improvement".

ABC on the other hand is simply the language used to communicate in this new environment and should not be considered a stand-alone initiative. Instead it is one of a number of initiatives required by organisations that seek world-class status.

Figure 2.5. How ABM uses ABC Information



Source: Turney, 1992

2.3.4 Components of ABM

This section will discuss some of the operational issues summarised by Hally (1994) and presented in Figure 2.4. It will describe the activity analysis technique and review its power and application. It will assess the ability of the organisation to exploit the value of activity analysis through the effective use of performance measures and identify the importance of the concepts of business process re-engineering and activity based budgeting within the ABM framework.

2.3.4.1 Activity Analysis

According to Booth (1992) the use of activity analysis will appeal to managers who insist on seeing their decisions supported by hard information. He summarises the advantages of using the methodology as precision and accountability. The approach may be used to provide the information necessary to make decisions in the following areas:

Pricing Strategies:	Once accurate data on product and customer profitability is established appropriate action can be taken by management.
Investment Appraisals:	Activity analysis not only examines the benefits of a reduction in the cost of quality and improvements in lead times etc., it also quantifies them.
Cost of Quality:	Activity analysis can identify where these costs are incurred so that management can take appropriate action.
Cost of Complexity:	A clear understanding of how indirect and overhead costs are driven allows the product line and customer range to be pruned.
Embedded Costs:	Many overheads are incurred through unnecessary activities which can be reduce once the causes are understood.

Improve Customer Service Standards:	A cross functional view of activities facilitates the improvement of standards by management.

Booth (1992) presents a six stage activity analysis technique to provide the information necessary to facilitate decision-making in the above areas. A particular strength of this approach, shown in Table 2.3. is that as well as analysing costs, it provides information on the non-financial attributes of activities. The main advantages of this technique are precision and accountability. However because of the need to manipulate large amounts of data the use of a database tool is a pre-requisite.

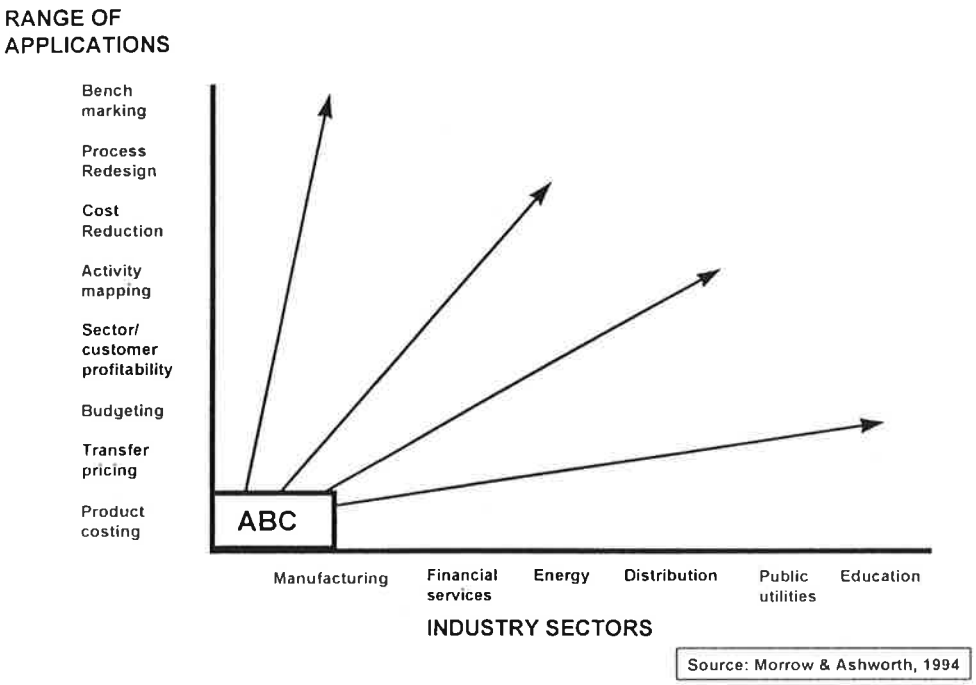
Table 2.3. Activity Analysis Technique

1. Structure the project; there should be a clear purpose to the exercise.
2. Develop the data structure; no ambiguities in data can be allowed and an accepted source of information has to be used for any analysis i.e., the general ledger system.
3. Calculate activity costs, trace costs to activities. Understanding cost behaviour is vital here.
4. Calculate product and business process costs.
5. Analyse issues; the financial and non-financial information is now available to support strategic decisions. With a better understanding of cost behaviour usually better decisions are made.
6. Plan implementation; the main advantage with an activity view is the control it gives over implementation.

Source: Booth, 1992

Finally, the power and range of applications using activity analysis continues to expand. The initial concept as summarised by Cooper (1988 a, b) has been the stimulus and baseline from which a number of applications have been developed. These applications, started out with a very strong manufacturing bias, but have now gained much wider appeal as depicted by Morrow and Ashworth (1994) in Figure 2.6.

Figure 2.6. ABC Range of Applications



Source: Morrow & Ashworth, 1994

2.3.4.2 Performance Measurement

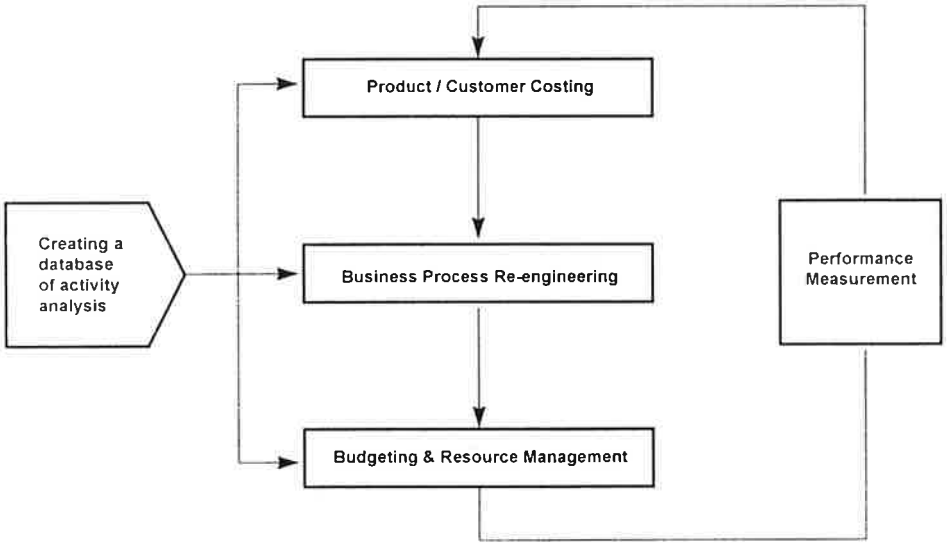
Conventional reports of the financial performance of a business, both internal (budget or variance reports) and external (income statements or cash flow reports), are similar to the scoreboard at a baseball game. The scoreboard tells a player whether he is winning or losing the game, but tells him little of what he is doing right or wrong in the mechanics of baseball. If he tries to play baseball by watching the scoreboard, he will not be successful. Traditionally a scoreboard approach has been an acceptable role for financial reports, both internal and external. Consequently, their role has been limited to providing periodic, *ex post facto* statements of financial performance. Success, however, is a function of hitting, fielding, pitching and not just watching the scoreboard (Fisher, 1992).

As competition in industry has intensified, managers have looked for new sources of information on the key factors that contribute to success and how they can be measured. Financial measures reflect the results of past decisions and not the actionable steps needed for surviving in today's competitive environment. Fisher (1992) sees the

need for non-financial measures as the primary tool of strategic control.

Before performance can be effectively measured it must be clearly defined (Campi, 1992). This effort to define must be driven by whatever strategy the firm wishes to pursue. Firms must be able to evaluate financial and non-financial effectiveness both internally and externally. Effective use of the performance measures developed out of the model shown in Figure 2.7. by Morrow and Ashworth (1994) should ultimately reduce an organisation's dependence on financial reporting.

Figure 2.7. Exploiting the Value of Activity Analysis



The three main areas of integrated application

Source: Morrow & Ashworth, 1994

By bench-marking "best in class" in the business process employed, firms can focus on the continuous improvement of processes and on the activities that support these processes. Continuous improvement is also enhanced by tying the reward system not simply to financial performance, but also to the continuous improvement of activities that advance the strategy of the organisation and thereby improve the business processes of the firm (Campi, 1992). This will ultimately lead to improved overall financial performance. In effect, by implementing ABM, an organisation can empower it workforce to participate in substantive ways by improving the activities they perform.

2.3.4.3 Business Process Re-engineering (BPR)

BPR is a relatively new management tool which may have a significant impact on the way that organisations are controlled in the future. The basic thinking behind BPR is how to fundamentally change the way work is performed in order to achieve radical performance improvements in speed, cost and quality. BPR is also called process innovation or core process redesign. The key question is "if we could start from scratch, how would we do this?" And the result: "then do it that way, and throw away everything else"[3] The principal academic thought on the subject has been provided by Hamer and Champy (1993) in their book: *"Re-engineering the Corporation"*.

BPR is set to become an important element of ABM in the future as a guide for re-deploying unused resources and for activity analysis in general. The creative use of information technology is essential, not merely to computerise tasks but also to start from scratch, discarding traditions and assumptions and re-inventing the way work is organised.

2.3.4.4 Activity Based Budgeting (ABB)

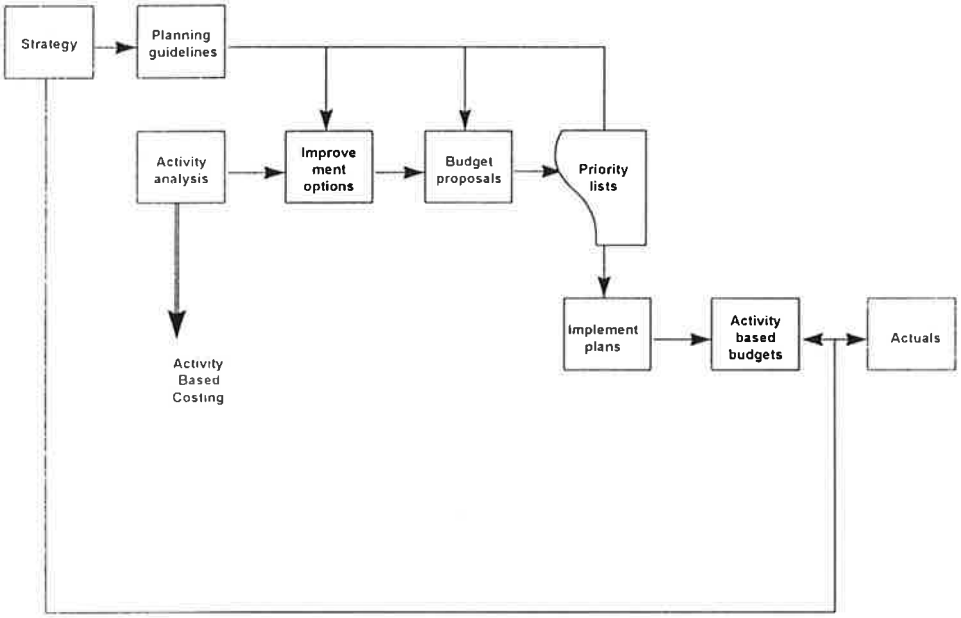
Planning and budgeting are the two tools that should support continuous improvement in a business. Brimson and Fraser (1991) found that planning usually tackles the issues at too high a level and remains too separate from budgeting. On the other hand, they found that budgeting is too much a financial forecasting exercise, without sufficient emphasis on the allocation and efficient use of resources. Management accounting has tended to place too much emphasis on cost variances and not enough on the achievement of output and performance measures. As a result opportunities to reduce costs are not exploited to their full potential (Brimson and Fraser, 1991).

A new approach to this planning, budgeting and control process is called Activity Based Budgeting (ABB). It is a concept drawn mainly from priority base budgeting and total quality together with the activity based cost concepts. According to Dugdale (1990a) "it is only

[3] Fortune Magazine August 23, 1993

a small step to employ the ABC analysis for resource allocation and control. Clearly if the resource implications of a given product mix can be established; then the analysis can be used in deciding how to allocate resources during the budgeting process". It is shown graphically in Figure 2.8.

Figure 2.8. The ABB-Process



Source: Brimson & Fraser, 1991

The key objective of ABB is to strengthen the interface between planning and budgeting through activity analysis (Brimson and Fraser, 1991). The output from the strategic plan must be a set of coherent objectives for each business unit. These will include detailed financial objectives for each individual business unit. The financial objectives will vary but will include targets for market share, growth, quality and customer satisfaction. Under ABB these broad objectives are cascaded down to the level of detail required to provide objectives for individual activities within the business and thus for the managers responsible for them.

Connolly and Ashworth (1994) argue that an integrated activity based budget will help to achieve a number of benefits. These include the effective implementation of the organisation's business vision, strategy, objectives and plans, the effective communication of objectives both 'top-down' and 'bottom-up' throughout the organisation and the optimum allocation of scarce resources across

the business consistent with the agreed objectives and plans. They also suggest that it can provide a focus on continuous improvement initiatives and on the things the organisation must do well if it is to be successful in achieving its future vision. Therefore, if properly implemented, it has the potential to overcome many problems by contributing to a more equitable and visible approach to the resource-management or budget bidding process.

2.3.4.5 Summary of ABM

ABM is an important tool of management. It is a means to an end and not an end in itself. It facilitates a greater understanding of cost behaviour which is so vital for competitive success. According to Clark (1994) it provides managers with important activity performance metrics for those operating business process re-engineering, customer profitability and supplier performance programmes. It is a powerful new technology but much remains to be learned and achieved. Though there have been many successes, major problems have arisen because the conceptual framework of ABM has been misunderstood and misapplied.

The above list of components of ABM is not exhaustive and is set to get larger as new techniques are introduced and the framework matures. It is, in effect, hardly seven years old.

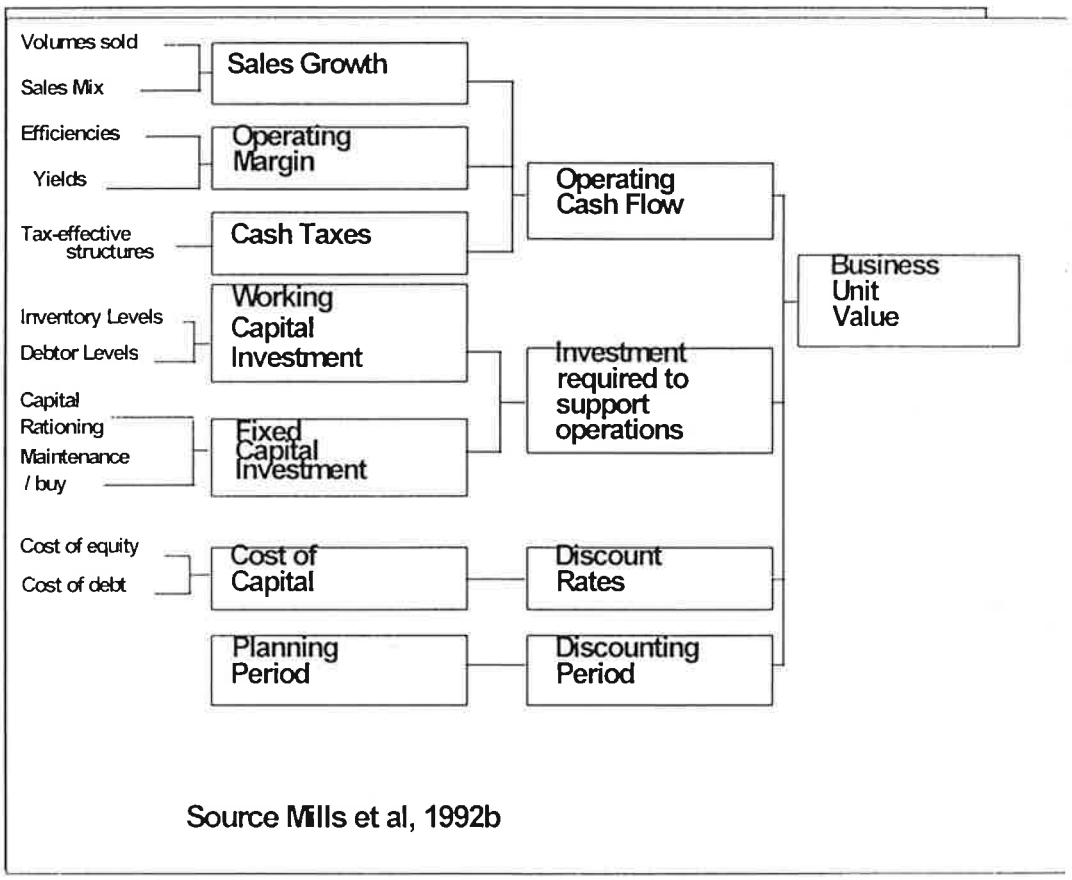
2.4. Shareholder Value Analysis (SVA): A Framework for Improving Shareholder Value

2.4.1 Introduction

Shareholder value is the value that the stock market places on a business and, in an efficient market, should represent the net present value of the long term cash flows of the business (Ward and Patel, 1990). It has been described by Mills (1993) as a technique which allows for the selection from a group of strategies the one which will give the greatest future value to the shareholders, in addition to creating the best long term competitive advantage for the business. It is the process of analysing how business decisions

affect the company's "economic value" (Wenner and Le Ber, 1989). The shareholder value framework was first developed by Rappaport (1986) and based on the concept of utilising seven value drivers. These are summarised by Mills et al (1992b) in Figure 2.9.

Figure 2.9. Value Drivers: The Key Factors



From this one can see the impact that operating and investment decisions, through their impact on profitability and cash flow, have on the overall business unit value. Particular care is required in calculating the cost of capital given its pivotal role as is the need for accurate cash flow information (Mills et al, 1992a).

The planning period in which the shareholder value is calculated can be important. It is likely to be an evolving process taking into account such issues as new entrants to the market, the threat of substitutes, rivalry of existing firms and the bargaining power of buyers and sellers (Porter, 1985).

The benefits of using SVA are best summarised by Moskowitz (1988) as follows:

- It can provide a consistent basis for evaluating and measuring capital allocation decisions and management performance.
- It overcomes accounting measures which were not designed to evaluate future investment opportunities.
- It reduces corporate gamesmanship in submitting divisional plans and budgets.
- It can provide a standard for investor communication that reflects how the market actually behaves.

SVA should not be confused with strategic analysis which is primarily concerned with customers and competitors. The difference between these two approaches is summarised in Table 2.4.

SVA can in effect turn strategy into cash flow. For this to happen it is vital that "managers think of SVA as a rigorous analysis of strategy and not as a number crunching exercise" (Day and Fahey, 1990). They go on to say that if the strategic analysis is not rigorous then the SVA process can cause managers to overvalue poor strategies, undervalue good strategies and ignore other possible options. They come to the conclusion that these problems can be avoided by management broadening their range of strategic alternatives, challenging the inherent soundness of each option and testing the sensitivity of different strategies to changes in cash inflows and outflows.

Table 2.4. The Difference between Strategy Analysis and Shareholder Value Analysis

	Strategy Analysis	Shareholder Value Analysis
Purpose of Strategy:	To establish superior value in the eyes of the customer and/or gain lowest delivered cost	Maximise shareholder return
Reference Group:	Customers and Competitors	Shareholders or proxies
Decision Variables:	Inputs (resources, skills) and immediate outcome (market share, relative costs)	Revenues, costs, investments, and capital structure
Level of analysis:	Product - market segments and business units	Company and business unit.
Basis of measurement:	Customer perception of benefit, comparisons with competitors, cost analysis and management judgement.	Share prices, market/book ratio and net present value of cash flow.

Source: Day and Fahey, 1990

SVA is not without its limitations. These include the general concerns about the quality and integrity of the data used to derive the variables and the lack of imaginative and rigorous thinking in the creation of the strategic alternatives. Specific concerns have been expressed in regard to the assumption of constant growth and constant relationships between all variables in the model (Gregory, 1992) and a possible difficulty by those involved in the day to day operation of the organisation in mastering the approach. In the latter case the concept demands a commitment to change and experimentation which may not fit into some organisational cultures and participants require a full understanding of the firm's strategic alternatives (Day and Fahey, 1990). Some of the above limitations

can be overcome by the top management putting in place guidelines on when and how to use the concept (Wenner and Le Ber, 1989).

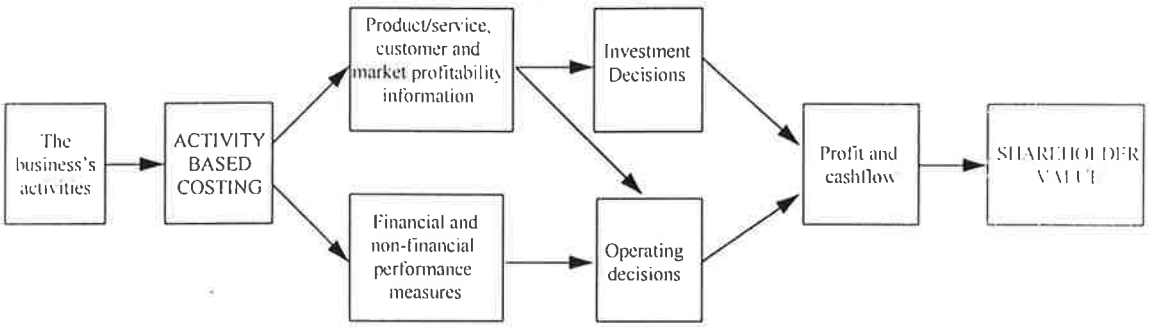
Competitive advantage is gained either by performing activities at lower cost than competitors or by providing a differentiated product or service to a customer who is prepared to pay a higher price (Porter, 1985). The activities performed within a firm may be split into direct or overhead activities. Direct activities include those activities that are directly concerned with the product generation or service provision process whilst overhead activities support direct activities and may be product, customer or market segment sustaining (Ward and Patel, 1990). The focus here should be on high cost activities. To ascertain if a business is generating sustainable competitive advantage, key individual activities must be identified, costed and reviewed in order to ensure that they add value to the organisation and thereby create long-term shareholder value.

2.4.2 Shareholder Value and Activity Based Costing

The management of both direct and overhead activities requires meaningful information in the appropriate form. Ward and Patel (1990) believe that only an ABC information system can provide such information, i.e. information crucial to a firm's understanding of how its competitive advantage is generated. In Figure 2.10. they highlight the pivotal role that ABC can play in that process.

By accurately attributing cost to products, services and customers, ABC plays an important role in providing relevant information for management decisions which in turn impact on shareholder value. They also believe that ABC provides a sound foundation for future cash-flow projections and that by using an ABC approach, investment is made only in those value added activities that will support products, services, customers and market segments that will increase shareholder value.

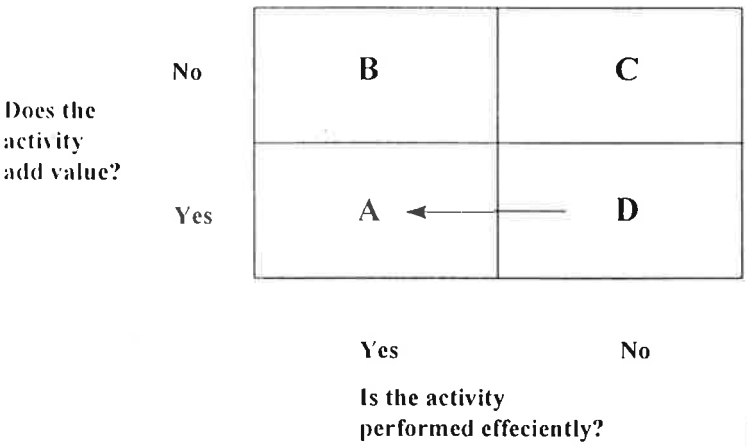
Figure 2.10. The Link between ABC and Shareholder Value



Source: Ward & Patel 1990

Once a firm's key activities have been identified, the ABC approach can be used to critically analyse their contribution. Shank and Govindarajan (1993) highlight such an approach in Figure 2.11. by asking two questions; is the activity necessary and is the activity performed efficiently?

Figure 2.11. Value Engineering the Cost Structure



Source: Shank & Govindarajan, 1993

As indicated in Figure 2.11. only activities in box A should be assigned to products. Activities in box D need to be examined for ways to improve their efficiency and, ultimately, those should be moved to box A. Activities in box C should be eliminated and the activities in box B should be examined to see if the resources can be redeployed in value-adding activities. This approach could be used as a basis for suggesting that firms need ABM as a follow on to their adoption of ABC systems (Turney, 1992a).

ABC provides the framework that allows the cost of non-value added activities to be made visible to management, thus aiding operational decision making and providing cost reduction opportunities. Traditional cost accounting information often confounds efforts to manage costs simply because it shows only where money was spent, and how much, not why it was spent. Johnson (1991) believes that only a cross-functional analysis of activities will clarify relationships between products and resources. Finally, by contributing to a greater understanding of what the business is doing and where the business is going, ABC allows the valuation of the business by the stock market to be a more accurate reflection of shareholder value.

2.4.3 Shareholder Value and Earnings per Share

The long term cash generation focus of the SVA concept contrasts sharply with the short term profit maximisation focus of earnings per share (EPS). While the EPS approach is widely adopted and is considered to be one of the best methods of determining corporate financial health, a study by Henry and Smith (1991) cited by Mills (1993) found no correlation between EPS and overall shareholder return. The short term focus of this earnings based approach can lead to poor strategic decision making and give rise to a number of other difficulties which are largely overcome in the SVA model. These difficulties include the fact that alternative accounting methods may be employed both within and between different countries, investment requirements and risk are excluded, dividend policy is not considered and the time value of money is ignored (Mills, 1990b).

Management who are aware that the "economic value of a business" reflects both risk and the time value of money should realise that it is more important than the singular values of EPS and growth in sales or profits as given by traditional accounting methods.

2.4.4 Examples of Shareholder Value Applied Research

In order to highlight the relevance of this concept there are a number of examples worthy of mention. Wenner and Le Ber (1989) cite the case of a new CEO in a multibusiness company who upon arrival discovered that his predecessor had undertaken a major diversification programme which was considered very successful by everyone. By using the SVA techniques he was able to measure how much value each segment of the business was creating and found that the programme had actually destroyed $500 million of shareholders` value. Mills (1990a) used the annual report of the Quaker Oats company to help explain the concept. He describes how, by focusing on the economic value generated by the key value drivers, the SVA approach overcomes many of the problems associated with traditional accounting methods. The case highlights the point that return on equity in itself does not create value but it will receive the benefits derived by sales growth, operating profit margin and investment value drivers. Finally, Mills et al (1994) in a case study on the Euro Disney theme park located near Paris document how estimates of shareholder value per share are drastically revised downwards as more realistic assumptions, such as total debt owed, are built into the model. The case also shows the impact of using over-optimistic forecasts and confirms the importance of constantly reviewing the planning period.

2.5. Criticisms of ABC

2.5.1 Introduction

Despite the perceived advantages of using the ABC techniques and its relative popularity in practice a number of criticisms have appeared in the literature. In reviewing these criticisms it is deemed appropriate to start with the evolution versus revolution debate. This is followed by a review of the logic under-pinning the ABC concept before concluding with a view as to the suitability of ABC as a formal monthly accounting reporting system.

2.5.2 Evolution versus Revolution Debate.

There exists at present two views of contemporary management accounting practice. Cooper, Kaplan and other U.S. commentators believe that traditional management techniques have lost their relevance in today's competitive environment and that overhead costs should be allocated under an activity based system rather than on a more general basis such as labour or machine hours. Thus conventional techniques should be replaced by what they see as the "revolutionary" ABC approach and in line with their Darwinist assumptions of accounting evolution.

The rapidly changing environment was one factor given by Johnson and Kaplan (1987) in "*Relevance Lost: The Rise and Fall of Management Accounting*" for the obsolescence of the traditional management accounting techniques. Their research indicated that a small but growing number of companies were experiencing a rapidly changing technological environment. They predicted that this environment would continue to change rapidly and that ultimately all sectors would be affected. The problems that they perceived as not being satisfactorily dealt with by the management accounting techniques at the time include the lack of strategic considerations in management accounting and project appraisal and the over-reliance of management accounting on redundant assumptions concerning manufacturing processes. These problems were reflected in the narrow, historical focus adopted by most management accounting techniques and an over concentration on volume based approaches to the treatment of overheads. The maintenance of traditional assumptions in performance evaluation and the short-term financial orientation of this process were also cited as issues that gave rise to concern, as was the alleged subservience of management accounting to external financial accounting practice in general.

Both the National Association of Accountants in the U.S. and the Society of Management Accountants of Canada have strongly endorsed some of these criticisms. They both seem to subscribe officially to the importance of ABC in the development of the management accounting literature and practice.

The other view put forward by Bromwich and Bhimani (1989) is that while ABC is of great importance in improving management in many businesses, traditional accounting continues to serve many companies well and remains a valuable tool. They have urged a less radical approach to change by concluding in their 1989 monograph entitled *Management Accounting: Evolution not Revolution* that "no general crisis has been identified within the management accounting profession in the UK *vis-à-vis* the changing manufacturing environment and, therefore, no radical reforms are recommended at this stage". They further argue that, in the early case studies, it could be said that the problems these firms had encountered were as much a result of poor management as poor management accounting practice. They state "for example, that some of the US firms which have been surveyed produced an impossibly wide range of products and seemed to rely on cost plus pricing of a very conventional type". They go on to say that, while an ABC system might change product costs substantially, there is little to suggest that it enhances profits. In their monograph they explored the challenges and opportunities facing management accounting and came up with a number of findings. These include the following:

1. Non-financial accounting information has become increasingly important in many different manufacturing environments.

2. Both strategic investment appraisal techniques and strategic management accounting seem to be increasingly important as a means of processing relevant accounting information.

3. The new production methods may affect responsibility accounting systems, information flows and organisational control measures.

4. Evidence of the benefits of new accounting techniques and the continued benefits of some conventional techniques is only beginning to emerge. No general crisis has been identified within the management accounting profession *vis-à-vis* a changing manufacturing environment and therefore no radical reforms are recommended at this stage.

5. Need for activity costing and target costing to be used and further developed in the context of British manufacturing environment. Also management accountants should experiment, seek new ways of using their existing expertise and to enlarge their competence by seeing management accounting as a much broader function.

They conclude that "the evidence and arguments advanced by advocates of wholesale change in management accounting are not yet sufficient to justify the wholesale revision of management accounting". To them ABC is an evolution of existing techniques and is supported by the reawakened awareness of the "old wine" concept (Shank, 1989). The old wine in the case of ABC, could be said to stem from the traceability concept put forward much earlier by Schillinglaw (1961). Finally, they believe that opportunities in management accounting must lead to the further growth of successful innovations if they wish to play a major role in twenty-first century financial management.

These arguments are supported by Piper and Walley (1990) and Morgan and Bork (1993) who see the need for more empirical research and hypothesis testing. Dugdale (1990a) in agreeing with Bromwich and Bhimani (1989) believe that the ABC technique does not challenge conventional accounting theory, rather it extends and refines the idea and concept. Miller and O`Leary (1993) go a step further in the *Accounting, Organisation and Society* (AOS) literature by finding ABC ideologically unsound. They question the insistence in seeking to establish through the ABC process a causal relationship between professional support activities and individual products. They see ABC as one of the calculative technologies of accounting which can contribute to a significant shift in modes of corporate governance and is linked to attempts to foster a new form of economic citizenship.

At the heart of this debate is the degree to which accounting practice dominates American enterprises and the consequential process of control and exploitation. In contrast, Johnson (1991) in agreeing that there are flaws in some of the arguments put forward by proponents of ABC, sees ABC in a much less threatening fashion. He describes it as a tool for understanding cost behaviour and suggests that it

must rank among the major accounting innovations of the twentieth century.

2.5.3 Testing the ABC Logic

Piper and Walley (1990) question the fundamental assumption on which ABC is founded, i.e. activity causes cost. They believe that there are competing assertions on the causality of costs, for example that decisions cause costs or that the passage of time causes cost. While each may be useful in different contexts, it is dangerous they add to believe that one is correct or true. They argue that the proposition that decisions cause cost is superior to the argument that activity causes cost as decisions precede activity. They also show that clear empirical relationships between activities and costs are not always as easily established as ABC advocates have led us to believe. Their example that a reduction in production volume may not result in a reduction of costs in many indirect production areas, but may lead to a reduction in activity, shows that "activity does not have a clear, causal relationship with cost, yet that is what ABC is founded on".

Piper and Walley (1990) also claim that the advocates of ABC only show success stories and in so doing attribute all or most of that success to one item, i.e. ABC. They describe this as a 'logical fiction' as, in reality, any result is due to a number of separate, different, concomitant events and to attribute blame or credit to one particular reason is not always correct. For example, if a man falls from a ladder and dies, what was the cause of death? The faulty ladder or the fact that the man's heart stopped beating.

They further propose that the "picture of activities", cited by Cooper, (1990), is another flaw with the logic of ABC. As ABC is best suited to firms in high-technology, rapidly changing environments, they query its ability to provide long run information in the following way: "...the ABC approach uses a small sample of historical information and simply extrapolates this to a long term situation...".

They then go on to criticise an article by Jeans and Morrow (1989), which had as its proposition that ABC-based product costs are

superior to more conventional product costs. In this article they use a "straw man" argument to make their case for the ABC system. A straw man argument consists of establishing a weak or non-viable option and then demonstrating the superiority of ABC to that option. Why they ask is ABC seldom, if ever, compared with a more viable alternation such as the contribution approach.

Jeans and Morrow (1989) further state that "the use of multiple cost drivers attributes the resulting costs to the products and customers that cause it". This Piper and Walley (1990) believe is a "tautology", i.e. use of words that needlessly or pointlessly say the same thing, because it was earlier asserted that activities cause costs. Secondly, ABC was used to provide meaningful product costs. This Piper and Walley (1990) believe would infer moving towards a true or real product cost which they believe is limiting. They conclude by saying that ABC does not stand up to close scrutiny on the basis that it has not yet been empirically tested or logically established. In fact, Piper and Walley (1991) in reviewing some of the early case studies, i.e. Siemens, John Deere Component Works and Tektronix (Cooper and Kaplan, 1991) have produced a counter-thesis, namely, that it is strategic decisions and not activities that cause costs.

2.5.4 Explicating the Logic of ABC

Robin Cooper (1990b) in replying to the Piper and Walley criticisms says "that while decisions precede activities, the number of decisions that can be made in a practical setting are so large that it would be impossible to explore each alternative. Realising this the designers of ABC systems have focused their attention on reporting the costs of activities". Cooper (1990b) dismisses the argument that traditional cost systems are a "straw man". If traditional product costs were a straw man, then traditional cost systems would report only the cost of goods sold and ending inventory valuations. Further, Cooper (1990b) in response to the argument that ABC logic is based upon a "clear tautology", replies "that ABC systems are designed using a two-stage procedure that underlies most modern cost systems. In an ABC system the first stage determines the cost of activities (relies on the assertion that activities cause costs), while the second stage determines the cost of products (relies on the assertion that products

consume activities)". In response to the point that ABC infers a move towards a real or true product cost, Cooper (1990b) argues that an ABC system approximates the consumption of resources by products. Finally, Cooper (1990b) argues that an ABC system is not a decision tool but rather an attention focusing device.

Piper and Walley (1991) still remain unconvinced of the logic of ABC. They say that not only is the underlying philosophy of ABC unconvincing but that the empirical justification is also spurious. That some organisations are using ABC does not mean that they will achieve superior profits. They ask a final question: "Is ABC an in vogue management technique or is it a profound development in our understanding of cost behaviour"? They strongly suspect the former. While activity analysis may be worthwhile, ABC may not be, they conclude.

In their follow-up monograph *Management Accounting: Pathways to Progress* Bromwich and Bhimani (1994) suggest further problems with ABC by pointing out that, because discretion is part of any cost determining exercise, a 'true' cost of production can never be ascertained. Noreen (1987) had similar doubts in asking "have Johnson and Kaplan discovered the *holy grail* of management accounting - the secret of determining true costs". Bromwich and Bhimani (1994) in comparing ABC to other cost systems, traditional or otherwise, contend that the "superiority of one costing system over another cannot be established unambiguously". They propose that ABC has not succeeded in addressing the problem of the 'overhead blob' which it had aimed to do by not absorbing the "facility sustaining costs" into products. This one large chunk of overheads under the ABC system remains 'below-the-line' and were these costs to be apportioned, it is by using arbitrary allocation bases, which, in turn would create cost distortions. Other problems which they raised include the problem of the jointness nature of a number of cost classifications. Set-up costs, often used as an example of an activity in ABC literature, show how joint costs are subjectively apportioned. They ask "should, for instance, set-up costs in switching from one product to another and back be allocated to both products equally?". They contend that such general problems of overhead allocation cannot easily be resolved through a change of cost system.

Due to resource restrictions, some companies are using a small number of cost drivers in their ABC system. Bromwich and Bhimani (1994) respond that this creates a distortion reflecting the differences between activities in the same cost pool, leading to a trade-off between accuracy and the costs of collection and processing of data. Therefore, it is possible that ABC is only viable in large corporations, where the expertise and resources are available to design and implement an ABC system. According to Parker and Lettes (1991) "a scale factor limits the complexity that small companies can handle and may prevent them from using similar systems". Cooper (1988b) adds to this criticism by reminding potential users that "there is no guarantee that the cost of the additional measurements required by an ABC system will be offset by the benefits".

Roth and Borthick (1989) claim that a major limitation of ABC is that a firm cannot wait until the end of a product's life cycle to compute costs. This implies that an arbitrary method of allocation of costs is necessary, as an interim solution. Thus, ABC does not resolve the problems of arbitrary cost allocations. They also indicate that as post-production costs, e.g., marketing, are not reflected in ABC cost data, this detracts from its usefulness as a management tool.

Drucker (1990) asserts that many of the drawbacks of traditional cost accounting systems are not adequately answered by ABC. Notable among these are the accusations that he makes of all costing systems:

a) their inability to measure the cost of not producing, as distinct from producing, (e.g. wages still need to be paid, etc.) and

b) all costing systems, (including ABC), assume that the factory is an isolated entity, where only internal variables are real. Everything else is speculation, including marketing / service factors.

It is also worthwhile to note, that one of the early advocates of ABC, H. Thomas Johnson (1992) offers words of caution to those making extravagant claims about the usefulness of ABC in a paper entitled *It's Time to Stop Overselling Activity-Based Concepts*. He suggests that companies that continually improve customer-focused

processes eventually discover that their process improvements eliminate most of the "overhead activity" that prompted the development of ABC in the first place. He goes on to say that due to the inability of ABC to inform managers of customer satisfaction, or if a process is capable of satisfying customer expectations, it will not obtain the process improvements required to become "globally competitive".

Considering that TQM, AMT, JIT etc. have been in use in Japan for quite some time, it would appear reasonable to assume that the Japanese would have encountered the same problems with their 'traditional' cost systems as their Western colleagues. That being so one would have expected them to have and devised methods of combating these problems. Not so! Although Japanese companies are aware of the criticisms of traditional cost accounting, Hiromoto (1988) found few Japanese companies agreeing with them. In large, highly automated plants, (e.g. Hitachi videocassette division) he says direct labour is still being used as the basis of allocating overhead. He goes on to say that "managers there believe that reducing direct labour is essential for cost improvement and that by maintaining a labour based absorption system ...a desired strong pro-automation incentive throughout the organisation...is created".

Perhaps the most damning indictment of ABC can be traced back to its origin. Cooper and Kaplan (1992) have clearly stated that with respect to ABC "the goal is to increase profits, not to obtain more accurate product costs". However, Innes and Mitchell (1990a) are unequivocal in their view that after reviewing the literature and practice of ABC, there is "no evidence to date that ABC improves corporate profitability". This is a view reiterated by Bromwich and Bhimani (1989) in stating that "there is no real evidence that ... profitability can be increased if this new technique is used in firms". They follow this up with a more succinct synopsis of their view which is published in the executive summary of their monograph (Bromwich and Bhimani, 1994). This states that "current evidence and experience suggest that those who urged the use of ABC as a revolutionary approach to accounting...have not yet provided a sufficiently strong case or the necessary empirical evidence to convince practitioners".

2.5.5 Suitability of ABC as a Formal Monthly Accounting Reporting System

Shank and Govindarajan (1993), do not believe that ABC is suitable as a formal cost system. They base their claim on a case study written by Cooper and Kaplan (1991). While the case study clearly highlights the benefits of ABC as a tool for strategic analysis, they believe that this benefit dissipates when it is seen as a formal accounting system and in compliance with external reporting requirements. Hartnett, Lowry, and Luther (1994) in a careful study of ABC with particular attention to enhancements since 1990, show a number of obstacles to its use in financial reporting. These include the conflict with SSAP 9 *Stocks and Work in Progress* and the exclusion of what Cooper and Kaplan (1991) call "facility-sustaining costs" from product stock valuations. They are also concerned with the question of capacity in that with ABC, the costs of activities are ascribed to products on the basis of a recovery rate derived by dividing pooled costs by practical capacity rather than by actual or budgeted volume. As practical capacity will in general exceed expected normal operating levels used as the denominator in conventional absorption costing, product costs under ABC will be lower than under the SSAP 9 guidelines. In addition as ABC 'capacity' is typically framed in terms of resource units supplied to perform each activity rather than some broad volume measure, these activities (and thus resources) are not demanded in the same proportions to broad capacity measures such as units produced or sold, direct labour costs, etc., which are the focus of SSAP 9.

They go on to note that since ABC's *raison d'être* is improved decision-making, including better product pricing and range decisions, opportunity costs can be incorporated into a firm's product-costing model. However, this would flout SSAP 9's definition of cost as "expenditure which has been incurred". They also comment on the use of standards rather than actuals and the frequency of the revision of standards. Their concern is that the numerous cost pools recognised under ABC and the way in which cost assignment, (*via* activities and cost drivers) in being affected by issues such as product mix and changes in work processes, leads inevitably to a requirement for frequent revision of standards. They argue that this is not only costly, but may conflict with financial

accounting's tenet of consistency. Finally, they assert that because ABC aims to allocate costs of organisational activities more completely to the products that consume the activities, the identification of activity costs and the choice of cost-drivers are not always objective and verifiable. They add that as ABC includes many steps to which subjectivity and a degree of arbitrariness could apply, e.g. activity identification, assigning costs to activities, selecting the best driver for each cost pool, this provides scope for managers to manipulate costs and makes auditing such results difficult if impossible. These concerns contribute to the view that the proponents of ABC have avoided discussing the merits of the framework for external reporting.

In summary, therefore while the major advocates of ABC have been from the US, it seems that management accounting academics in Europe and some notable exceptions in the US are more sceptical in their outlook. This is in contrast with the relative adoption rates in practice, the degree of prominence given to it in the academic literature and the continued interest in the framework as a basis for a number of other related initiatives.

2.6. Significant Prior Research

The research to date in this area has been primarily descriptive case studies, conceptual studies in the form of analytic modelling, field studies using statistical analysis and the survey based information on adoption and use.

Numerous case studies have described companies` cost systems and the problems associated with the traditional volume based costing systems. The seminal teaching case studies, Schrader-Bellows (Cooper and Weiss, 1985), John Deere Components (Kaplan, 1987) and Tektronix (Cooper and Turney, 1988), relating specifically to ABC, were followed up by a comprehensive series published by Professors Cooper and Kaplan from the Harvard Business School with appropriate readings in their class room text aptly titled "The Design of Cost Management Systems" (1991). The case studies, in documenting the view that the traditional cost system was perceived as being inadequate and required

management action, all offer positive support for the application of ABC. They have been categorised (Harsh, 1993) by the problems that prompted the analysis and revision of the cost system of the firm in question and can be matched (Appendix A) by the warning signals and the environments which foster the need for an activity based system (Cooper, 1987 a, b; Kaplan, 1989). These categories are;

1. in response to constituents or customers requests;

2. to support automation, process changes, or quality enhancement programmes;

3. as a result of inappropriate bids on prospective jobs;

4. to cost new products and designs;

5. as a result of increased industrial competition;

6. because the existing system is seen as inefficient and untimely.

As most of the case studies have been based on single firms and, in some instances, single facilities they have been subjected to the criticism that they may not properly reflect the cost and managerial behaviour in the firm or industry as a whole. Further, there is the view that perhaps only the successful implementation cases have been written and that ABC is not long enough in existence to be able to evaluate its long term effects.

As regards analytic modelling a number of studies have attempted to mathematically model an ABC system and, subsequently, test that model for its adherence to ABC assumptions, such as linearity of costs with cost drivers. Noreen (1991) concluded that ABC systems may not provide information which is perfectly relevant for decision making. Roth and Borthick (1991) illustrate the per unit product cost distortions that can result from violating the assumptions of homogeneity and proportionality. Banker and Potter (1992) modelled the profits earned by monopolists and by oligopolists who use either a perfect ABC system, an ABC system that imperfectly allocates costs or a direct labour hour cost driver system. They found that a

monopolist is always better off using an ABC system, even an imperfect ABC system. An oligopolist, on the other hand, is better off using a direct labour based system when the demand for the over costed labour intensive product is expected to increase relative to the demand for the undercosted activity intensive product. Finally, Radhakrishnan and Srinidhi (1992) demonstrate that a firm using an ABC cost system has the advantage of being able to calculate the product costs under the more refined ABC system and under the single cost driver system. This strategic use allows the ABC firm to strategically underbid its competitors who use a single cost driver system.

The statistical analysis research comprised a number of field studies of multiple facilities. Noreen and Soderstrom (1991) completed a cross sectional analysis of twenty two overhead accounts and their cost drivers from hospitals in the State of Washington. Their findings were that two-thirds of the overhead cost pools were not strictly proportional to their cost drivers. Banker and Johnston (1993) analysed the cost structure of twenty eight carriers in the U.S. airline industry. By using regression models they found that both volume and operations based cost drivers were important in understanding cost behaviour. Foster and Gupta (1990) looked at the relationship between overhead costs and various cost drivers in thirty seven plants of one multinational electronics firm. They gathered data by way of a questionnaire survey and to a lesser extent by interviews and plant visits. They found that the volume related cost drivers were more consistently correlated with manufacturing overhead costs than were the complexity or efficiency cost drivers. Banker, Potter and Schroeder (1992) in a study somewhat similar to the Foster and Gupta (1990) study looked at the relationship between overhead costs and various cost drivers. In doing so they gathered data from thirty one separate companies drawn from the electronics, machinery and automobile components industries. Having analysed the data they found that all variables, volume and complexity, were significantly related to manufacturing overhead costs.

Finally, a number of surveys have been undertaken in order to assess the degree of interest and adoption of ABC. These have already been discussed at length in section 2.2.10. In general, they present a picture of very strong initial interest by the larger firms

followed by adoption rates of up to 20%. Current practice would seem to suggest that full ABC costing system adoption rates have tapered off with a large number of firms using the concepts and/or techniques in a partial way to assist in cost management and other programmes. An exception to this trend is the large UK financial institutions. They have become enthusiastic adopters of the ABC concepts in the last two to three years (Innes and Mitchell, 1997).

In summary, therefore, it is felt that whilst the case studies and survey information were positive and could be classified as both comprehensive and rich in realism, they suffer from a loose causal link. This allied to the fact that there is not unanimity from the conceptual and field studies leads to the conclusion that more research needs to be done before ABC and its set of techniques can be said to stand up to full academic rigour.

2.7. Conclusions

The problems caused by the "lost relevance" of management accounting, which was attributed to the obsolescence of traditional management accounting techniques, triggered the development of activity based management concepts in the 1970s and 1980s. Basically, the proponents of these developments assert that the causes of costs, and ultimately, profitability in most organisations are too complex to understand or to control by referring to the financial information recorded in the standard accounting records or reports. Instead, organisations must manage their financial results by tracking costs with information about activities. This process should identify what activities are consuming resources and allow the organisation to satisfy customer needs better, maintain and improve competitiveness and, finally, profitability.

The traditional management accounting system is not capable of providing the type of information that most organisations required in order to compete effectively. It gives misleading signals about product cost and adopts a closed, historical and inward-looking focus. Specifically, it does not accurately reveal the high costs of complexity caused by the proliferation of product lines, the globalisation of markets, generally, and the dramatic change in the cost profile of most organisation in the last thirty years in particular. It

continues to use volume sensitive drivers to attach overhead costs to products. This maybe a convenient and economical way to insure that production costs are properly matched against revenues at a macro level in financial statements but is not appropriate for today's business environment. Many manufacturers in the 1970s and 1980s made erroneous strategic marketing decisions, which led to diminished profitability and in some case's business failure as a result of relying too much on the information generated by this system.

In addition by using this information managers became increasingly divorced from their customers, markets and manufacturing operations. Their concentration switched to the statutory and regulatory requirements of the organisation and the need to achieve short term goals set down by the major stakeholders and the financial community generally. In doing so they lost sight of the need to change the way information was being presented in an ever changing business environment. This gives rise to the question as to what type of information is appropriate for today's business practice. In attempting to answer this question we need to learn more about the role of management accounting systems in modern organisations and how they can cope with an evolving situation. The solution probably lies somewhere in a greater understanding of the concepts and techniques that form part of the activity-based management framework.

Activity-based management purports to undo many of the flaws of conventional management accounting as they provide the organisation with both the strategic cost focus and the operational control information it needs in order to be competitive and profitable in this new and ever changing global environment. By facilitating management analysis, choice and implementation it can bridge the information gap that conventional management accounting systems are perceived to have either created or ignored.

Finally, the ABC approach is not without its critics. Serious questions have been raised as to its basis logic, its claims in regard to product costing and the contribution it makes to the firm's "bottom line". In the final analysis, it may properly be seen as another, albeit important,

"calculative technology" to assist management to make decisions in an increasingly complex and competitive environment.

CHAPTER 3

3. HYPOTHESES SPECIFICATION & DEVELOPMENT

3.1 Introduction

The primary research objective of this study, as introduced in Chapter 1, is to empirically test the association between the introduction of the activity-based costing techniques (ABCTs) and firm performance. This chapter begins with a discussion of the theoretical argument underpinning the efficient market hypothesis as the basis for assessing firm performance. It continues with a review of the literature on long-term stock performance and the decision to use a three year performance "window". Given the volume and diversity of the literature on ABC in its short life, a contextual framework is then presented as a basis for synthesising the key attributes or characteristics of the ABC set of techniques. The link between the ABCTs and market value is then developed followed by a statement of the hypothesis to be tested.

3.2. Theoretical Argument

Financial markets exist in order to facilitate the transfer of funds between investors and firms. These markets must operate efficiently in order to ensure that investors can buy or sell stock at a "fair" price and firms can obtain funds at a cost commensurate with the risk of the business activities being undertaken. This notion of efficiency is, therefore, fundamental to the allocation of resources and, consequently, an important determinant of overall economic growth. In this context the stock price is the ultimate arbiter of managerial performance.

The efficient financial market concept is conventionally defined as one "in which prices always fully reflect available information" (Fama, 1970). It exists when stock prices reflect all available information about the economy, the financial markets themselves and the specific firm involved. Put more formally this means that the unanticipated portion of the return earned on a stock is unpredictable

and on average does not differ systematically from zero. In effect this means that there is an intrinsic or fundamental value for each stock and that the actual share price will equal that value. Thus, by implication, stock prices should adjust instantaneously and in an unbiased way to any piece of new information released to the market. This aspect has been further developed over the years and using the definitions of Fama (1970) was tested in three forms.

Weak-form market efficiency means that the unanticipated return is not correlated with previous unanticipated returns. Semi-strong-form market efficiency means it is not correlated with any publicly available information and strong-form market efficiency means the unanticipated return is not correlated with any information, be it public or private information. This study interprets the efficient financial market concept in a semi-strong form as empirically tested by Losey and Talbott (1980) and in a strong form as empirically tested by Affleck-Graves et al (1987).

The efficient market hypothesis was first empirically tested by Fama (1970) and became the basis of a huge volume of research activity thereafter. It has become as Jensen (1978) said "the best established fact in all of the social sciences and no proposition in any of the sciences is better documented". Whittington (1986) asserts that "the empirical approach has become almost a cult among ambitious young academics especially in the USA". Most of the work has been done on the situation in the USA and to a lesser extent in the U.K. This is due to the fact that the concept is of more interest and significance in those countries due to the pivotal role of the financial markets and the process of corporate reporting underpinning its operation. Hawawini (1984) in his review of the U.K. market, the basis of this study, concluded that it was semi-strong efficient. This means that the share prices set by the market do not leave opportunities for abnormal returns for investors who have publicly available information. In addition, security markets are highly efficient processors of new information and regulatory supervision promotes fair and equitable trading, and the prevention of fraud.

The notion of efficiency in regard to the stock market is qualified to mean "economically efficient". This means that the investor after acting on information to trade securities and subtracting all costs

would have been as well off with a simple buy-and-hold strategy. In such a market, some stock could be priced slightly above their intrinsic values and some slightly below. Lags can exist in the processing of information but not in such a way that the differences can be exploited.

As this study is based on the performance of stocks listed on the UK market, the question of international asset pricing and issues such as market integration or segmentation do not arise.

Despite this interpretation, there are a number of anomalies worth noting. The techniques or strategies that appear to be contrary to the notion of an efficient economic market include post-earnings-announcement drift, short-term overreaction, long term drifts in stock returns following equity issuance, stock repurchases, dividend initiations and stock splits.

There is some evidence that the market does not rapidly and fully impound the information content of financial reports into share prices (Ball and Brown, 1968; Latane, Tuttle and Jones, 1969). Jones, Rendleman and Latane, (1984) later documented this effect through the identification of the size of the *standardised unexpected earnings* in regard to 1,000 firms in the period 1972-1980. Their study found long run positive drifts in stock returns for firms with positive earnings surprise and negative drifts for stocks with negative earnings surprise. These drifts can last for several months, and possibly even for one year. This result is a violation of the semi-strong market efficiency form. Bernard and Thomas (1989) in attempting to explain this "lag" effect distinguish between "the failure to control fully for risk" and a "delayed price response to information". They conclude that the most plausible reason is a combination of traders *not recognising fully the implications of current earnings for future earnings* (Ou and Penman, 1989) and, to a lesser extent, the presence of transaction costs. These pricing errors or under-reaction effects were seen to be particularly pronounced for small-thinly traded firms.

Short-term overreaction is the tendency for individuals to overweight recent information and underweight basic data. De Bondt and Thaler (1985; 1987) ranked stocks on the basis of their returns in the

previous five years. They classified the top 50 stocks as "winners" and the bottom 50 as "losers". Subsequent performance, however, showed that, on average, the "losers" outperform the "winners" in the year following the ranking. This suggests that investors overreact to new earnings figures and as a result stock prices depart at least in the short-term from their underlying fundamental values (De Bondt and Thaler, 1985; 1987). Potterba and Summers (1988) also found that there are transitory components in stock prices in their analysis of U.S. and U.K. data. The implications of these findings are that investors have an excessively short-term orientation and that there is a bias against firms investing in long-term projects. However, these findings have been subsequently challenged on both statistical and conceptual grounds by Conrad and Kaul (1993). They conclude that there is no evidence of market overreaction. The abnormal performance, documented in earlier studies, was due to a combination of a biased performance measure and a "January" effect that is unrelated to prior performance. This result had important implications for a number of empirical studies. It is reflected in the weight given to the holding period returns (HPRs) methodology versus the cumulative adjusted returns (CARs) in this study.

Clearly the efficient market hypothesis has implications for the pricing of new stock issues. If investors have homogeneous beliefs new stock issues should be equal to their equilibrium values. However, research studies (Stoll and Curley, 1970; Ibbotson, 1975; and Stern and Bornstein, 1985) found statistically significant abnormal returns in the short-run performance of the IPO firm. They conclude, however, that the "results generally confirm that there are no departures from market efficiency in the aftermarket".

However, Ritter (1991) found a substantial (over 27%) underperformance for IPOs in the first three years following the offering. This finding was robust across both different calendar years and different industry groupings. Loughran and Ritter (1995), in looking at both initial public offerings and seasoned equity offerings, conclude that investors are periodically overoptimistic about the earnings potential of young growth companies. Firms take advantage of these "windows of opportunity" to issue new stock when, on average, they are substantially overvalued. Their findings carry with

them a "warning label" for any potential investors in new equity issues of small thinly traded firms - *caveat emptor et venditor* (Ritter and Silber, 1989).

Spiess and Affleck-Graves (1995) also document significant long-term underperformance by firms that made seasoned equity offerings. They found the underperformance to be more severe for the smallest, youngest and NASDAQ-traded firms, and those with the lowest market-to-book ratios. They restricted their sample to include only primary seasoned offerings in the interests of removing confounding effects from other factors and used a more comprehensive matching methodology than Loughran and Ritter (1995). As most of the research in this area used U.S. stock issue data, documented long-term underperformance by rights issuing firms listed on the Johannesburg Stock Exchange (Affleck-Graves and Page, 1996) is worth noting. Because of specific exchange listing rules in South Africa the "window of opportunity" management timing hypothesis explanation is not valid. Affleck-Graves and Page, (1996) posit the view that the underperformance is better explained by either a market cycle hypothesis or that all stock issues convey a negative signal of the firm's value (Miller and Rock, 1985).

Research by Levis (1993) documents similar long run underperformance following UK IPOs during the 1980s. This shows that the long-run underperformance of IPOs is not a phenomenon unique to the U.S. new issues market. Overall this allows one to conclude that the negative signalling effect of new stock issues is not fully revealing and that this is clear evidence of a persistent and economically significant market inefficiency.

The anomalies identified in regard to the issue of new equity, in whatever form, are also empirically evidenced following share repurchase transactions, albeit in the opposite direction. Lakonishok and Vermaelen (1990) for repurchase tender offers and Ikenberry, Lakonishok and Vermaelen (1995) for open-market share repurchases, document positive abnormal returns at the announcement date and for two or four years thereafter. Given that stock repurchases are regarded as positive signals of firm value, the empirical evidence suggests a persistent and economically significant market inefficiency.

Further evidence of similar long-term drift patterns in stock performance is evidenced by market reactions to initiations and omissions of cash dividend payments (Charest, 1978; Christie, 1990). Michaely, Thaler and Womack (1995), using a trading rule that combines both dividend initiations and omissions, find abnormal returns in 22 of the 25 years observed. Consistent with prior research, they find the magnitude of short-run price reactions to omissions (Healy and Palepu, 1988) to be greater than for initiations (Asquith and Mullins, 1983; Healy and Palepu, 1988). No convincing explanations are offered for these deviations from the market efficiency paradigm. In keeping with other long-term market price drift phenomenon, information asymmetry and intensity, transaction costs and thinly traded firms were cited as possibilities.

Notwithstanding the identification of the above anomalies, there is a substantial body of evidence that the market reacts strongly to earnings announcements. A number of research studies in the U.S., by Rayburn (1986), Wilson (1986, 1987) and Bowen et al. (1987) and others, have empirically documented the explanatory power of earnings and cash flow information on stock returns. This follows on the seminal work of (Ball and Brown, 1968) and Beaver (1968). It is augmented by similar findings by Madani (1995) in regard to stock valuation in the U.K. market. Ball (1988) argues that there is good reason to believe stock markets to be efficient on *a priori* grounds, because such markets are "paradigm examples of competition". This evidence is broadly consistent with the hypothesis that the market uses earnings information to predict future dividends (Beaver, 1981; Watts and Zimmerman, 1986). There is also clear evidence that a significant proportion of the information content of reported earnings is anticipated by the market. This is especially so for large actively traded firms (Donnelly and Walker, 1995).

On balance, the principle that financial markets generally behave efficiently has stood the test of time. This in effect means that, given "good" information to the market, stocks are normally fairly priced and reflect an approximate current value based on the expected firm's lifetime cashflow. Consequently, it would be difficult to consistently outperform the local market index for the same level of risk. Recently, several studies documenting long term drifts have challenged the efficient market hypothesis. Whether these studies

mark the demise of the efficient market hypothesis or whether they are merely the result of methodological errors, remains an open question.

Further a number of writers (Grossman and Stiglitz, 1980; Lorie et al, 1985) have pointed out the curious paradox that stock markets are efficient only if a sufficiently large number of investors disbelieve its efficiency and behave accordingly. In other words, the economically efficient market theory requires that there is a sufficiently large number of market participants who in their attempts to earn profits, promptly receive and analyse all the information that is publicly available about firms. In this study, the author assumes that markets are reasonably efficient in the information sense described above, particularly, in the long-term. However, we do not rule out the existence of market imperfections that can on occasions affect stock prices.

Finally, as the results of this study are based on firms drawn from the top 1000, the findings of Dharan/Ikenberry (1995) that "larger firms, that are more widely held by institutional investors, show little evidence of poor-post-listing performance" are worth noting. This means that the larger firms are likely to be fairly priced and not subject to the above anomalies. This underpins the results of this study and the decision to use a three year window of analysis. By so doing the debate about short versus long-run market efficiency is to a large extent avoided.

3.3. Contextual Framework

In studying the system of ABC, it may be useful to place it in the context of the triptych of problems, programmes and technologies as summarised by Miller and O`Leary (1993). They consider managerial expertise to be a loose assemblage of these three types of practice. Problems they see as an inherent part of the modern industrial environment with management constantly looking for ways to deal effectively with them. Programmes reflect the dynamic action of a variety of agents and agencies promoting new ways of thinking about the product and factory and suggestions on how to overcome existing deficiencies. Thus the problematization and programmatic

aspects of managerial expertise have a reciprocal relationship to each other. Technology expertise reflects the needs to interlink the key areas of accounting, architecture, industrial engineering and design by computer simulation and the development of predictive costing software. In summary, Miller and O`Leary (1993) use the term "politics of the product" to characterise the multivalent nature of these debates, arguments and strategies that centre on the factory and the manufacturing process.

Miller and O`Leary (1993) use these three dimensions to show that attempts to transform the "calculative technologies of accounting", e.g. ABC, should be seen as more than just technical devices for better representing new manufacturing systems. They posit a new form of "economic citizenship" which entails novel relationships between and among companies, their employees and technology. They see this citizenship as one of continual entrepreneurship and creativity aimed at sustained capacity for design and manufacturing innovation. Embedded in this way of thinking is the conviction that management need to possess or visualise the "facts relevant to the management of manufacturing enterprise". They contend that "the complex reality of the enterprise is to be made familiar and plain by envisaging it as a dense, interlinked network of the ordinary actions and movements of people and technologies". Ostrenga (1990), from his experience as a cost management consultant, concludes that "the focus shifted inevitably to the effect that activities and activity-consuming resources have on the economics of the business". Activities are therefore seen as the fundamental building blocks of total cost management and competitive advantage (Borden, 1990; Cooper, 1989; Cooper and Kaplan, 1988 and Kaplan, 1985, 1986).

The current debate on the significance of this new phenomenon called ABC has been fuelled firstly by the debate that hitherto a calculative mentality among senior American managers, allied to a dominant capital market mode of governance, had resulted in a lack of a genuine understanding of the product or process and a disregard for the customer. Secondly the apparent obsolescence of some of the core technologies of accounting for manufacturing (Howell and Soucy, 1988; Hronec, 1986; Johnson and Kaplan, 1987 and McIlhattan, 1988) have called into question the relevance of accounting in the modern manufacturing environment. According to

Miller and Vollman (1985) accounting technologies for the active management and reduction of overheads, often the single most significant cost category, do not exist. As General Motors Chairman Roger Smith (1989) acknowledged, product cost numbers in American enterprises were often grossly inaccurate, particularly in the case of factories making multiple, differentiated products, because accounting technologies that would accurately assign indirect costs to products had often not been installed (Cooper, 1987 a, b). These views reflect the extent of the perceived obsolescence of the traditional volume based costing systems and the need to understand more fully the contribution ABC makes to company performance.

Given that ABC can be thought of as a "technology" it is useful to briefly identify the "problems" out of which ABC was born and the "programmes" that developed and promoted it.

3.3.1 Problems out of which ABC was Born

Managerial expertise is constantly evaluating its environment in order to identify problems and to classify and make amenable programmes. These programmes evolve on a plane of proposals, arguments and counter-arguments put forward by interested parties including professional groups, trade unions and government agencies. Through their action an agenda of issues and proposals emerge.

Accounting held out the promise of demarcating a financial domain that would be neutral, objective and calculable, and that would allow the corporation to be governed and administered according to the "facts" (Hopwood, 1984 and 1986; Loft, 1986; Miller and O`Leary, 1987 and Miller, 1991b). This objectivity and neutrality of calculative expertise was also expected to achieve several ideals. For example, it was to bring the facts of costing to light (Loft, 1986), to enable the pursuit of efficiency in the public sector (Hopwood, 1984), to enable the state to govern better both private enterprises as well as those entities formally tied to it (Miller, 1990, 1991a), to translate the moral into the factual (Miller and O`Leary, 1989) and to regulate management-labour relations (Bougen, 1988) to mention just a few.

By articulating the potential contribution that it could offer to diverse domains accounting was elevated to a position of dominance within the boardroom (American Accounting Association 1970 and Burchell *et al.* 1980, 1985). The expertise on which this dominance was built is now being increasingly questioned in a much changed and dynamic environment.

This environment has seen global competition intensify and an explosion in the rate of technological innovation. This has meant that organisations must understand their business processes, respond almost instantaneously to their customer needs and plan both strategically and on an integrated level. In this regard the quality and relevance of the management accounting information is crucial for both survival and sustained growth. In to-day's global competitive environment, companies are competing in terms of quality, on-time deliveries, reliability, after-sales service, innovation and customer satisfaction. None of these variables, however, are directly measured by the traditional accounting system which places major emphasis on the bottom-line. As a result, little attention is paid to the determinants of financial success.

These ideas are well summarised by Johnson and Kaplan (1987) in their seminal work "Relevance Lost: The Rise and Fall of Management Accounting". In particular, they contend that management accounting was in a major crisis, stating that;

> "Today's management accounting information, driven by the procedures and cycle of the organisation's financial reporting system, is too late, too aggregated, and too distorted to be relevant for manager's planning and control decisions"

They were supported in this view by a number of writers. Lewis (1993) summarised the main problems which many companies had with management accounting information in the following way: information does not support business priorities; important information is hidden in a maze of detail; information is too late to be useful; information is expressed in financial terms; information supplied is often inaccurate due to simplistic and arbitrary cost distribution measures; information supplied is period based rather than strategically organised and information is structured to reflect

the organisational structure not the activities and processes. These views are not in keeping with the high ideals expressed earlier and give rise to the conclusion that there is substance to the perceived obsolescence of traditional management accounting systems.

What is required is a balanced set of measures which, while recognising the importance of the financial dimension, reflect the organisation's strategic objectives and competitive demands. No single measure or system can provide a clear performance target or focus attention on the key success factors of the organisation. The management challenge, therefore, is for companies to adapt their performance measurement systems to the realities of to-day's competitive and dynamic environment.

3.3.2. Programmes

In an attempt to remedy the perceived obsolescence of traditional volume based costing systems Robin Cooper (1988 a, b) developed, along with Robert Kaplan (1989), a new approach to product costing known as ABC. Later ABC was broadened to include Activity Based Cost Management (ABCM) by Turney (1992a) and Clark and Baxter (1992), and was the basis of a number of other frameworks.

Although there is some evidence that ABC type approaches (Staubus, 1971; Kilger, 1981; Morgan and Bork, 1993 and Kim, 1994) existed before the late 1980s, it was following the work of Professors Cooper and Kaplan from the Harvard Business School that the concept and debate gathered serious momentum. The Schrader–Bellows (Cooper and Weiss, 1985), John Deere Component Works (Kaplan, 1987) and Tektronix cases (Cooper and Turney, 1988) were the original ABC systems to be described. The combination of practitioners, who designed and effected its practical implementation and academics, who translated it into a general framework, gave rise to its current popularity and status. They were the principal agents in setting the agenda of issues to be addressed from which the proposals and arguments for change evolved.

3.4. Attributes of ABCT

3.4.1. Introduction

In this study, ABC should not be viewed as a substitute for or a better alternative to traditional costing systems. Rather it could be seen as a "new technology", a new way of thinking with the potential to offer new insights (Friedman and Lyne, 1995) into how to better manage the organisation. The ABC technique could be seen as "evolutionary" in the sense that it extends conventional theory rather than challenging or overturning it. This is in line with the Bromwich and Bhimani (1989) report entitled "Management Accounting: Evolution not Revolution". Their subsequent work in 1994, entitled "Management Accounting: Pathways to Progress", in consolidating that position drew attention to the interrelationships between accounting activities and other enterprise processes. They also added the rider that "progress along pathways can involve hardwork, along circuitous and undulating routes which may sometimes become impassable or dwindle away, however promising the original outlook".

The other view of contemporary management accounting practice has its origins in the work of Johnson and Kaplan (1987), entitled "Relevance Lost: The Rise and Fall of Management Accounting". They saw ABC as a "revolutionary" approach and in line with their Darwinist assumptions of accounting evolution. They questioned the ability of the traditional volume based costing systems to deal with the complexities of the modern manufacturing environment and were supported by others including Sheridan (1989) who stated that:

> "Tragically many companies spend their time on the sheer mechanics and arithmetic of allocations, building up cost cascades that are a wonder to behold but which are not easily understood by the recipients and add little to the decision process".

Irrespective of whether you accept the Bromwich and Bhimani or the Johnson and Kaplan view of the historical development of management accounting practice there is no doubt that the introduction of the ABCTs could have wide-ranging consequences from a practical standpoint. They could, for example, instigate a fundamental change in product strategy and, therefore, by their adoption be revolutionary in their effects. On the other hand they could add an extra, albeit small, dimension to the information output of the firm and, therefore, be part of the evolutionary process of the organisation. Whichever perspective one chooses to adopt is determined by the strength of the link between the introduction of the ABCTs and firm performance. In seeking to understand more about this relationship the next section summarises what the author sees as the key attributes or characteristics of the ABCTs under the following headings:

1. a more equitable allocation of overheads
2. an ability to deal with a complex and opaque cost base
3. an ability to integrate non-accounting aspects, and
4. a control device.

3.4.2. A More Equitable Allocation of Overheads

ABC has the ability to allocate costs to the lowest meaningful level and in so doing to treat as many costs as is possible as variable (Stephen and Ward, 1990). It is a system that attempts to identify the causal relationship between the incurring of cost and activities and thereby facilitates better quality product cost information. Sharman (1990) states that "activity based costing provides a relatively accurate product cost because it captures many dynamic variables". It has the ability to operate in a highly flexible mode and to be applied to all overhead costs and not just production and volume related overheads. According to Innes and Mitchell (1990a) "the accurate analysis of profitability by market segment, product line, distribution channel and customer which underlies business strategy formulation is dependent on ABC being extended to include these non-production overheads". Also ABC, because of its potential to attach costs to cost objects and not the final product, is particularly suitable for use in the services sector. Winchell (1987) cite examples

of this in regard to how costs can be attached to a variety of distribution channels and Bellis-Jones (1989) show how it can help in the analysis of customer profitability.

In summary, the ABC technique determines the underlying "driver" of the activities, establishes cost pools related to the individual drivers, develops costing rates and applies cost to the products on the basis of the resources consumed. It has evolved out of the perceived inadequacy of the traditional volume based product cost systems in an environment of much greater competition, expanding product mix, diversity and increased manufacturing automation.

3.4.3. An Ability to Deal with a Complex and Opaque Cost Base

The ABC techniques or expertise purport to render operable solutions to problems through the development of a network of procedures. Thus, for instance, accounting has a range of measurement and calculative routines in order to approach problems. In instances such as ABC it attempts to either develop new technologies or repackage old ones in order to address new problemizations in the management of an increasingly complex and opaque cost base in industry. These problemizations are a consequence of the advanced management systems defined by Kim (1994) as a "very complex system of machines, computers and people, developing and producing products with great efficiency". The use of the cost driver concept to better understand the high overhead cost profile and resultant behaviour is of particular importance at a time when a consensus programme revolving around competitiveness and maximum responsiveness to the market has evolved in industry.

In viewing ABC as a "new technology" this is part of the "new economic citizenship" articulated by Miller and O`Leary (1993) which aims to improve and remould industry and management practice. The ABC approach allows a realignment of management attention onto activities as distinct from the traditional volume based systems concentration with administrative and departmental cost centres. In summary, by facilitating a greater understanding of factory layout and non-volume related overhead costs it helps management in its

search to make its work more "calculable" and thereby renew or revisit some of the proud ideals of the accountancy profession in the past.

3.4.4. An Ability to Integrate Non-Accounting Aspects

This is an extension of the "new economic citizenship" concept developed by Miller and O`Leary (1993) in their 1994 publication entitled "Accounting, "Economic Citizenship" and the Spatial Reordering of Manufacture" and is closely linked to the organisations ability to deal with a complex and opaque cost base. The Miller and O`Leary (1994) publication, which was based on the new "assembly highway" at the Caterpillar Inc. plant in Decatur, Illinois, documents the effects of rethinking factory layout and seeks to understand the complex economic and personal dimensions of an advanced manufacturing operation. It concludes that "it is the novel arrangements of persons and things on the factory floor, the new ways of making calculations of the spaces thus formed, and the distinctive conceptions of the capacities and attributes of the individuals who are to occupy such spaces, that gives content to the notion of a new economic citizenship. ABC with the dual characteristics of diversity and enrichment as distinct from conservation and uniformity which are more closely aligned with traditional costing systems gives visibility to the various components of cost by disclosing the source of resource consumption. This is due to the potential of the ABC process to produce costings from various perspectives by resource usage.

This pressure to supply more diverse information arises due to the need to supply multiple representations of the same events or facts. For instance the costs attached to an individual product may differ depending on the purpose of the valuation. The most suitable figure for inventory valuation may be inappropriate for evaluating relative contribution to profitability (Miller and Vollmann, 1985) across a range of products sold in varying volumes. Enrichment can be achieved by utilising insights from non accounting fields such as engineering and information systems in conjunction with the ABC principles.

ABC is sometimes referred to as transactions costing because of its association with transaction cost theory. Transaction cost theory according to Arrow (1969) deals with the " costs of running the economic system" and a transaction is defined by Williamson (1986) as occurring "when a good or service is transferred across a technological-separable interface". Miller and Vollmann (1985) in emphasising the importance of the ABC set of principles state that "logistical, balancing, quality and change transactions account for significant and growing proportions of overhead costs in the contemporary factory".

In summary, the process of activity identification forces management to analyse the minutiae of the company's production in a comprehensive manner and within an economic frame of reference. This analysis should highlight areas within the process where waste and/or non-value adding activities occur and establish how much influence management can exert over these activities (Innes and Mitchell, 1990a). ABC "could also mean implementing continuous improvement programs in order to enhance quality, reduce set-up time and improve factory layouts" (Cooper and Kaplan, 1991). The detailed analysis of the production process and the allocation of an easily understandable measure to activities in the process, (i.e. costs/pounds), helps workers to see exactly how specific improvements affect the bottom line. Bhimani and Pigott (1992) in following this theme describe how ABC "made it possible to identify the economic impact of any changes within manufacturing at individual points of the production process".

3.4.5. A Control Device

ABC could be seen as an example of a control device in the spirit of "panopticon" as mentioned by Foucault (1977) and based on the work of Baumol (1982) on contestable markets. Although Foucault never wrote about accounting, his approach influenced a number of accounting scholars who saw accounting as a disciplinary technique built upon the knowledge created through the accounting system. The essence of contestable market theory is the need to maintain a cost advantage over one's rivals if the enterprise's strategies are to be sustainable. By enabling the "managing of managers" (Hopper

and Armstrong, 1991) ABC replicates the production processes and makes them visible on paper. Therefore ABC, with its attention on the technical detail, has the potential to enable those in power, i.e. corporate managers, to exercise control from a distance through the impersonal mechanism which depersonalises the act of control, while at the same time minimising their costs in the interests of competitive market pressures. It can go further by creating in organisations a reality of costs and profits which shapes actions and events far beyond its immediate surroundings.

The above headings and presentation are consistent with the work of Friedman and Lyne (1995). They summarised the essential features of ABCT under headings such as emphasis on activity analysis, enlarged concept of cost variability, flexibility (different costs for different purposes), compatibility with a general process approach to organisations, i.e. BPR, potential use and benefit to non-financial managers, diversity in use and wider application than traditional VBC system.

In essence, ABC should not be viewed as just an accounting technique but rather as a management tool with many characteristics and applications. Its potential to aid cost management is evidenced by the novelty and variety of the types of information that it can provide. This information has the capacity to direct management's attention to areas where action can improve profitability. The significance of ABC is that it helps to identify the opportunities and problems which should be the concern of managers. The impact its implementation has on firm performance is the core issue being addressed in this research study.

3.5. Hypothesis Generation

In developing the potential hypothesis, answers were sought to a number of questions such as the following;

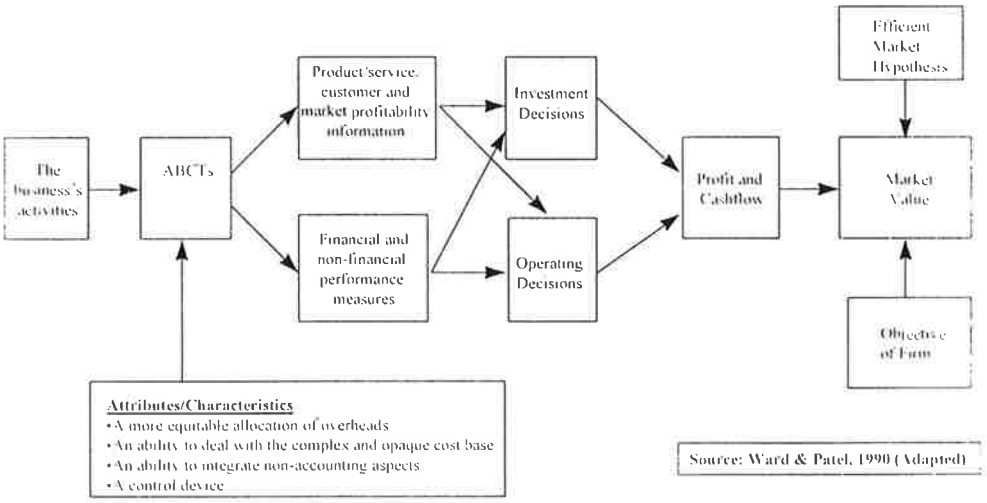
- Do the ABCTs have a measurable benefit?;
- How do we know that a benefit exists?;
- Is there any proof of a measurable benefit other than the anecdotal case studies and the conflicting field work? and
- Is there a relationship between the introduction of the ABCTs and the "bottom line" and/or some other performance metrics?

Further, Bromwich and Bhimani (1989) state the need to empirically test these questions by stating that "there is no real evidence that .... profitability can be increased if this new technique is used in firms". Innes and Mitchell (1990a) support this view by stating unequivocally that there is "no evidence to date that ABC improves corporate profitability".

These questions are embedded in the literature through Cooper and Kaplan`s (1992) view that "the goal of ABC is to increase profits, not to obtain more accurate costs" and, by so doing, create, measure and improve value for the organisation's shareholders. Consequently, the question is primarily a cost-benefit one in seeking to determine if the ABCTs add value beyond their cost. This is consistent with the widely accepted finance paradigm that the objective of the firm is to maximise shareholders` wealth (Copeland and Weston, 1988) as evidenced by the firms` market value on a daily basis. Given that the SVA framework is the process of analysing how business decisions affect “economic value” through the identification of the key value drivers (Wenner and Le Ber, 1989), ABCT`s can provide the information crucial to an understanding of how a firms` competitive advantage is generated (Ward and Patel, 1990).

Figure 3.1 integrates the resourceful, evaluative, maximising model of human behaviour (Jensen and Meckling, 1994) with the SVA framework for linking management decisions and strategies to value creation. Given the primary financial goal of the firm is to maximise shareholder wealth, management use sophisticated techniques, such as net present value (Gordon and Pinches, 1984), to guide their actions and strategies. This decision-making tool depends on quality and relevant information to be of benefit. The ABCTs, with the characteristics/attributes set out in Figure 3.1. have the potential to provide such information. Finally, the model is operationalised in the context of an "economically efficient" capital market.

Figure 3.1. The Link between ABCTs and Market Value



As the nature of the relationship between the introduction of the ABCTs and firm performance is somewhat ambiguous, there is a need to empirically test if a causal link exists. Consequently, this issue is primarily an empirical rather than a theoretical one and gives rise to the general research question in this study, namely, "*is the introduction of ABCTs associated with significantly improved or increased firm performance ?*".

This leads to the formulation of a single-sided null hypothesis as follows:

H_o: *The adoption of the ABCTs does* ***not significantly improve*** *a firm's relative performance.*

H_o: $\mu_{abc} = \mu_{nabc}$

where

μ_{abc} = mean performance of firms that have adopted the ABCTs and;

μ_{nabc} = mean performance of firms that have not adopted the ABCTs

This can be written equivalently as H_o: $\mu_{abc} - \mu_{nabc} = 0$. By setting the difference between the two populations equal to μ_d, H_o is expressed as $\mu_d = 0$.

The alternative hypothesis is:

H_a: *The adoption of the ABCTs does* ***significantly improve*** *a firm's relative performance.*

H_a: $\mu_{abc} \neq \mu_{nabc}$

where

μ_{abc} = mean performance of firms that have adopted the ABCTs and;

μ_{nabc} = mean performance of firms that have not adopted the ABCTs

This can be written equivalently as H_a: $\mu_d > 0$.

In order to empirically test the general research question, the null hypothesis is expanded into the following statistical hypothesis:

1Ho: There is **no significant difference** between the performance of a portfolio of firms adopting ABCTs when compared with a set of matched firms that do not use the ABCTs.

The decision to use a single-sided hypothesis was based on the understanding that the ABC process has the potential to provide meaningful and relevant information. It can play an important attention-directing role by indicating those products/services where resource consumption is high relative to their revenue generation. This should encourage a forward-looking focus and provide the basis for better informed management decision-making. Theoretically, a firm should perform better if it employs sophisticated rather than naive management decision-making techniques (Fama, 1977; Rubenstein, 1973 and Myers and Turnbull, 1977). As the ABCTs can contribute to both the operational and investment activities of the organisation, increased value should logically accrue. The use of the term "techniques" is deliberate and based on the study by Friedman and Lyne (1995) of eleven firms that had implemented ABCTs. They found a great variety in the way that firms implemented ABCTs. They concluded that the general classification of ABC and ABM meant different things to different firms and were interpreted in a broad rather than narrow sense.

In framing the above hypotheses, it is worth repeating at this point that, this study adopted the normative definition of management accounting as stated by Wilson and Chua (1993) namely:

> "Managerial accounting encompasses techniques and processes that are intended to provide financial and non-financial information to people within an organisation to make better decisions and thereby achieve organisational control and enhance organisational effectiveness."

This is consistent with the view that management accounting systems should be organic, flexible and task oriented within a contingency theory perspective. The flexibility of ABC has been

promoted as one of its major advantages (Cooper and Kaplan, 1991). It allows customers, distribution channels or any other cost object and not just production to be analysed. Armed with this information, management are able to make better strategic decisions, such as pricing, product mix, customer profitability analysis and product redesign. These decisions and the resultant managerial action should logically impact firm performance. Finally, the external focus of strategic management accounting and the complementary central theme of the "balanced scorecard" concept (Kaplan and Norton, 1992) are firmly based within the stated attributes or characteristics of the ABCTs tested in the study.

3.6. Conclusions

The principle that financial markets individually behave "economically" efficient in the long-run was used as the basis for developing the theoretical model for this research study. It incorporated the explanatory power of earnings and cash flow information relative to stock returns. Given the time honoured assumption that the objective of the firm is to create value for its shareholders, this led to the proposition that, by adopting a sophisticated set of techniques i.e. ABCTs over a naive set of techniques i.e. VBCTs, increased stock value should accrue. It follows that the more sophisticated techniques, with the potential to produce better quality management information, should contribute to the more efficient allocation of the firm's resources. The resultant improved firm performance adds value to the firm and is represented in the market price of the firm's stock.

In categorising the ABCTs as sophisticated, a contextual framework encompassing the complexity and dynamic nature of the modern industrial environment was presented. This allied to the impact of technological change and innovation resulted in the use of the term "politics of the product" and formed the basis of a new form of "economic citizenship" to describe the relationships between companies, employees and technology. In the final analysis, these interactions and complex linkages are best captured through the identification of the key activities that consume the firm's resources and therefore justify the label sophisticated. These activities are, in

effect, the fundamental building blocks of the ABC process and in sharp contrast with the more traditional and naive volume based cost allocation systems.

Given the wide ranging literature on ABC in its short life and the lack of unanimity in the debate, an explicit statement of the key attributes of the ABCTs was deemed appropriate. These were summarised under the headings of

(i) a more equitable allocation of overheads;
(ii) an ability to deal with a complex and opaque cost base;
(iii) an ability to integrate non-accounting aspects and
(iv) a control device.

These headings reflect the diverse and flexible nature of the techniques and are presented from a process rather than a (product) cost perspective.

Finally, a null hypothesis is then formulated from the general research question, namely, "*is the introduction of ABCTs associated with significantly improved or increased firm performance ?*". It is embedded in the literature and has a "real world" focus for practising management accountants and managers generally. It should also be of particular interest to a wide range of consultancy support services that owe their origin and continued existence to the development of the ABC and ABCM processes.

CHAPTER 4

4. THE RESEARCH APPROACH / METHODOLOGY

4.1. Introduction

The objective of this chapter is to summarise the research methodology and strategy/design issues that were considered in carrying out this research study. In doing so it was necessary to briefly review the various research approaches or rather to consider the set of dilemmas to be "lived with". The characteristics of scientific research are then reviewed as a basis for developing the appropriate strategy and design. This is followed by a discussion of the strategy and design issues in the context of the recent research focus in management accounting. The research process is then described in detail and the chapter concludes with an evaluation of the research approach adopted against the previously defined criteria of internal/external validity and reliability.

4.2. Research Approaches/Choices

In determining the most appropriate research methodology, a researcher is faced with many different types and methods of conducting research in order to understand social phenomena. Inevitably, the researcher will have to choose between the various approaches considering the nature and context of the research problem and the extent of available resources (Gill and Johnson, 1991). That process is made more difficult by the fact that there is a lack of general consensus as to which research methodology is the most appropriate for the conduct of social research.

McGrath (1982) has coined the term 'dilemmatics' to describe this fact and to summarise the various choices available. In making that choice the social scientist is faced with a philosophical dilemma at all levels of the research process in regard to the nature of human action and its explanation. Gill and Johnson (1991) argue "which set of philosophical assumptions we implicitly adopt regarding what

Burrell and Morgan (1979) have termed human nature, influences our subsequent choices of particular modes of engagement and what we see as warranted in research".

The crux of the philosophical dilemma facing the social scientist is centred on the tensions and conflicts associated with the prominence of research methods modelled on the physical sciences *versus* the need to individualise and contextualise social research. These conflicting demands have produced two fundamental choices in research methodology referred to as positivism and naturalism. These represent two directly opposing philosophies about human nature and our ability to understand it. Before I make that choice, it is helpful to review these two philosophies in some detail.

4.2.1. Positivism

The positivist approach assumes that social research is similar in nature to that of the natural and physical sciences. This means that knowledge can be viewed in an objective way and that such an objective reality can be developed and explained by causal theories and laws using quantitative analysis. Positivism, therefore, seeks to apply to the social world the scientific methodology approach, which is so successful in the natural and physical sciences.

In applying such scientific methodology to social research, positivism assumes that social phenomena can be treated as analogous to the "it" beings or "'things" studied by natural and physical scientists. In other words it is assumed that there is an ontological continuity between the "it" beings of the physical and natural sciences and the human beings of the social sciences. As a consequence, in operational terms, positivism assumes that social phenomena like those of the natural and physical sciences can be broken down into quantifiable variables, studied independently and that theories and laws that predict future observations through causal analysis and hypothesis testing can be developed. The logic of the physical and natural sciences is, therefore, imposed on the social sciences. The tendency is to reduce human action to the status of automatic responses achieved by external stimuli. It ignores the subjective dimension of human action, namely, the internal logic and

interpretative processes by which such action is created (Gill and Johnson, 1991).

Central to the positive tradition is the use of deductive research methods. The deductive approach starts with the development of conceptual and theoretical structures before empirical observation and testing. The concepts are then operationalised into indicators or measures that make it possible for observations to be made. The theories and concepts are then tested through empirical observation. The results can either take the form of theory falsification or the creation of an unfalsified theory which explains past and predicts future observations (Gill and Johnson, 1991).

The deductive approach emphasises that the most important thing is not the sources of theories and hypotheses but the process by which ideas are tested and justified. In order to achieve this the deductive approach assumes that the researcher and the subject under research can remain separate by using quantitative devices such as questionnaires and surveys which allow for replication and reliability of results. By utilising such standard and predetermined methods it is believed that objective knowledge results. Roger and Louis (1981) use the term inquiry from the outside to describe the positivist approach, due to the detachment of the researcher and the application of *a priori* analytic categories.

Keat and Urry (1975) summarise the central beliefs of the positivist tradition in the following way:

1. The view that for the social sciences to advance they must follow the hypothetico-deductive method used by natural science, i.e. the experimental method.

2. The knowledge produced and explanations used in social science should be the same as those proffered by the natural sciences.

3. Social science should treat their subject matter as if it were the same as the natural world of the natural scientist.

Researchers have recently come to question the logic of the positivist deductive approach when applied to the study of social phenomena. Their concern with this approach centres on the denial of the importance of human subjectivity and its over deterministic orientation towards an understanding of human action and behaviour (Glenn, 1978; Van Maanen, 1979; Burrell and Morgan, 1979; Bygrave, 1989; Brewster and Hunter, 1989 and Gill and Johnson, 1991). As a result, social science researchers have looked towards more subjective research methods in order to overcome what they regard as the inherent problems of the positivist approach to research.

4.2.2. Naturalism

The various attempts at applying a more subjective approach to the study of social phenomena have drawn on a number of sources such as anthropology and sociology (Lincoln and Guba, 1985 and Gill and Johnson, 1991). Such approaches are more commonly termed naturalism and are essentially a rejection of positivism and a departure from purely scientific methodology.

The naturalist view is that the contention that social phenomena are analogous to the 'it' beings, so forcefully advocated by the positivist approach, is invalid in social research. Social scientists, it is argued, need to explain human behaviour adequately and, therefore, need to develop a "sympathetic understanding of the frames of reference out of which that human behaviour arises" (Gill and Johnson, 1991).

Naturalists argue that in contrast to physical objects and animals, human beings attach meaning to surrounding events. From these interpretations they select courses of meaningful action which they can reflect upon and monitor (Gill and Johnson, 1991). Such subjective processes are the sources of human behaviour whereby human beings can alter their behaviour, thereby negating or moderating the prediction (Seelye, 1963). The aim of the naturalist approach is to understand how people make sense of their worlds and where human behaviour is seen as purposive and meaningful rather than externally determined.

In contrast to the deductive research methodology of the positivist approach, naturalism favours a more inductive approach. The essence of the inductive approach is that in order to understand social phenomena, such as an organisation, one has to become immersed in its world and inquire into whole systems for patterns and explanations. Induction therefore, begins with an observation of the empirical setting and proceeds to construct theories about observed phenomena. Theory is perceived to be the outcome of induction, which can then be tested. In this sense naturalism can inform positivism. Roger and Louis (1981) describe naturalism and its inductive approach as inquiry from the inside where the researcher does not apply *a priori* categories, intends to understand a certain situation and is experientially involved.

Justification for such an approach is rooted in the main criticisms of the positivist approach and rests on two key premises. Firstly, naturalists believe that explanations are worthless unless based on experience and observation. By observing phenomena, it is argued, that research is likely to fit the data and, therefore, be more useful and plausible. Secondly, naturalists reject the causal model of the positivist approach due to the fundamental differences between animals, physical objects and human beings. Laing (1967) argues that human action has an internal logic of its own which must be understood in order to make action intelligible. The social world, therefore, cannot be understood in terms of causal relationships that do not take account of the situation that human actions are based upon. As Burrell and Morgan (1979) state;

> "Science is based on taken for granted assumptions and thus like any other social practice, must be understood within a specific context. Traced to their source all activities which pose as science can be traced to fundamental assumptions relating to everyday life and can in no way be regarded as generating knowledge with an objective, value free status as is sometimes claimed. What passes for scientific knowledge can be shown to be founded upon a set of unstated conventions, beliefs and assumptions just as everyday common sense knowledge is. The difference between them lies largely in the nature of rules and community which recognises and subscribes to them. The knowledge in both cases is not so much objective as shared."

For naturalists, subjectivity is seen as the intervening variable in any causal relationship between stimuli, external social reality and subsequent human behaviour. It is this commitment to viewing human action that results from actors' subjectivity that distinguishes naturalism from positivism.

Such a view has important implications for the type of research methodology employed. Naturalists avoid the use of deductive, highly structured approaches where the subjectivity of actors is largely ignored and an external logic is imposed on a phenomena that has an internal logic of its own. It is this internal logic which is of interest to naturalists who believe a true understanding of social phenomena can only be achieved through empirical research first and then theory building.

Consequently, naturalists use largely unstructured approaches to research that allow access to human subjectivity in its natural setting in order to provide a contextually bound picture of events. Such unstructured approaches favour qualitative research including ethnography, participant observation and open ended interviewing. The lack of standardised methods ensures that there is freedom to respond to the world under investigation. Researchers accept their subjective experience, which is shaped by the social setting, as being a useful source of information.

Naturalist inductive approaches are, of course, open to counter argument from positivists. They view unstructured inductive methods as unreliable since they are extremely difficult to replicate and bias cannot be eliminated. Researchers are therefore, faced with a methodological continuum running from positivism at one extreme to naturalism at the other. It has become clear that an individual researchers' position on the continuum will influence the research method chosen. The trend in recent years has been to consider a multi method approach in the hope that the benefits of both types will be maximised and the weakness of any one individual approach will be minimised.

4.2.3. Multi Method Approach

A multi method approach to research methodology has been advocated by researchers who argue that there is no one best method of research but that many methods exist contingent upon the issue being studied, regardless of epistemological biases (Kuhn, 1970; Giddens, 1978; Jick, 1979; Brewster and Hunter, 1989; Gill and Johnson, 1991; Taber, 1991 and Hill, 1993).

The central belief of a multi method approach is that it is fundamentally wrong to view research methodology purely in terms of a dichotomy running from positivism to naturalism. The criticisms of both positivism and naturalism, while both having merit, tend to ignore the characteristic strengths of the alternative paradigm (Taber, 1991). As Brewster and Hunter (1989) argue social research should not be viewed as "mutually exclusive alternatives among which we must choose and then passively pay the costs of our choices". Gill and Johnson (1991) corroborated this viewpoint arguing that "it would appear implicitly that many of the researchers working within this approach would argue that the nomethetic/ideographic debate does not necessarily reflect a fundamental conflict, rather it reflects different interests which are reconcilable".

The choice, therefore, between positivism and naturalism, may not be viewed as mutually exclusive alternatives. The different research techniques have strengths and weaknesses and, consequently, no single method exists which generates scientific knowledge in all cases. Trow (1957) states that "different kinds of information about man and society are gathered most fully and economically in different ways, and the problem under investigation properly dictates the methods of investigation". This view seems to be implied in the commonly used metaphor of the social scientists 'kit of tools' to which he turns to find the methods and techniques most useful to the problems at hand".

The multi method approach or "methodological pluralism" in Gill and Johnson's (1991) terminology essentially recognises and acknowledges the inherent strengths and weaknesses of both positivism and naturalism. In doing so proponents of the multi

method approach argue that while each of the methods may be flawed they are not identical in terms of the strengths and weaknesses. As a consequence, it is argued that the researcher can in fact gain their combined strengths while compensating for particular weaknesses of any one approach. Brewster and Hunter (1989) support that view by saying that "a diversity of imperfection allows us to combine methods not only to gain their individual strengths but also to compensate for their particular faults and limitations".

In order to achieve such a desired result the multi method approach employs the strategy of addressing a research problem with a variety of methods that have non overlapping weaknesses while having complementary strengths. In other words, the variety of approaches used result in a combination of their strengths while eliminating the particular weakness of any one approach. Different kinds of complementary data about a problem may be acquired by using different research techniques in the same empirical study. As Gill and Johnson (1991) argue such a "methodological triangulation is thought to overcome the bias present in a single method approach to research".

Methodological triangulation is defined by Denzin (1970) as "the combination of methodologies in the study of the same phenomena". Triangulation measurement in assigning either quantitative or qualitative value to social phenomena attempts to identify the values of phenomena more accurately by viewing it from different methodological angles. The convergent findings of a multi method approach are, therefore, accepted with greater confidence in terms of validity and reliability. Brewster and Hunter (1989) strongly support this view by saying that;

> "For if our various methods have weaknesses that are truly different, then their convergent findings may be accepted with far greater confidence than any single method findings would warrant. Each new set of data increases our confidence that the research result reflects reality rather than methodological error. And divergent findings are equally important but for another reason. They signal the need to analyse a research problem further and to be cautious in interpreting the significance of any one data set."

That being said, the multi method approach does not favour the use of all research methods in every single case. The diversity of research methods used should relate to the information required to shed light on the problem under investigation (Brewster and Hunter, 1989). A multi method approach is likely to combine complementary quantitative and qualitative methodologies rather than competing approaches.

In summary, therefore, the multi method approach is a compelling one for researchers faced with the problem of using either positivism or naturalism. Firstly, its major strength is that it has the potential to focus on a problem from different angles using different research methods. As Brewster and Hunter (1989) state "solutions based on multi method findings are likely to be better findings in that they have a firmer empirical base and greater theoretical scope because they are grounded in different ways of observing social reality".

Secondly, the approach is considered to be high in both validity and reliability by way of triangulated cross method comparisons. Validity can be inferred from agreement between different data sets and invalidity from disagreement. The data must, however, be generated with truly different methods, each independent of one another or convergence could indicate shared methodological bias. In the final analysis the process of triangulation, when appropriately applied, should ensure higher validity and greater reliability of results.

As a basis for developing the appropriate research strategy that was adopted in this study it was important to consider the key characteristics of scientific research.

4.3. Characteristics of Scientific Research

The essence of scientific research is based on two important characteristics, namely reliability and validity. These are essential for effective research of any kind (Boyd, Westfall and Stasch, 1989 and Gill and Johnson, 1991). For instance, a clock is supposed to measure true time and to do so continuously. If it were sometimes slow and sometimes fast, we would call it unreliable. If it were to show the wrong time, we would say that it was invalid.

Reliability is therefore concerned with the consistency of obtaining the same results again (Oppenheim, 1992) . This means that another researcher using the same methods, subjects and under the same circumstances should be able to replicate the results. The results should be repeatable over time, over respondents and over samples (Alreck and Settle, 1985).

Validity tells us whether the question or item really measures what it is supposed to measure. This means that the research must not be subject to other extraneous factors which can give biased results in one direction or another. If there is a systematic bias in the research the results are considered to be less than valid. In assessing validity, Gill and Johnson (1991) further divided the process into two main areas. These are internal and external validity.

Internal validity is concerned with the question of whether a true measure of the effect of the independent variable is obtained for the subjects in the experiment. Essentially, the results arise as a result of relationships between variables rather than as a result of the way in which the study was designed. This is determined by how much control is achieved in the study. For this reason, the available control technique of matching will be adopted in this study.

External validity is concerned with the generalisability of the findings. It describes the extent to which the results of any one study are generalisable to other samples, time periods, events and so forth. This criterion can be further subdivided into population validity and ecological validity. Population validity refers to the extent to which any research findings can be generalised from the sample of people involved to a wider population. Ecological validity on the other hand refers to the extent to which it is possible to generalise from the actual social context under research to other contexts. In effect, it encompasses the issue of how atypical or artificial the research site is when compared to natural contexts concerning everyday life.

Case studies are usually high on internal validity and low on external validity. On the other hand, a broad empirical study will have high external validity. Campbell and Stanley (1963) maintain that internal validity is the *sine qua non* of research design, but that the ideal

design should be relatively strong on both the internal and external dimensions.

In essence, therefore, validity is concerned with the accuracy of the measurement process with reliability referring to the consistency of the measurement process (Gill and Johnson, 1991). By using both of these characteristics as important evaluative criteria for effective research, researchers have sought to achieve objectivity, accuracy and continuing and exhaustive investigation.

4.4. Research Focus in Management Accounting

Normal science methods are best applied to theories and practices that are already in widespread use. Researchers in management accounting have difficulty in finding widespread adopters of innovative practice. Further, the dominant research methods in management accounting have been *a priori reasoning*, deductive analysis from well-specified models and controlled laboratory experiments. This meant that the vast majority of management accounting research was neither informed by data nor tested on data (Kaplan, 1986a). He goes on to argue that this is in sharp contrast with operations management scholars who could look at Japanese manufacturers for observable examples of total quality management, JIT, computer-integrated manufacturing and design for manufacturability. In their case, new phenomena could be studied in organisations that already had considerable experience with the new practices and no "Japan" exists for learning about or studying innovative management accounting practices in the Western world. It is questionable if these views, while valid in 1986, are a fair reflection of custom and practice in management accounting today.

In reviewing the literature it would appear that management accounting has undergone a renaissance in the last decade or so. While there is a debate as to the extent of this renaissance there is no doubt that significant change has taken place in the practice of management accounting, generally. Central to this change is the development of new costing systems in all types of organisations and activity-based costing in particular. Innovations in management accounting have typically occurred in only a few organisations and

were not widespread or systematic. Consequently, there was a paucity of detailed, systematic observation and description in the management accounting literature. This meant that research on innovative practice in this area had to be done opportunistically with small sample sizes and most likely was done by way of longitudinal studies (Kaplan, 1986a).

However, because of the widespread adoption of new management accounting systems based on the ABC concept, opportunities now exist to empirically test its contribution. Traditional research methods, analytic modelling and statistical analysis, validly constructed, are appropriate for exploring this maturing concept and through hypothesis testing contribute to the development of ABC as a theory.

4.5. Research Strategy and Design

The major objective underlying both social and scientific research is to develop and test theories and hypotheses based on either social or scientific phenomena. The choice of research strategy and design is influenced by three factors (Yin, 1994). These are the type of research questions and problems posed, the extent of control an investigator has over behavioural events and the degree of focus on contemporary as opposed to historical events. In addition, the degree of control available to the researcher will determine the extent to which primary and/or secondary data is used.

Therefore, the research purpose to a large extent determines the type of research strategy and hence the type of research design employed. Each type of research strategy and design is especially suitable for certain objectives and certain circumstances. Survey methods are capable of studying population and sample distribution of opinions, attitudes and behaviour to formulate and test hypotheses about relationships between various variables. Ethnography and field work observes behaviour in natural settings in order to develop realistic ideas about the population under study. Experimental methods specifically test causal hypotheses while non reactive methods have the dual purpose of collecting data unobtrusively to minimise the reaction of subjects to observation and of providing research options when fieldwork, surveys and

experiments are not appropriate. Gill and Johnson (1991) agree with this view by saying that "there is no one best method, but rather the approach most effective for the resolution of a given problem depends on a large number of variables, not least the nature of the problem itself".

Every research project conducted scientifically has a special framework for controlling data collection. This framework is called research design. Its function is to ensure that the required data is collected accurately and economically (Boyd et al, 1989). Research design is the logic that links the data to be collected to the initial question of the study (Yin, 1994). This means choosing a research strategy that enables the researcher "to answer research questions as validly, objectively, accurately and economically as possible" (Kerlinger, 1973). The objectives of a good research design, as outlined by Abdel-Khalik and Ajinkya (1979), are:

a) to be able to determine the extent to which varying the independent variable(s) causes variation in the dependent variable;

b) to minimise the variation in the dependent variable attributable to variables not included in the experiment or design; and

c) to control or minimise random error.

Having discussed the important characteristics of scientific research strategy and design the next section sets out the actual approach adopted in this study.

4.6. Research Approach Adopted

4.6.1. Introduction

In order to operationalise the stated hypotheses this study uses a recognised statistical process by way of a quasi-experiment association study, in effect adopting a positivist approach. This methodology is grounded in the Chicago/Rochester School and the classic papers by Ball and Brown (1968) and Watts and Zimmerman (1986). It is deemed to be high in terms of both population and ecological validity and therefore satisfies the claim of generalizability as one of the most important criterion. Given the widespread adoption of new management accounting systems based on the ABC concept, opportunities now exist to empirically test its contribution. The basis for this approach and the step by step research process are outlined in detail, below.

The research approach adopted also provided the possibility of capturing some additional *rich, descriptive and interesting* data which would embellish the overall research outcome and thereby adds a qualitative dimension to the quantitative rigour of the statistical process. The end result was a degree of methodological triangulation which recognises the weaknesses of the approach adopted and adds to the quality of the overall findings.

The decision to pursue a predominantly positivist approach was based on the view that as the large volume of case studies that have been written since 1986 have not come up with any conclusive results, there was no merit in adding to that body of information. Further there was the additional concern that it is only the "successful" implementations of ABCT that have been so documented. Consequently, there is now the need and the opportunity, given the widespread practice and data available on the adoption of ABCT, to empirically test its contribution to overall firm performance. Finally, this is in keeping with the dominant research method in management accounting namely, *a priori* reasoning, deductive analysis (Kaplan, 1986a).

4.6.2. Quantitative/Empirical Research Process

A broad empirical study of this nature has the potential for high external validity and reliability. It was supplemented by the control technique of matching as a way of giving it added credibility. It was also appropriate for the research question raised in this study and the stated hypothesis. In particular, it is a reflection of the dominant research methodology in management accounting and is firmly based in the positivist philosophy.

The quasi-experimental research design chosen refers to the process underlying the generation of data. Conducting a true experiment requires the ability to (a) manipulate explicitly one or more of the independent variables and (b) assign subjects to control or experimental groups - to achieve randomisation. A quasi-experimental design technique was used as the primary data came from an environment which exists and where events occurred without direct intervention. The environment was observed not manipulated. Another distinct element of the quasi-experiment is that it did not generate or formulate a hypothesis but rather it allows one to test the hypothesis using statistical analysis (Kaplan, 1986a).

A quantitative research process was adopted as the empirical implications of the hypothesis, i.e. stock market returns and accounting measures of performance, allow investigation by empirical testing. As large a sample as possible was used as under normal conditions sampling fluctuations will be reduced as the sample size increases. Statistical techniques and methodologies were employed in order to provide results which were then interpreted and conclusions drawn. The research generated quantitative data which can be defined as having additive properties, equal intervals and usually a zero point (Oppenheim, 1992). Quantitative data sources such as financial market performance were used. This quantitative empirical data lends itself to analysis by standard statistical analysis software packages.

Finally, the empirical approach adopted involved the application of statistical techniques. The process used allowed inferences from the sample data to be made to the wider population in the interests of generalisation. The careful selecting of the ABCT firms and both the

matching control group and benchmark index ensures that the results can be generalised with a high degree of confidence. The study also benefits from the potential high degree of control that was exercised throughout the process by the researcher. In addition, the process is easily replicated and, therefore, complies with the reliability criteria. It is also worth noting that the questionnaire process gave the respondents an opportunity of expressing their own understanding and conceptualisation of the matters of interest.

4.6.3 Control

The essence of an experiment is control within the research project. It is recognised that the greater the control that can be achieved, the more powerful the study (Ryan, Scapens and Theobald, 1992) and the greater the test of internal validity. When operating under a quasi-experimental setting there are two means available for controlling the effects of extraneous (not directly tested) variables. These are limited randomisation and matching.

The former technique is usually adopted after the independent variable has occurred. The only degrees of freedom left to the experimenter are to 'randomly' select the experimental sample from the sub-population of firms who have experienced the effects of the independent variable and/or to 'randomly' select the control group from the other sub-population of firms which have not. This type of limited randomisation can do nothing to neutralise the effects of extraneous variables, except by chance. Further limited random selection from within each sub-population cannot compensate for sample self-selection biases (biases across the sub-populations themselves). Such 'limited randomisation' has been described as a very poor control mechanism (Abdel-Khalik and Ajinkya, 1979) and, consequently, matching will be utilised as a means of achieving control in this study.

4.6.4. Matching Process

Matching is a recognised technique by which to control extraneous variables in order to attempt to attain equivalence (Ryan, Scapens and Theobald, 1992). It is a deliberate attempt at neutralising the effects of extraneous variables. The matching variables are identified on the basis of presumed correlation as justified in many studies. If the matched groups differ on some third extraneous variable this may explain the association between the dependent and the independent variables. However, if the two groups can be made equivalent with regard to this extraneous variable then this cannot explain the association. In practice there are, of course, numerous extraneous variables and, ideally, equivalence should be obtained for all of them simultaneously.

Campbell and Stanley (1963) list history and maturation as two frequent threats to internal validity. History refers to events occurring between observations, other than the experimental treatment, which may provide alternative explanations of effects. Maturation effects are associated with changes which are a function of time *per se*, such as growth, learning, fatigue etc. These forms of instability do not threaten the internal validity of this study since both the experimental and control groups are equally affected by these factors. This technique is recommended by Moser and Kalton (1983).

The procedure consists of matching each unit in the experimental sample (a firm using the ABCTs) with another firm that is different on the dimension of the independent variable (i.e. a firm not using the ABCTs) but similar on all other dimensions identified as important (size, industry and market-to-book ratio). The matching process does not have to be and in reality cannot be exact. Ritter (1991) says the objective should be "to some extent". For example he only matched 36% of his control sample with firms in a three-digit (same) industry and a further 21% with firms in a two-digit (similar) industry. Overall, he matched 57% with a firm in roughly the same industry. Matched firms can be larger or smaller depending on the study and sampling procedures used. The matching process is merely aimed at providing an appropriate benchmark.

In this study the comparison of two groups was the basic feature. The matching process involved compiling a data set of ABCT adopters (experimental group) and a set of non-ABCT adopters (control group) from the 1995 and 1996 UK *Times 1,000* listings. These listings were edited to exclude firms that did not have a public quotation and resulted in a final mailing list of 853 firms. The survey results gave rise to two data sets. One showed 47 firms had adopted the ABCTs and the other showed that 187 firms had not adopted the ABCTs. The year of implementation was also shown for the 47 firms who had adopted the ABCTs.

In carrying out the matching process, the 31st December in the year prior to the adoption of the ABCTs, was used as the base date on which the firms were matched under the three different headings namely; market capitalisation, market-to-book ratio and net total assets. Market capitalisation was used as a size measure of market value, market-to-book ratio was used in response to the findings of Fama and French (1992) and net total assets was used as a size measure of balance sheet value. Throughout the exercise no firm was used more than once as a matched firm within a three year timeframe in the interests of statistical integrity.

The specific matching procedure in this study was carried out in the following way.

1. The ABCT (n=47) and non-ABCT (n=187) firms were set up in two different files and classified by *Datastream* industry code levels 1 to 4.

2. Data under three headings, namely market capitalisation, market-to-book and net total assets was downloaded from *Datastream* for each ABCT and non-ABCT firm.

3. A database program was written to carry out the following matching procedure:
   a) match ABCT firms in level 4 industry classification with all non-ABCT firms in level 4 industry classification and within 25% of the market capitalisation value assigned.

b) If no match was found in level 4 industry classification within 25%, go to level 3 industry classification and repeat. Repeat the exercise for level 2 and level 1 industry classifications.
c) Repeat the entire process for ABCT firms within 50% and 75% of the market capitalisation value assigned.

4. The output from step 3 was then analysed to produce the best match for each ABCT firm. The procedure was written to give first priority to the % difference and secondary status to the industry level match. This resulted in the formation of the market capitalisation data set of control firms under the market capitalisation classification. The matched non-ABCT firms became the control group for assessing the performance of the ABCT experimental group of firms.

5. Steps 3 and 4 were then repeated, separately and in full, using the market-to-book and net total assets classifications, respectively. This resulted in the formation of two additional control data sets under each heading.

The *Access* database software package was used to complete the process and the output was summarised on *Excel* spreadsheets. The final outcome, as summarised in Tables 4.1.,4.2.,4.3. resulted in 43 firms being matched by market capitalisation, 38 firms being matched by market to book and 34 firms being matched by net total assets within the criteria set down. Figures 4.1., 4.2. and 4.3. present the same information by way of a 3-D stacked bar chart. It is worth noting that, as it was decided not to go beyond the 75% size criterion, not all of the ABCT firms were matched.

Table 4.1. Market Capitalisation Matching Overview

Industry Level	% Range	No. Firms Matched	%	Cumulative % of Sample
4	+- 25%	10	23	23
3	+- 25%	18	42	65
2	+- 25%	9	21	86
1	+- 25%	3	7	93
3	+- 75%	1	3	96
2	+- 75%	1	2	98
1	+- 75%	1	2	100
	Total	**43**	**100**	

Figure 4.1. Market Capitalisation Matching Overview

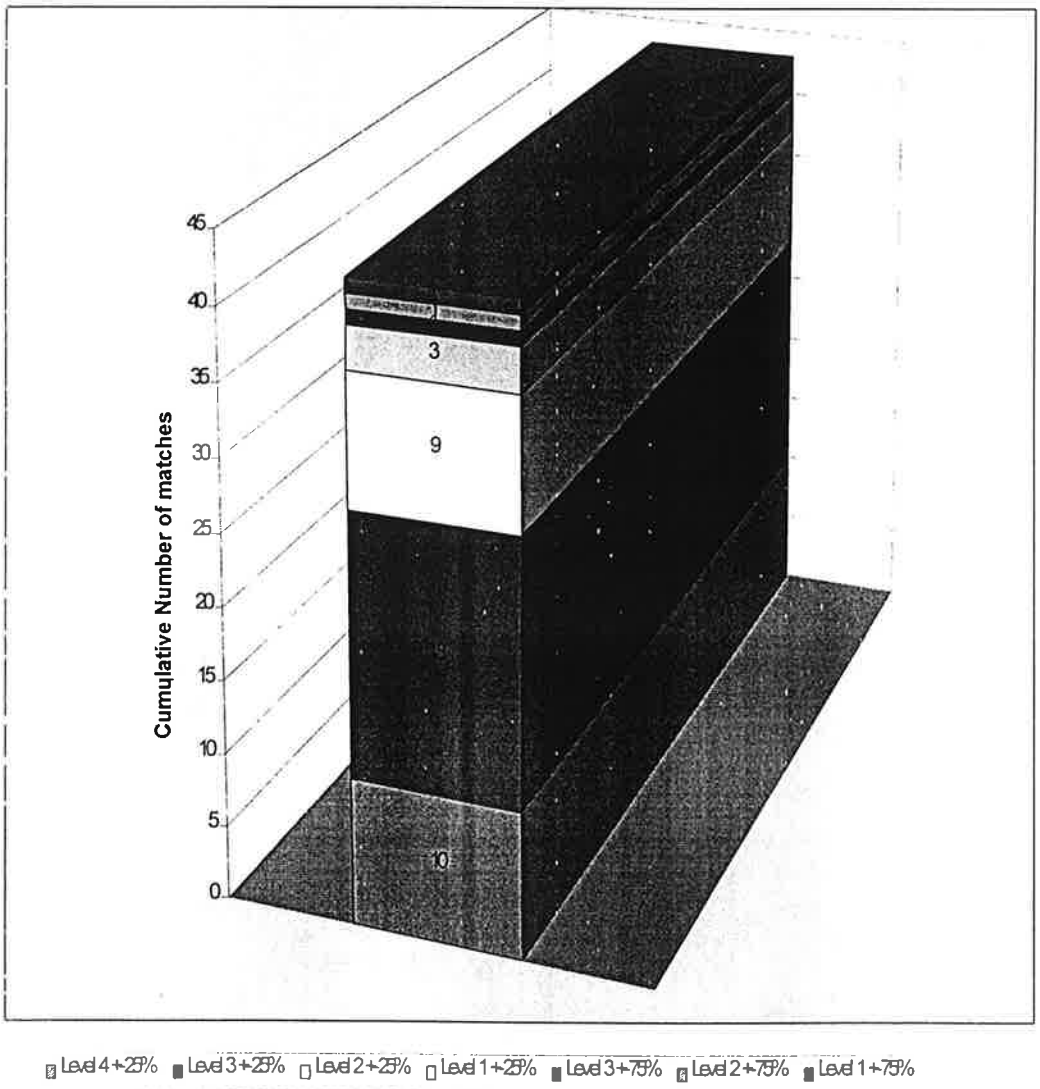


Table 4.2. Market-to-Book Matching Overview

Industry Level	% Range	No. Firms Matched	%	Cumulative % of Sample
4	+- 25%	18	47	47
3	+- 25%	14	37	84
2	+- 25%	5	13	97
3	+- 50%	1	3	100
Total		**38**	**100**	

Figure 4.2. Market-to-Book Matching Overview

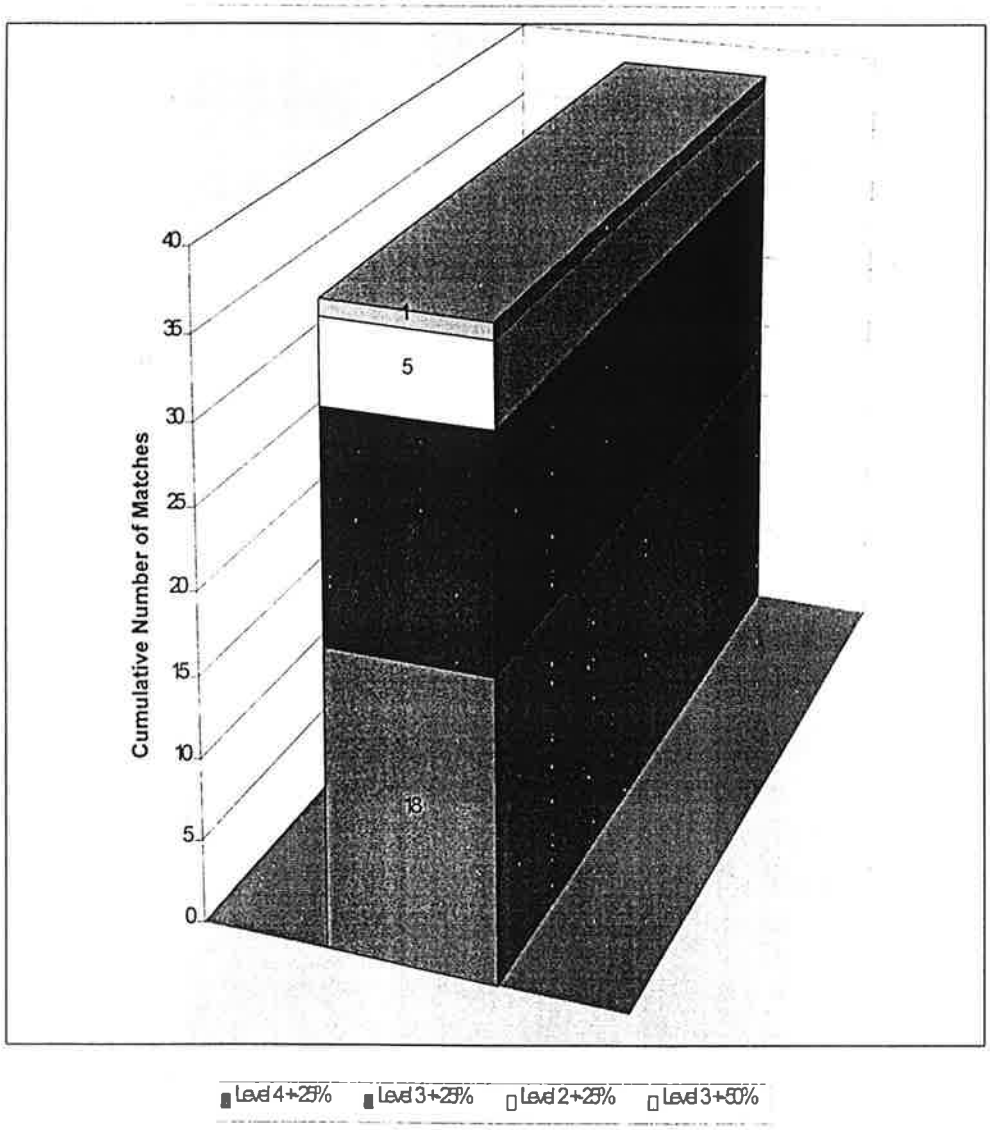
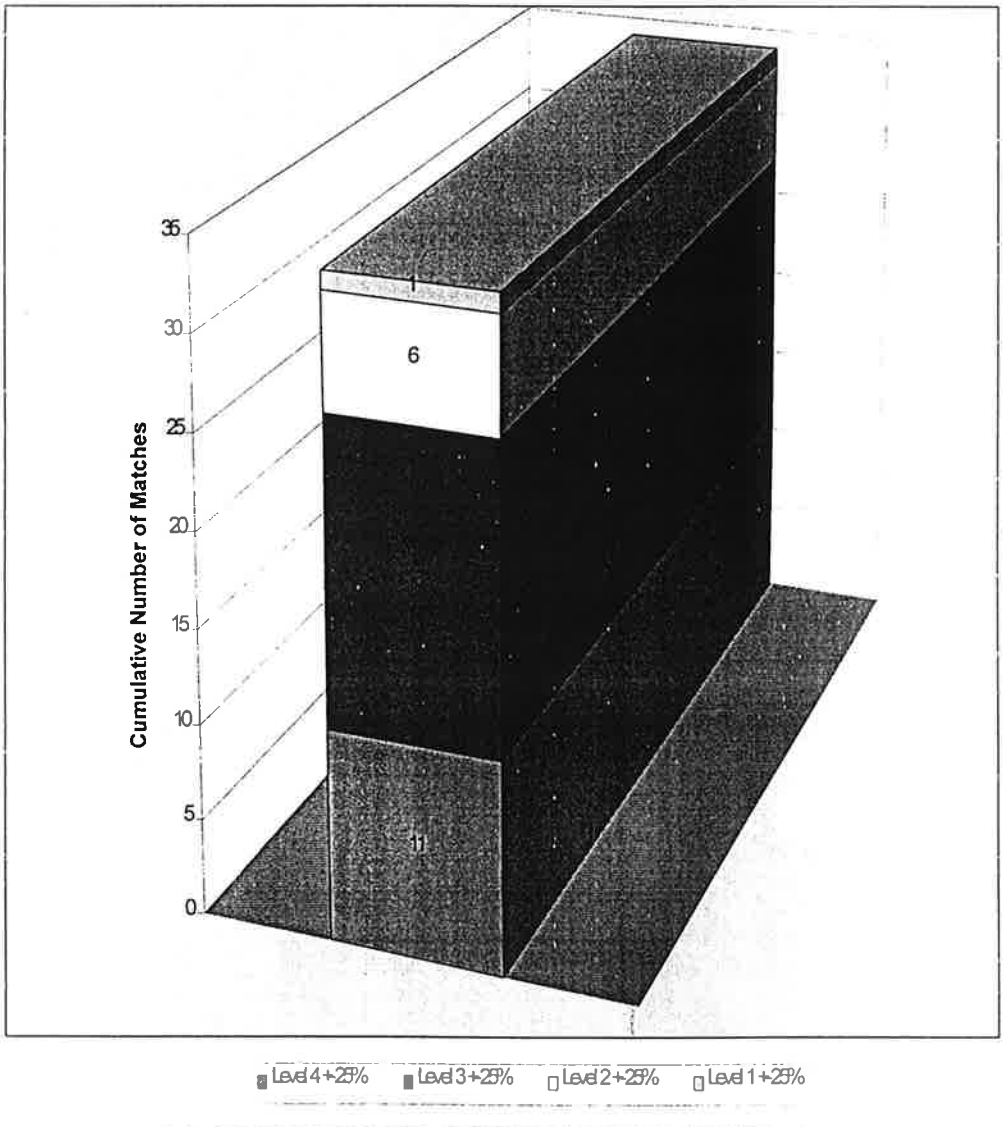


Table 4.3. Net Total Assets Matching Overview

Industry Level	% Range	No. Firms Matched	%	Cumulative % of Sample
4	+- 25%	11	32	32
3	+- 25%	16	47	79
2	+- 25%	6	18	97
1	+- 25%	1	3	100
Total		**34**	**100**	

Figure 4.3. Net Total Assets Matching Overview



The detailed results of the matching process and the significance tests compiled are shown in Tables 4.4., 4.5., and 4.6., and depicted graphically in Figures 4.4, 4.5. and 4.6. They show that the market capitalisation data set achieved the best match as it had the most ABCT firms (n=43) and was not statistically different from the non-ABCT firms in terms of market capitalisation, market-to-book or net total assets.

The market-to-book data set is reasonably matched against the prime criteria and comprises 38 firms. However, it is poorly matched when consideration is taken of the secondary criteria of market capitalisation and net total assets. In this case, the ABCT firms tend to be larger which may bias the results shown later in Chapter 7.

The net total assets data set is also reasonably matched against the prime criteria and comprises 34 firms. The high quality of the match under the secondary criteria of market capitalisation and market-to-book allows one to conclude that there is no statistical difference between the ABCT firms and their matched non ABCT firms. This allows strong inferences to be drawn from the results presented in Chapter 8.

The overall result of the matching process is that very high quality matches were achieved for both the market capitalisation and net total assets data sets. Caution is suggested in regard to the market-to-book data sets due to the less than satisfactory secondary matching results. It is also worth noting that up to 65% of the firms in the case of market capitalisation, 84% in the case of market-to-book and 79% in the case of net total assets were matched within the same general industry classification.

Table 4.4. Market Capitalisation Data Set Matched Overview

(n=43 Firms)			Two Sample for Means t-Tests		
Match Criteria	ABCT Firms	Non-ABCT Firms	Paired Two Sample	Two Sample (Un-Equal Var.)	Two Sample (Equal Var.)
	Mean	*Mean*	*t-Stat / t-Crit*	*t-Stat*	*t-Stat*
Market Cap	1,947.30	1,751.55	1.0197 / 2.0181	0.3557	0.3557
Market to Book	2.47	3.58	-0.7463 / 2.0301	-0.7597	-0.7597
Net Total Assets	1,305,768	1,019,557	1.1231 / 2.0301	0.8339	0.8339

Figure 4.4. Market Capitalisation Data Set Matched Overview

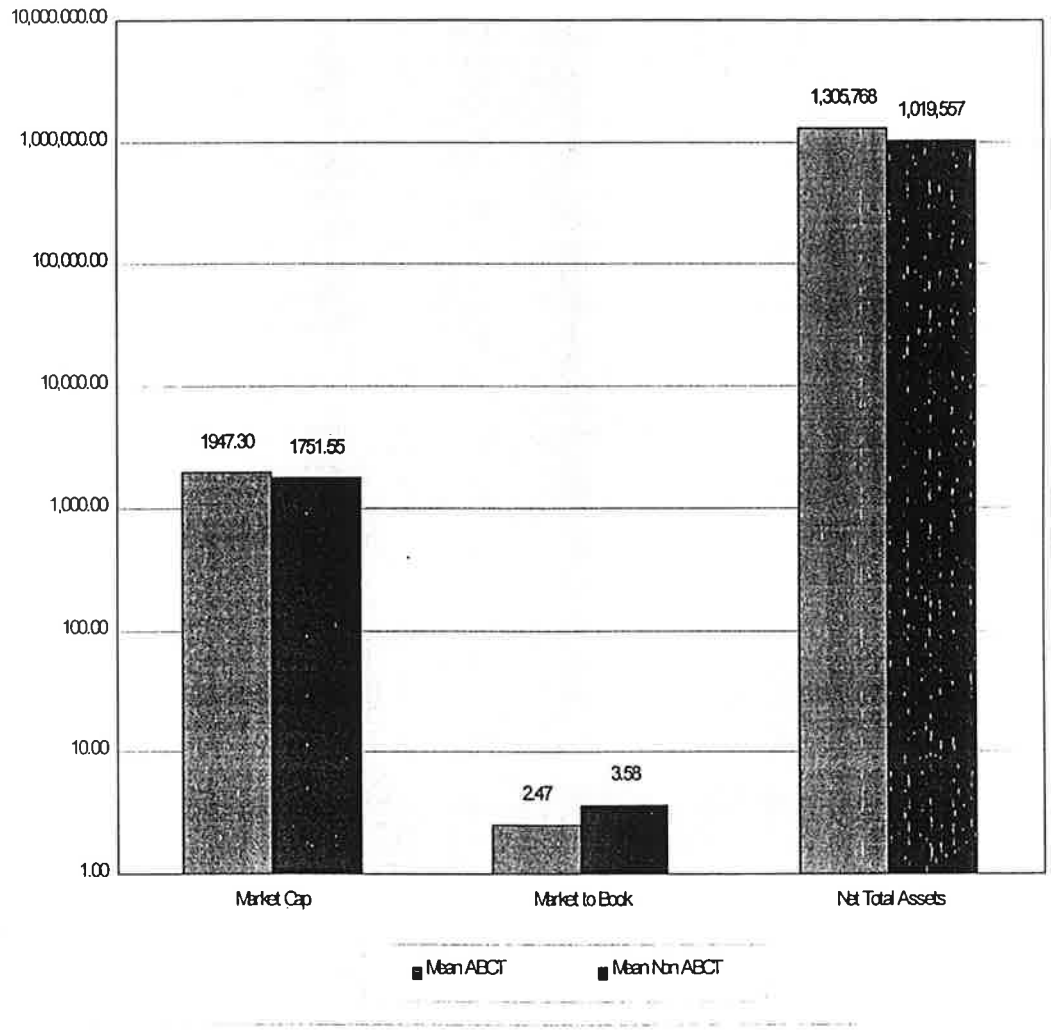


Table 4.5. Market-to-Book Data Set Matched Overview

(n=38 Firms)			Two Sample for Means t-Tests		
Match Criteria	ABCT Firms	Non-ABCT Firms	Paired Two Sample	Two Sample (Un-Equal Var.)	Two Sample (Equal Var.)
	Mean	*Mean*	*t-Stat / t-Crit*	*t-Stat*	*t-Stat*
Market to Book	2.51	2.31	1.4401 / 2.0262	0.4275	0.4275
Market Cap.	3,413.89	824.62	2.4814 / 2.0262	2.5708	2.5708
Net Total Assets	1,712,543	512,186	2.5584 / 2.0262	2.6930	2.6930

Figure 4.5. Market-to-Book Data Set Matched Overview

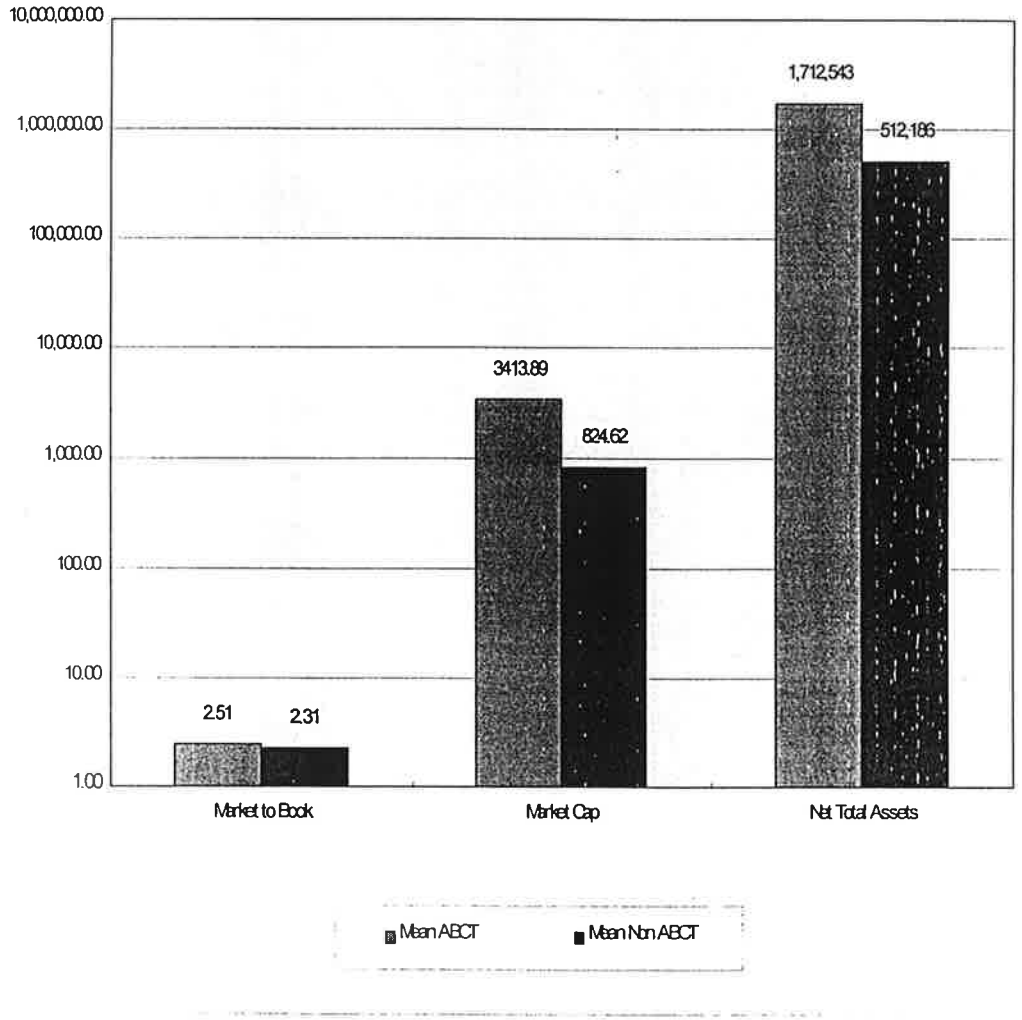
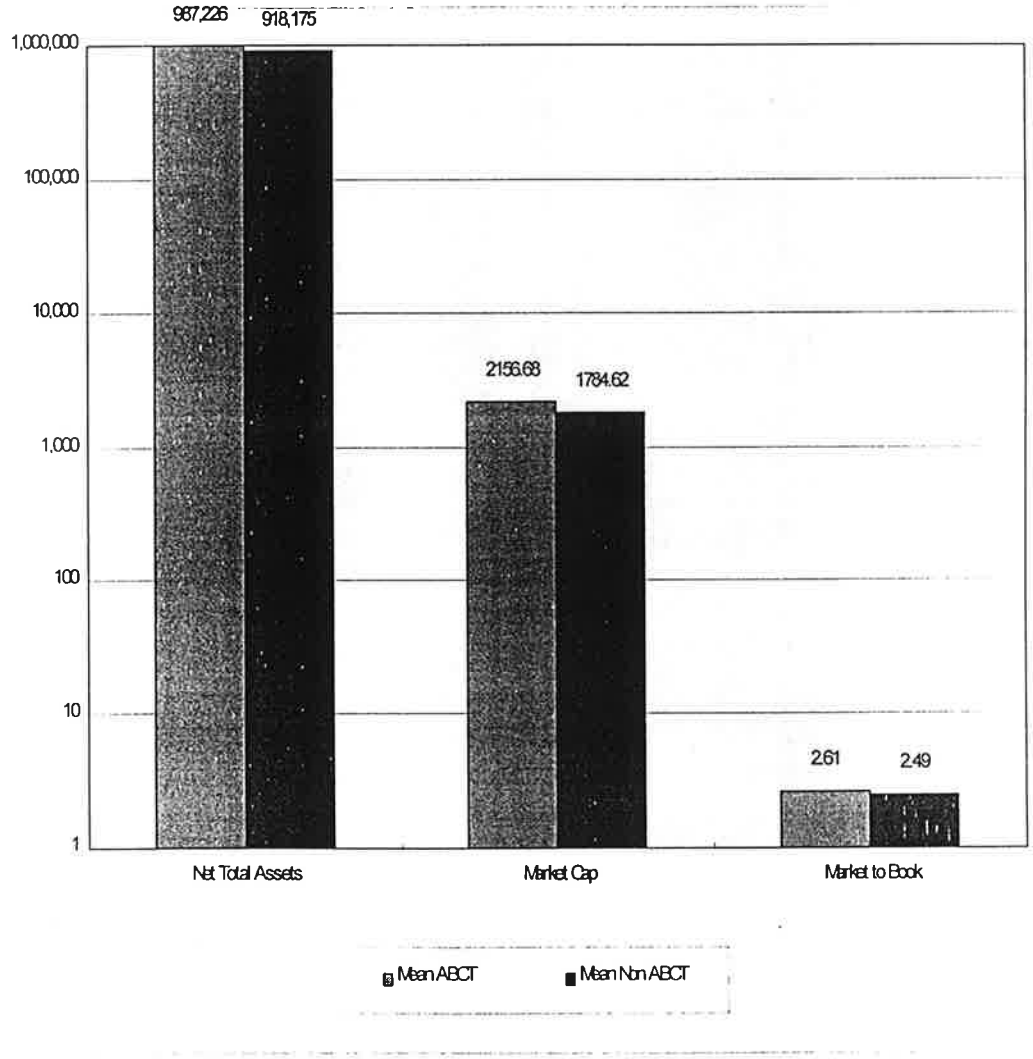


Table 4.6. Net Total Assets Data Set Matched Overview

(n=34)			Paired Two Sample t-Tests		
Match Criteria	ABCT Firms	Non-ABCT Firms	Two Sample for Means	Two Sample (Un-Equal Var.)	Two Sample (Equal Var.)
	Mean	*Mean*	*t-Stat / t-Crit*	*t-Stat*	*t-Stat*
Net Total Assets	987,226	918,175	1.5782 / 2.0345	0.2681	0.2681
Market Cap.	2,156.68	1,784.62	0.5417 / 2.0345	0.4794	0.4794
Market to Book	2.61	2.49	0.2202 / 2.0345	0.2144	0.2144

Figure 4.6. Net Total Assets Data Set Matched Overview



Finally, market returns and accounting data were then accessed for both data sets from the Ist January in the year of the adoption of the ABCTs in the case of each matched firm. This discrete date was chosen in the interests of consistency as the survey information did not identify the month of adoption of the ABCTs and also because of the earlier decision to use the 31st December prior to the year of adoption as the base date for matching purposes. This data became the core performance indicators for the research process described below and led to the compilation of the final results tables analysed in Chapters 6, 7 and 8.

As both parametric, i.e. t-test and non-parametric tests, i.e. sign test are used in this study, it is appropriate to summarise the important issues underpinning that decision before proceeding further.

4.6.5. Parametric *versus* Non-Parametric Tests

The decision on whether to use either or both parametric and non-parametric statistical methods should be based on the level of measurement, the type of inference desired, the generality of the assumptions made about the population distribution and the sampling procedure used. An important criterion for any statistical analysis or technique is that it does not violate the assumptions necessary to validate the procedure. If the assumptions cannot be verified then the inferences made may not be valid.

Parametric tests are powerful in that they are based on strong assumptions but they may not be robust against certain violations of those assumptions. On the other hand, non parametric methods are robust because their construction and validity require only weak assumptions. In the final analysis, the choice depends on an assessment of the "relative loss of power" and "robustness" in each case. Power is the probability of rejecting the null hypothesis when it is false and robustness refers to inferences which remain valid despite a violation of one or more assumptions.

Parametric statistical methods are used to analyse data which satisfies specific population distribution assumptions (Gibbons, 1975). These assumptions can be difficult to satisfy in practice. Many

parametric tests, including the t-test, assume that the underlying population is normally distributed. Although parametric tests are dependable in the face of moderate departures from normality, they can be quite misleading in the face of gross departures of this sort. Thus, if the population is perceived to be significantly different from normal, statisticians often prefer non-parametric techniques which avoid the assumption of population normality.

In situations where the data is measured to a much lower level of precision, non parametric procedures can provide validity and suitability, where parametric methods could not. According to Gibbons (1975), the conditions under which non parametric statistics should be used include;

(i) when data is measured and/or analysed using an ordinal or nominal scale of measurement;

(ii) when data entering the analysis is enumerative;

(iii) when the inference does not concern a parameter in the population distribution, and

(iv) when the probability distribution of the statistic on which the analysis is based is not dependent on specific information or assumptions about the population(s) from which the samples are drawn but only on general assumptions such as continuous and/or symmetric populations.

In effect, where the data is nominal or ordinal or where experiments yield responses that cannot be measured along a cardinal scale but can be ranked, and where the assumptions required by parametric methods are inappropriate, non parametric techniques should be used. In addition, the range of non-parametric tests and applications is much wider since they can be applied to interval scaled data.

As regards sampling procedure, both parametric and non parametric methods require a random sample and, consequently, this assumption cannot be violated irrespective of which approach is adopted. Barber and Lyon (1996), in documenting the empirical

power and specification of test statistics designed to detect long-run abnormal stock returns, found that both methods were well specified when a control firm benchmark was used. Therefore, in undertaking this study, both parametric and non-parametric approaches were used. This was due to the expectation that outliers may exist in the data and because the distribution of long-run stock returns is often asymmetric. Consequently, normality may not be a reasonable assumption.

The parametric average abnormal return test is constructed by computing the difference between the return for each ABCT firm and the return for its associated matched non-ABCT firm. The paired t-Test was used to determine if the mean difference was greater than zero. The test is defined as:

Paired t-Test

Formula $t_{(n-1)} = \dfrac{\bar{d}}{S_d / \sqrt{n}}$

where $t_{(n-1)}$ is the Student t statistic with *n*-1 degrees of freedom;

n represents the number of paired observations;

$d_i = X_{1,i} - X_{2,i}$ is the *i*th paired difference and $X_{1,i}$ and $X_{2,i}$ are the respective *i*th observations on the ABCT firms (1) and the non-ABCT firms (2).

$\bar{d} = \dfrac{\sum d_i}{n}$ where $\bar{d}$ is the observed mean of the paired differences;

$S_d = \sqrt{\dfrac{\sum \left(d_i - \bar{d}\right)^2}{n-1}}$, where S_d is the standard deviation of the paired differences.

The non-parametric sign test was used as a robustness check. This test makes no assumptions whatsoever about the parameters or the shape of the population distributions. It considers only the direction of difference in each sample pair and is defined as:

Sign Test

Formula $$Z = \frac{\hat{P} - P_o}{\sqrt{\frac{P_o(1-P_o)}{n}}}$$

where P_0 = the hypothesised proportion of times the ABCT firm is expected to outperform the non-ABCT firm.
i.e. $P_0 = 50\%$.

The next section summarises the proposed step by step quantitative research process.

4.6.6. Step by Step Quantitative Research Process

The following approach was adopted in this study.

The top 1,000 UK firms, as listed by *The Times 1,000,* was chosen as the appropriate sample frame. A survey was conducted to establish how many of these 1,000 firms used the ABCTs. The survey instrument used was a short mail questionnaire followed up by telephone calls, where necessary.

In order to evaluate the long-run performance of both the ABCT and the non-ABCT firms two measures were used:

(1) three year average holding period returns (AHPRs). This measure was used to overcome the findings of Conrad and Kaul (1993) and Barber and Lyon (1996), that CAR based metrics lead to biased test statistics in studies of long term stock performance, and

(2) cumulative average abnormal returns (CARs) as empirically tested by Ritter (1991) in the interests of robustness.

The matched firms were drawn from the results of a comprehensive mail and telephone questionnaire survey of the top 1,000 firms in the UK in the years 1995 and 1996. The survey identified firms who had adopted the ABCTs and the year of adoption. It also identified those firms who had decided not to adopt the ABCTs. It meant that clearly defined groups of either ABCTs adopters or non ABCT adopters were compiled. Firms that did not fall into either of those categories were discarded. As a result, the subsequent matching process was enhanced and ensured a pure comparison group. The matching process, as described in 4.6.4. above, was done under the three headings, namely;

(1) industry and market capitalisation;

(2) industry and market-to-book and

(3) industry and net total assets.

The *Datastream* daily market returns and accounting based files were then accessed to download the appropriate data for both the ABCT and the matched non-ABCT firms.

Before calculating the average holding period returns and the cumulative average abnormal returns, it was necessary to compute monthly average benchmark-abnormal returns for each matched ABCT firm. This involved calculating the difference between the monthly raw return on each ABCT firm's stock and the monthly benchmark return for the corresponding 21-trading-day period. The benchmarks used were;

(1) listed firms matched by industry and size, i.e. industry levels 1-4 and size criterion market capitalisation and net total assets;

(2) listed firms matched by industry and market to book ratio, and

(3) the FTSE all share index.

The monthly average benchmark-abnormal return for stock i in event month t is defined as:

$$ar_{i,t} = r_{i,t} - r_{m,t}$$

In calculating the above the event time t_1 refers to the first month in the calendar year of the adoption of the ABCTs and, consequently, is the same period for the benchmark return used. The event time is, therefore, different for each set of matched firms as the date of adoption of the ABCTs in the data set ranges from 1988 to 1996.

The monthly average benchmark-abnormal return on a portfolio of *n* stocks for event month t is the equally-weighted cross-sectional arithmetic average of the benchmark-abnormal returns:

$$\overline{AR}_t = \frac{1}{n}\sum_{i=1}^{n} ar_{it} \qquad \text{(Ritter, 1991)}$$

(Table 6.1., 6.4., 6.6., 6.8., 7.1., 7.4., 7.6., 7.8., 8.1., 8.4., 8.6., 8.8.)

A simple t-Test was then used to test whether the monthly average abnormal return was different from zero, that is, whether ABCT firms on average outperformed the benchmark used in month t. It was computed for each month as:

$$t = \frac{\overline{AR}_t \sqrt{n_t}}{Sd_t}$$

where n_t is the number of observations in month t, and
sd_t is the cross-sectional standard deviation of the abnormal returns for month t.

The monthly average abnormal returns led to the calculation of the average holding period returns. The average holding period returns measure the total return from a buy and hold strategy where a stock is purchased at the first market price after the implementation of the ABCTs and held for up to 3 years. It includes the effect of monthly compounding and is computed as follows:

$$R_i = \prod_{t=1}^{36}(1+r_{it}) \quad \text{(Ritter, 1991)}$$

(Tables 6.2., 6.7., 6.9,, 7.2., 7.7., 7.9., 8.2., 8.7., 8.9.)

where r_{it} is the raw return on company i in event month t.

In this study, average holding period returns were calculated for each ABCT and non-ABCT matched firm, individually. This involved calculating the difference between the initial benchmark return when the ABCT event took place and the return every 21 days up to three years or for 36 monthly periods. The average holding period returns were then cross-sectionally averaged and tested for difference using the paired t-Test. The abnormal return is, in effect, the difference between the holding period returns of the ABCT firms and the holding period returns of the non-ABCT firms.

The process continued with the computation of the cumulative average abnormal return (CAR). It is defined as the summation of the average benchmark-abnormal return from event month q to event month s:

$$CAR_{q,s} = \sum_{t=q}^{s} AR_{it} \quad \text{(Ritter, 1991)}$$

(Table 6.5., 7.5. and 8.5.)

The CAR was then cross -sectionally averaged and a simple t-Test was used to test whether the mean CAR was different from zero. The *t*-statistic for the cumulative average abnormal return from month 1 to month t is computed as:

$$t = \overline{CAR}_{1t} \cdot \sqrt{n_t} \,/\, csd_t \quad \text{(Ritter, 1991)}$$

where $\overline{CAR}_{1t} = \frac{1}{n_t}\sum_{i=1}^{n_t} CAR_{i1t}$,

n_t is the number of firms trading in each month, and csd_t is computed as $csd_t = (t \cdot var + 2 \cdot (t - 1) \cdot cov)^{1/2}$,

t is the event month,

var is the average (over 36 months) cross-sectional variance, and

cov is the first-order autocovariance of the AR_t series.

In addition to the paired t-Test, the ABCT firms are benchmarked with the matched non-ABCT firms by using the wealth relative approach (Ritter, 1991). This is defined as:

$$WR = \frac{1 + \text{average holding period return of ABCT firms}}{1 + \text{average holding period return of non-ABCT matched firms}}$$

(Ritter, 1991)

(Table 6.1., 6.2.,6.4., 6.5., 6.6.,6.7.. 6.8.,6.9., 6.10.,)
(Table 7.1., 7.2.,7.4., 7.5., 7.6.,7.7.. 7.8.,7.9., 7.10.,)
(Table 8.1., 8.2.,8.4., 8.5., 8.6.,8.7.. 8.8.,8.9., 8.10., 9.1. and 9.2.)

If the WR is > 1, it is interpreted as the ABCT firms outperforming the portfolio of matched firms and *vice versa*. As the WR is really only a descriptive statistic it does not lend itself to significance testing.

4.7. Conclusions

Having decided on the research question in Chapter 3, the mode of inquiry or research methodology best suited to answering that question had to be chosen. In doing so, the various philosophical positions underpinning the positivist and naturalist approaches were summarised as well as the hybrid multi-method approach. Given that no one method is flawless and that clear choices had to be made between competing philosophies, the fact that widespread adoption of the ABCTs had taken place in a mature and efficient financial market finally decided the issue.

In deciding primarily in favour of a positivist quasi-experimental research approach, the key characteristics of scientific research, i.e. reliability and validity were integrated with the current focus in management accounting research. In operational terms this meant testing the hypothesis that had been developed from the general research question, investigating cause and effect relationship(s), assessing validity and generalising to the population and different settings.

This quantitative, market and accounting based performance, approach had at its core the "matched pair" design concept. This

meant the creation of two groups of firms under three headings, namely market capitalisation, market-to-book and net total assets. One group comprised the ABCT adopting firms and was called the experimental group. The other group comprised the non-ABCT adopting firms and was called the control group. The quality of the matching process was assessed using a series of statistical tests and gave rise to the conclusion that there was no significant size difference between the various data sets. Consequently, this neutralised the effect of extraneous variables between the experimental and control groups and became the basis for evaluating the market and accounting based performance differences between them in Chapters 6, 7, and 8.

As the essence of the research approach adopted was to test for difference between the experimental and control groups, a number of measures were described. These comprised the monthly average returns, the average holding period returns and the cumulative average returns. They were computed for 3 years. The appropriate parametric and non-parametric tests were summarised, as was the wealth relative index.

An additional feature of the research approach adopted was the potential to capture descriptive data by way of a questionnaire. This added a qualitative dimension to the process and, in effect, amounted to a form of "methodological triangulation".

Finally, the sample frame chosen was the top 1,000 firms in the U.K. This was chosen because of its accessibility, the maturity of its financial market and previous research demonstrating a clear interest in the subject matter under review.

CHAPTER 5

5. DATA COLLECTION

5.1. Introduction

This chapter describes the process of gathering the primary data. It begins by detailing the sample selection process. This is followed by a summary of how the survey instrument was constructed and validated. The live mailing and follow up processes are then outlined. The chapter concludes with a detailed analysis of the questionnaire response rate and data.

5.2. Sample Selection Process

The top 1,000 firms in the U.K. as listed by *The Times 1,000* was chosen as the appropriate sample frame. This was based on the view of Cobb, Innes and Mitchell (1992) that as the implementation of the ABCTs caused a "considerable drain on accounting resources", it was most likely that they would be considered more seriously by larger firms than smaller firms. In addition, as the phenomenon in an applied state was of fairly recent origins, the firms with the greatest access to resources of people or technology and those engaged in ongoing strategic evaluations were the most likely to have given it serious consideration.

Having chosen the 1995 *Times 1000* listing as the initial sample frame I then integrated it with the 1996 version and excluded all firms not having a public quotation. The latter aspect was due to the fact that I was using share price returns as a proxy for firm performance, I could only work with firms that had a public listing in the U.K. and, therefore, were accessible on-line through the *Datastream* service.

As regards integrating the 1996 version, I did this in order to update the data set and incorporate the structural revisions that had been decided upon by the authors of that service. The outcome of this review was to change the way firms were ranked. Prior to the 1996 version the size of firms was determined by turnover. When the service was originally conceived this measure had alluring

advantages over other criteria. It was relatively simple to compile, it was unambiguous, it was provided by the companies themselves and, finally, it was easily understood by everyone.

It also had disadvantages which resulted in a bias towards manufacturing firms and the exclusion of service firms in the financial and property area because they had no obvious measure of turnover. In addition, it favoured the inclusion of firms operating as traders or agencies *vis a vie* substantial industrial firms.

The outcome of the review was to change the ranking process from turnover to a specifically devised measure of capital employed. This measure was defined as "shareholders funds *plus* long term loans (where separately disclosed) *plus* intra-group payables *plus* deferred liabilities *less* (for insurance companies) technical reserves" (*The Times 1,000*, 1996). The outcome of this revision was that a much greater number of financial sector firms were included in the top *1,000*. Some mutual insurance companies were however excluded by this new ranking criterion. The net result was that, by integrating the 1995 and 1996 Times *1,000* versions, the integrity of the sample frame was enhanced both in terms of time accuracy and content.

The final outcome to the sample selection process was that 853 firms were identified for mailing purposes.

5.3. Questionnaire

Mail questionnaires are recognised as a convenient way of reaching a large sample. They can be comprehensive, efficient and flexible. They can be used to measure simple things such as demographic information and also very complex data, such as personal attitudes and feelings. Moser and Kalton (1983) indicate that for a simple enquiry amongst an educated professional section of the population on a subject of close interest to them, a mail questionnaire is adequate. The volume of data collected and the degree of complexity of information gathered, can be defined at the start by the researcher, according to a budget, information requirements and time constraints.

Depending on these limits, the questionnaire as a research instrument can be used as the basis for personal interviews, telephone surveys, direct mail surveys individually or collectively. Alreck and Settle (1985) remind us that "some potential sponsors may have overly ambitious expectations, while others may think that surveys are much more limited than they actually are".

However, the questionnaire as a research instrument is not perfect. It has a number of limitations, including:

(a) it takes a considerable length of time to research background information, develop the questionnaire, administer it and then analyse the results;

(b) it can be expensive, depending on the sample size and the questionnaire length;

(c) there is no such thing as the perfect questionnaire, and

(d) the questionnaire results can never dictate decisions.

According to Alreck & Settle (1985), "there will be mistakes, errors and oversights along the way...the objective is to avoid the *major* errors and oversights". Pilot testing should, however, iron out most of the errors. As regards results, the survey data should be treated as another body of evidence or set of indications. It should be evaluated in the light of experience, common sense and any other information available.

Stamped self-addressed return envelopes should be provided and this, as reported by Kinnear and Taylor (1996) should enhance the response rate. This research places an emphasis upon empirical investigation - one of the safeguards against subjective interpretation of the environment (Abdel-Khalik and Ajinkya, 1979). Where necessary, telephone calls should be used as a response stimulant and to clarify any queries.

In drawing up the questionnaire, I was conscious of the importance of the wording and the need to arrive at the appropriate structure/layout. In doing so, I made every endeavour to relate the

questions to the literature underpinning this study and this is documented, question by question. Finally, I was aware of the necessity to carry out a pilot test of the instrument and to make the appropriate amendments deemed necessary as a result. These issues are now dealt with in that order.

5.3.1. Structure of the Questionnaire

The first section of the questionnaire set out the basis for its use, gave a brief definition of the ABC concept and asked for the firm's name and respondent details. Given that the sample frame was drawn from the public domain and that the research strategy was to use the *Datastream* data service, no additional firm information was required.

Thereafter, the questions were primarily of a closed multiple-choice style. This style of questioning was decided on because it allowed for a range of answers, was easy to complete and analyse subsequently. Furthermore, multiple-choice questions are considered best suited for collecting factual information of the type required.

However, it was recognised that bias in multiple-choice questions may result from a number of sources, not least of which is that the respondent is forced to choose an option, even when none is exactly correct. The result is, therefore the "closest approximation" of the respondent's views. Conversely, by offering options to an interviewee, one may also bias the result, particularly if they are offered options which they had not previously considered. In order to overcome these biases, Chisnall (1986) advises that "checklists should be prepared from information gathered during piloting and these should be as complete as possible". With this in mind, the options offered in the questionnaire were based on both the pilot testing exercise and the findings of other research. Of particular importance were the works of Innes and Mitchell (1990a), Cobb, Innes and Mitchell (1992) and Innes and Mitchell (1994).

It was decided to use a list of Likert scales for Question 7. These are a useful method of measuring attitudes because "...they have been

shown to have a good reliability, are simple to construct,... and give rather better information about the degree of respondents' feelings" (Chisnall, 1986). The analysis is very easy in that a coding 5,4,3,2,1 or 2,1,0,-1,-2, can be applied, respectively, to favourable statements and in the reverse order for unfavourable ones. Another advantage of using them is the ease with which they can be administered and understood by the interviewees. However, this also creates a problem of perceptual differences. For example, is "very successful" the exact opposite of "very unsuccessful"?. Similarly, the distance between "fairly successful" and "very successful" is subject to the relative view of the respondent. "Moreover, it cannot be assumed that the mid-point on a Likert scale is necessarily the precise middle between extreme scores" (Chisnall, 1986).

5.3.2. Rationale for Each Question

Question No.	Aim
1 and 2	To establish what firms adopted the ABCTs, when it was adopted and if the adoption was total or partial.
3	To establish the abandonment rate of the ABCTs.
4	To establish who was involved in the design and implementation of the ABCTs.
5	To establish for what purpose were the ABCTs introduced and whether they were still used for that purpose, today.
6	To establish if the ABC techniques were used as the main costing system or in parallel with another.
7	To establish the overall success of the introduction of the ABCTs as perceived by the respondents.
8	To establish if the respondents experienced any unexpected outcomes from the introduction of the ABCTs.
9	To allow the respondents to add any comments they thought appropriate about the use of the ABCTs.
10	In the case of firms that had not implemented the ABCTs to establish if they were or had considered their introduction and comment, accordingly.

5.3.3. Question Wording

Questions are the raw material of questionnaires and it is on them that the quality of the research depends. Therefore, it is appropriate to look at some of the factors which have influenced the construction of the questionnaire that was used for this study. According to Ferber and Hauck (1964), there are three conditions necessary to gain a true response to a question, *viz.*,

(1) The respondent must be able to understand the question.

Chisnall (1986) comments that questions should be phrased in a simple language which can be easily understood by the particular respondents interviewed. Ambiguity in wording is to be avoided, for example, the word "dinner", can be construed as a midday meal or as an evening meal, depending on the respondent. Chisnall (1986) also warns against any attempt to impress the respondent by the use of unusual phrases and jargon.

(2) The respondent must be able to provide the information requested.

For the results of the research to be useful, the respondent must be sufficiently knowledgeable of the area being researched so that clear and considered responses can be provided. Furthermore, questions should not place too much strain on the memories of respondents as this leads to guesswork and false responses.

(3) They must be willing to provide the information

Sensitive information is often difficult to elicit. Respondents become coy when asked for information which they may feel embarrassed to supply. Therefore, it is imperative that a good relationship develops between the interviewer and the respondent, so that the latter is at ease when answering questions of this type. It is also useful to remind the interviewee that all information divulged will be kept in the strictest confidentiality and that the respondent is only one of a (large) sample being interviewed.

In the light of the above, some general rules of thumb can be established when deciding upon the wording of the questions

(1) Focus

Each question should be examined for its relevance to the objectives of the survey and should focus on a specific information requirement.

(2) Brevity and Clarity.

As outlined earlier, everyone should interpret the question in exactly the same way. Long questions lose their focus and often, when using multiple choice alternatives, the respondent may only remember options which are close to the end of the list, irrespective of other choices.

(3) Bias in Wording

Questions should be phrased in such a way as to avoid suggesting certain answers. Likert scales, for example, should offer an equal number of negative as positive options. Leading phrases, such as "you don't think ..... do you?", which can indicate a "preferred" response, should likewise be avoided.

(4) Question Order Bias

Bias due to question order is a frequent problem with questionnaires. It should be structured so that earlier responses do not predetermine the answer to a particular question. Schuman et al (1983), show how two related questions, even when separated by seventeen unrelated ones, still show a "sizeable order effect".[4]

[4]This research focused on a pair of questions related to Communist and American Reporters. Respondents were asked: "Do you think the United States should let Communist newspaper reporters from other countries come in here and send back to their papers the news as they see it?"
The American Reporter item was : "Do you think a Communist country like Russia should let American newspaper reporters come in and send back to America the News as they see it?"
A split Ballot experiment, (reversing the order of the question), showed the order effect. Respondents were more willing to allow Communist Reporters into the US after having previously answered the American Reporter Question, and *vice versa*.

5.4. Cover Letter

A cover letter setting out the reason for the study, its practical real world value and emphasising the importance of a large response was sent with each questionnaire (see Appendix C). Despite the possible limitations and errors in the identification of the specific addressees, five hundred and fifty five (555) letters were personally addressed to a named Finance Director. This was done in the expectation that correspondence so addressed would give rise to a better response rate. In the case of the remaining two hundred and ninety eight (298) the title Finance Director was used as the *Times 1,000* data base did not provide this information. In addition the cover letter assured each respondent of complete confidentiality, promised to send respondents the aggregate results and was personally signed by the author. Finally, in order to maximise the response rate and minimise any potential bias, the letter was printed on the appropriate Henley Management College headed paper.

5.5. Pilot Testing

5.5.1. Introduction

The role of a pilot test is to ensure that the "questionnaire used in the final survey contains questions which are specific, clearly understandable, capable of being answered by the particular population sampled and free from bias" (Chisnall, 1986). Consequently, any problems with wording, ambiguity, order, bias, etc. are highlighted and should be resolved before the questionnaire is used to the "real" sample population. This implies that the questionnaire is field tested under conditions which would exist in the final survey by using a sample of respondents of the same characteristics and educational experience as that of the "real" survey sample.

5.5.2. Pilot Testing Process

A sample of fifteen (15) firms in Ireland was taken from a list of attendees at a conference on the "implementation of ABC" in May 1992. This list was supplemented by another five (5) firms that the author knew had considered the introduction of the ABCTs in the last five years.

The total sample of twenty (20) firms were sent a covering letter (see Appendix B) explaining the reason for the pilot test on Wednesday 7 February `96 and asked to respond by prepaid envelope or fax by Friday 16 February `96. Enclosed was a copy of the draft letter and questionnaire to be used in the live survey. They were encouraged to complete the questionnaire and comment on whether the "contents were self-explanatory and the questions clear and unambiguous". They were also asked to state approximately how long it took to complete the questionnaire in order that I could assess the workload involved in carrying out the live survey. Finally, they were encouraged to write any comments/suggestions they thought appropriate.

By Monday 19 February `96, nine (9) firms had responded and a further two were returned later that week, citing absence from the office as the reason for the delay. I decided to contact the remaining nine firms by telephone in the week beginning 26 February `96 and was successful in getting responses over the telephone from five (5) of them. This resulted in a satisfactory final response rate of 80%.

5.5.3. Results of Pilot Testing

The respondents noted that the questionnaire itself could be administered in 3 to 10 minutes depending on whether the firm had implemented the ABCTs or not. As regards wording and layout, there was no change of any significance suggested. In fact a number of respondents commented very favourably on the clarity and brevity of the documentation. This was both encouraging and partly expected as prior to the formal pilot testing process I had tested a number of iterations on my faculty colleagues and, in particular, incorporated

the comments of those who had experience of this type of research process.

5.6. Live Mailing Process

The survey documentation comprising the cover letter, a two page questionnaire and a prepaid envelope in a white sealed A4 envelope (see Appendix C) were forwarded to Henley Management College Post Room for mailing purposes. This activity was synchronised so that all the firms would receive the documentation on either Tuesday March 12 `96 or Wednesday March 13 `96 given that the cover letter was dated Monday March 11 `96. The envelopes were sent by first class mail in order to ensure high quality handling priority and, therefore, enhance the response rate (Kinnear and Taylor, 1996).

5.7. Follow up Process

Each firm was supplied with a self-sealed prepaid envelope and a return address of Henley Management College in order to maximise the initial response rate. As an alternative, respondents could use the Henley Management College fax number. The cover letter and questionnaire set a final return by date of Friday March 22 `96 and rather tentatively advised that the author would follow-up non-respondents, beginning Tuesday March 26 `96.

By Monday March 25 `96, 98 envelopes were returned and processed against the master mailing listing. The follow-up telephone stage began as scheduled on Tuesday March 26 `96 and continued until Friday June 14 `96. The telephone numbers used in this part of the process were taken primarily from The 1995 and 1996 Times *1000* databases. It was also necessary to contact the international telephone inquiry service for up to date numbers in the case of a small number of firms.

In conducting the telephone follow-up process, the strategy adopted was that up to four attempts would be made to reach the potential respondent in the case of each firm. During that process a number of firms could not locate the survey documentation and asked for

copies. Forty five follow-up letters and questionnaires were sent during that period. By the end of the process 1696 calls had been logged and an overall response rate of 94.8% had been achieved. Detailed records were maintained throughout the process and the outcome is summarised in the next section.

5.8. Questionnaire Response Rate

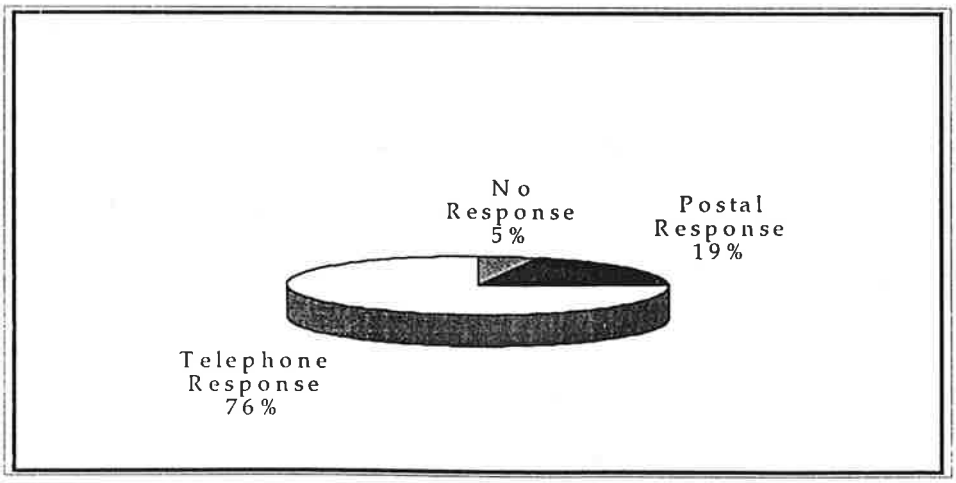
Descriptive statistics were applied to summarise the questionnaire response outcome and present the basic characteristics of the questionnaire data. As noted earlier, the original *Times 1,000* listings were edited to exclude firms that did not have a public quotation. This resulted in a final mailing sample of 853 from which a response rate of almost 95% was achieved, as indicated above. This high response rate was due, in the main, to the follow-up telephone calls carried out in the period immediately after the final date for returning the questionnaire and continued for about six weeks thereafter.

The survey response mode details are shown in Table 5.1. below and presented graphically in Figure 5.1.

Table 5.1. Survey Response Mode Overview

Response Analysis	No Response	Postal Response	Telephone Response	Total No. of Firms
Total	44	164	645	853
%	5.2%	19.2%	75.6%	100%

Figure 5.1. Survey Response Mode Overview



In addition, the direct mailing of the questionnaire documentation from Henley Management College, the use of Henley Management College headed paper, the inclusion of a pre-paid reply envelope and the availability of a fax reply facility would all have contributed to this high response rate. Given that the average response rate for mailed questionnaires tends to be between 20% to 40% (Green and Tull, 1978), the decision to use the telephone follow-up strategy was well justified. Finally, the higher the response rate the less likelihood there is of non-response bias. Nevertheless, by dating the postal responses and keeping a record of the daily telephone calls, I was able to compare the respondents over time (Oppenheim, 1992). I found that there was no significant difference between those firms that responded earlier and those that responded later. Assuming that the late respondents are similar to the non-respondents (Oppenheim, 1992), there is no evidence of non-response bias in this study.

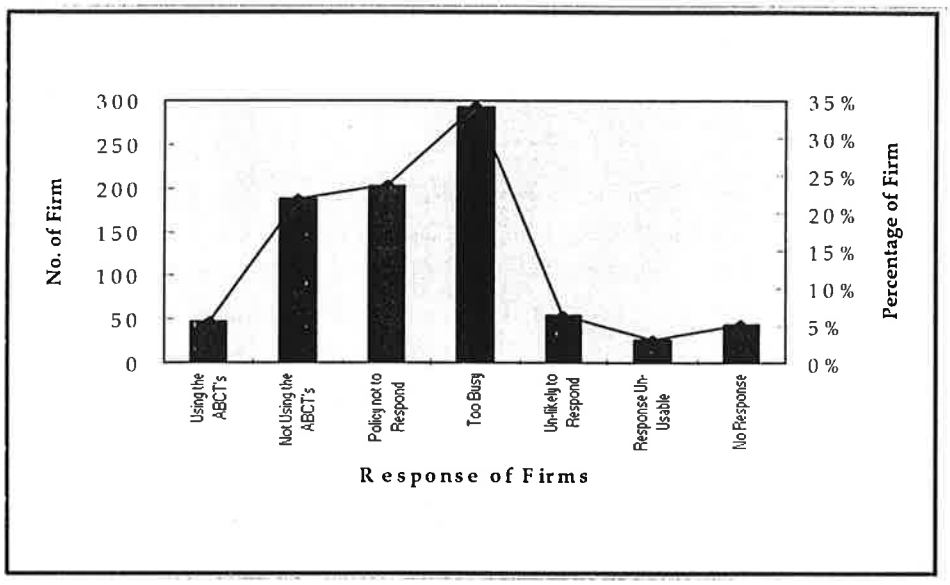
The survey results were analysed further as shown in Table 5.2. and presented graphically in Figure 5.2. This analysis highlights the finding that up to 24% of the sample frame had a specific policy not to respond to surveys. This they stated was due to the frequency with which they were asked and the input of senior management time in complying with the variety and type of information requested. The dominant message from these firms was that, rather than respond in a random or even systematic way, they took a policy decision not to respond at all in the interests of clarity and simplicity. In the main they said, that as they were in the largest sampling frame, they received on average up to two mail survey requests per week.

Table 5.2. Analysis of Survey Results

	Firms using the ABCTs (a)	Firms *not* using the ABCTs (b)	Firm policy not to Respond	Too Busy	Un-likely to Respond	Response Un-Usable	No Response	Total No. of Firms
No. of Firms	47*	187	203	292	54	26	44	853
%	5.5%	21.9%	23.8%	34.2%	6.3%	3.1%	5.2%	100%

**(= 20.09% of a+b)*

Figure 5.2. Analysis of Survey Results



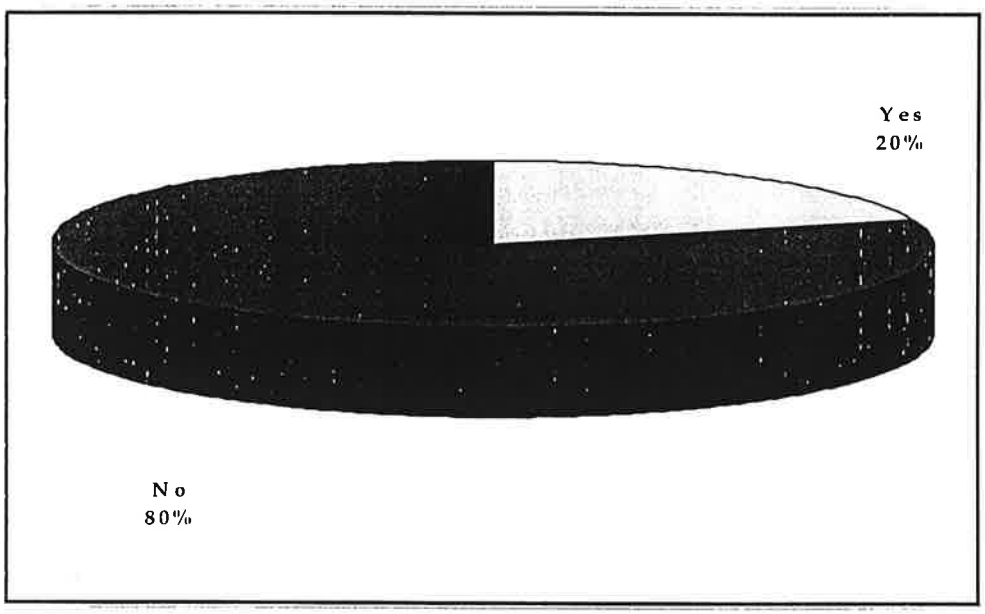
In addition to the 34% who replied that they were too busy, over 6% replied that they may respond later in the year when the respondent was less busy. Though I recorded this as stated, I did not expect a response to be forthcoming. This expectation was borne out as, to date, I have not received any response from the firms so classified. Finally, the un-usable responses at 3% were a combination of firms not understanding the questions being asked and in-complete answers. Overall, these findings are consistent with previous mailed surveys (Ho, 1988). A satisfactory outcome was the level of "usable" responses from firms either using or not using the ABCTs, i.e. 27.4% from the total sample population and 28.9% from the survey respondents.

5.9. Questionnaire Response Analysis

Question 1
What is the ABCT`s adoption rate ?

As shown in Table 5.2. and Figure 5.3. just over 20% (n=47) of the firms, who replied to the questions on the questionnaire, had adopted the ABCTs. This is consistent with the findings of the Innes and Mitchell (1994) study drawn from the same sampling frame and somewhat at variance with the maximum adoption rates of 14% reported in earlier surveys in the U.K., Europe and North America (Nicholls, 1992; Cobb *et al.*, 1992; Ask & Ax, 1992; Drury *et al.*, 1993; Armitage and Nicholson, 1993; Lukka, 1994).

Figure 5.3. *ABCTs adoption rate*

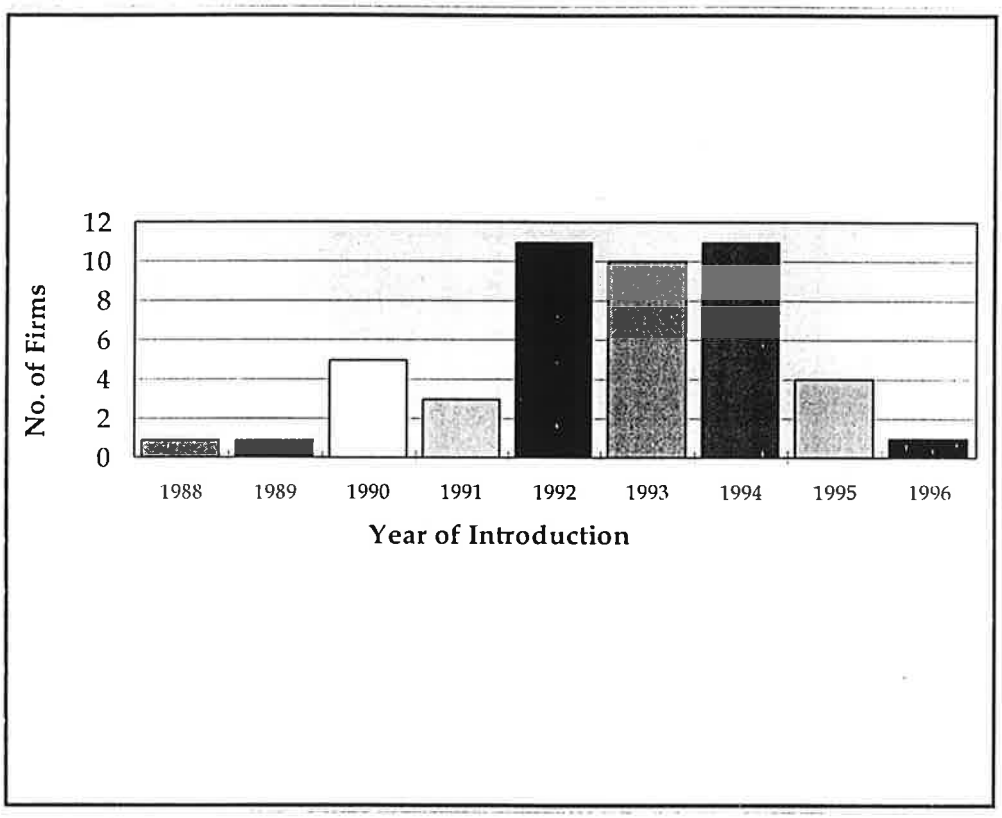


Question 2
When adopted and the degree of adoption of the ABCTs ?

The results of this question suggest that the adoption rate of the ABCTs has levelled out as shown in Figure 5.4. Given the interest that the concept generated in both the academic and professional communities in the late 1980s a significant implementation rate was to be expected in the early 1990s. The results of this survey indicate

that this was achieved primarily in the years 1992 to 1994. However, the rate of growth has slowed dramatically since then.

Figure 5.4. When were the ABCTs Introduced ?



As regards the second part of Question 2 and the proportion of the firms Sales, Assets or Total Costs affected by the introduction of the ABCTs, very few of the respondents answered this question in sufficient detail. The information sought was on reflection over-ambitious and, therefore, no conclusions can be reached on this aspect.

Question 3
What is abandonment rate of the ABCTs ?

None of the respondents answered this question which implies that no firm used the ABCTs and subsequently abandoned them. Consequently, one can conclude that all adopters of the ABCTs are still committed to them and are endeavouring to make the process work efficiently. This was to be expected given the age of the

concept and the degree of investigation and investment required prior to the decision to implement.

Question 4

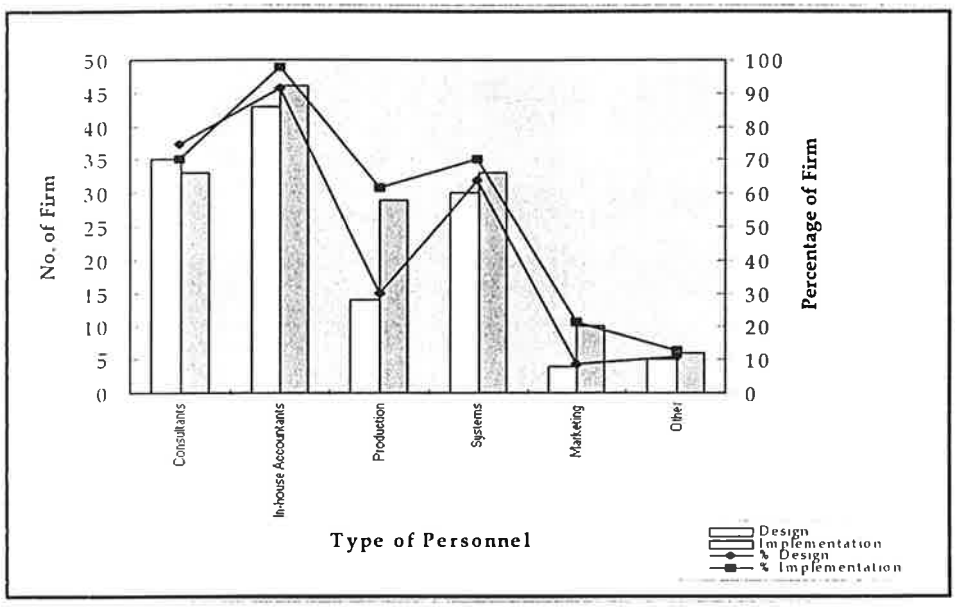
Who was involved in the design and implementation of the ABCTs ?

The crucial issue of who should be involved in the design and implementation of the process is summarised in Table 5.3. and presented graphically in Figure 5.5. As expected, expert consultants, in-house accountants and systems personnel were heavily involved in all aspects of the design and implementation aspects. Given the particular interest by manufacturing firms in the process, the involvement of production and, to a lesser degree, marketing personnel in the implementation stage is welcome. Suffice is to say that their involvement at an earlier stage would have been preferred as this result adds validity to the criticism that the process is primarily accounting driven, either in-house or through the use of expert consultants.

Table 5.3. Who was involved in the design and implementation of the ABCTs ?

	Personnel involved in ABCTs design		Personnel involved in ABCTs implementation	
	%	*n*	%	*n*
Consultants	74.5	35	70.2	33
In-house accountants	91.5	43	97.9	46
Production personnel	29.8	14	61.7	29
Systems personnel	63.8	30	70.2	33
Marketing personnel	8.5	4	21.3	10
Other	10.6	5	12.8	6

Figure 5.5. Who was involved in the design and implementation of the ABCTs ?



Question 5

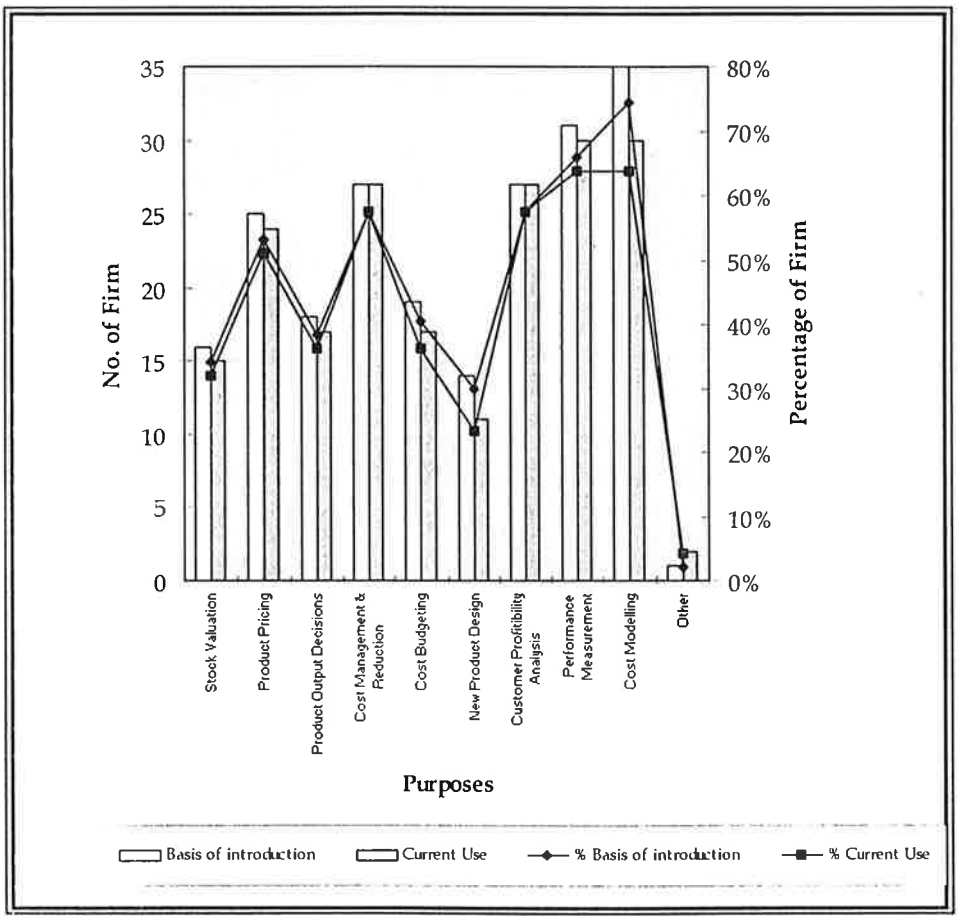
For what purpose were the ABCTs introduced and are they still used for that purpose?

Table 5.4. and Figure 5.6. focus on the specific purposes for which the ABCTs were introduced and whether they were still being used for that purpose or some other. While the extent and mix of applications varies considerably, the results highlight the capability, perceived or otherwise, of the ABCTs to contribute to the provision of better management information. This capability is manifested in the need for assistance with cost modelling, performance measurement and cost management issues. In essence, the process, rather than cost view is well supported in the literature and appeared to be the driving issue that led to the decision by many of the firms to adopt the ABCTs. There was also a very close match between the purpose for which the ABCTs were introduced and their current use. This was to be expected given the length of time the techniques had been adopted by the respondents.

Table 5.4. Purpose for which the ABCTs were introduced *and the* Current Use of the ABCTs

	Purposes for which ABCTs were introduced		Current use of the ABCTs	
	%	*n*	%	*n*
Stock Valuation	34.0	16	31.9	15
Product Pricing	53.2	25	51.1	24
Product Output Decisions	38.3	18	36.2	17
Cost Management & Reduction	57.4	27	57.4	27
Cost Budgeting	40.4	19	36.2	17
New Product Design	29.8	14	23.4	11
Customer Profitability Analysis	57.4	27	57.4	27
Performance Measurement	66.0	31	63.8	30
Cost Modelling	74.5	35	63.8	30
Other	2.1	1	4.3	2

Figure 5.6. Purpose for which the ABCTs were introduced *and the* Current Use of the ABCTs



Question 6

Were the ABCTs used as the main costing system or in parallel with another ?

Figure 5.7. summarises the extent to which the ABCTs were used to underpin the firm's costing systems. As expected and following on Question 5 above, the ABCTs were used primarily as a parallel costing system and were not adopted as the firm's main costing system as shown in Figure 5.8. This is consistent with the use of the techniques in an *ad hoc* fashion and in the context of its potential to provide better information for management decision-making purposes.

Figure 5.7. Use of ABCTs as a parallel costing system

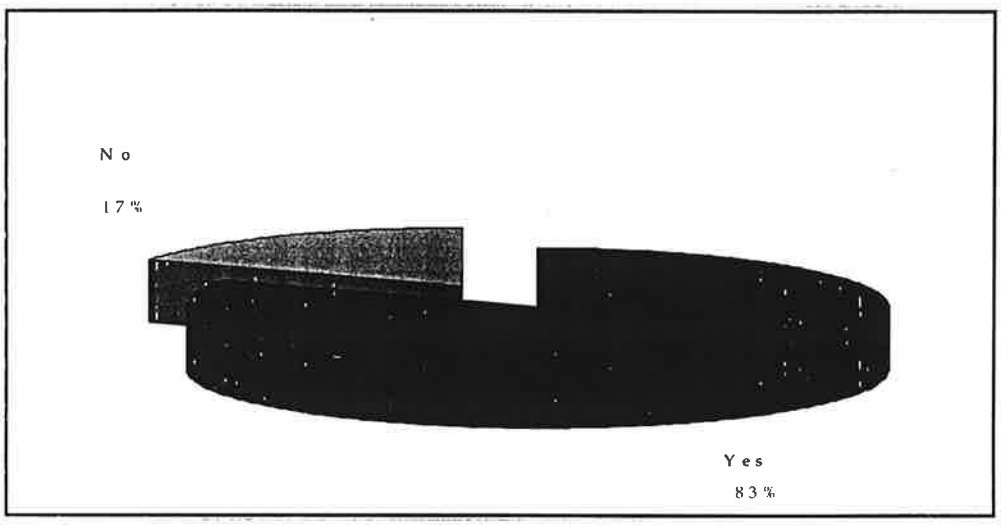
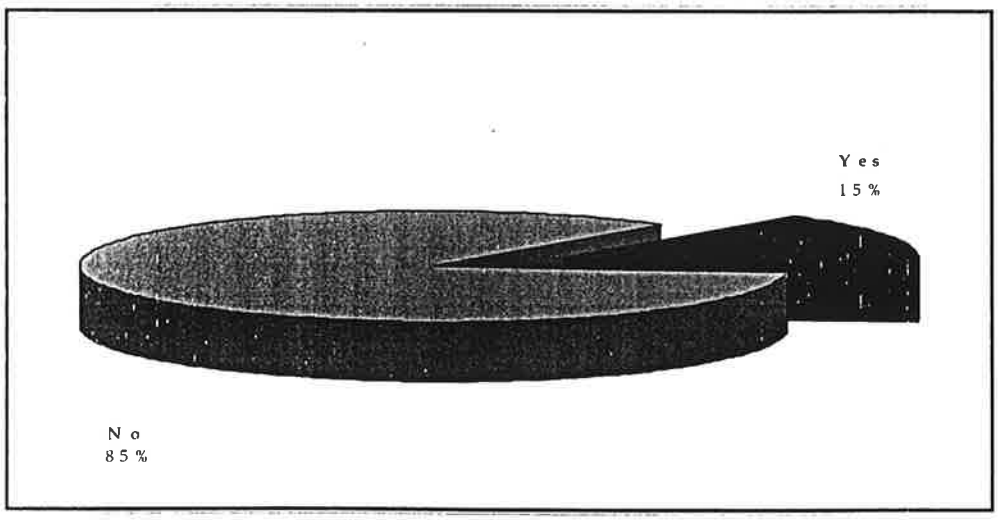


Figure 5.8. Use of ABCTs as the main costing system

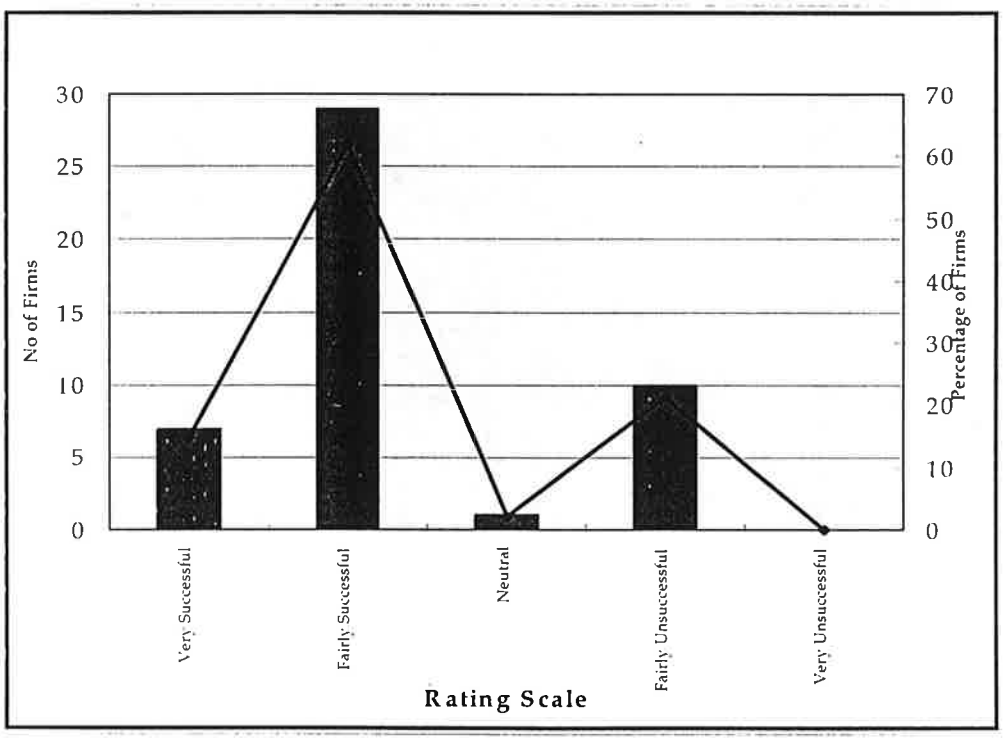


Question 7

How would you rate the overall success of the introduction of the ABCTs ?

Figure 5.9. presents the firm's rating of the overall success of the introduction of the ABCTs. In general a substantial majority (62%, n=29) of the ABCT's firms considered their experience with the process to have been fairly successful. Seven (15%) firms rated their experience very successful, only one (2%) firm offered a neutral rating and ten (21%) firms felt it was a fairly unsuccessful experience.

Figure 5.9. Success rating of introduction of ABCTs



Question 8

If and what unexpected outcomes arose from the introduction of the ABCTs ?

Figure 5.10. reports that 55% (n=26) of the firms experienced unexpected outcomes as a result of the introduction of the ABCTs. These unexpected outcomes are summarised in Figure 5.11. Given the purposes for which the ABCTs were introduced and the potential they offer for more quality cost information, it was not surprising that "different product costs than expected" was the highest recorded at

35%. Other unexpected outcomes worthy of special mention include "the degree of complexity experienced" and "the interest shown by non-financial staff at 19% each". Another unexpected outcome at a lowly 12% was that "the ABCTs facilitate a greater understanding of business activity".

Figure 5.10. Was there unexpected outcomes from the introduction of the ABCTs

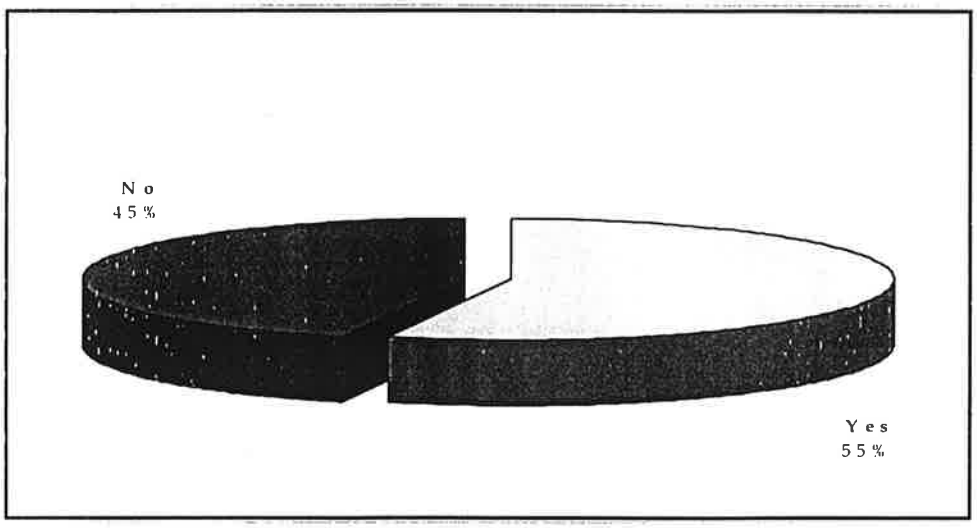
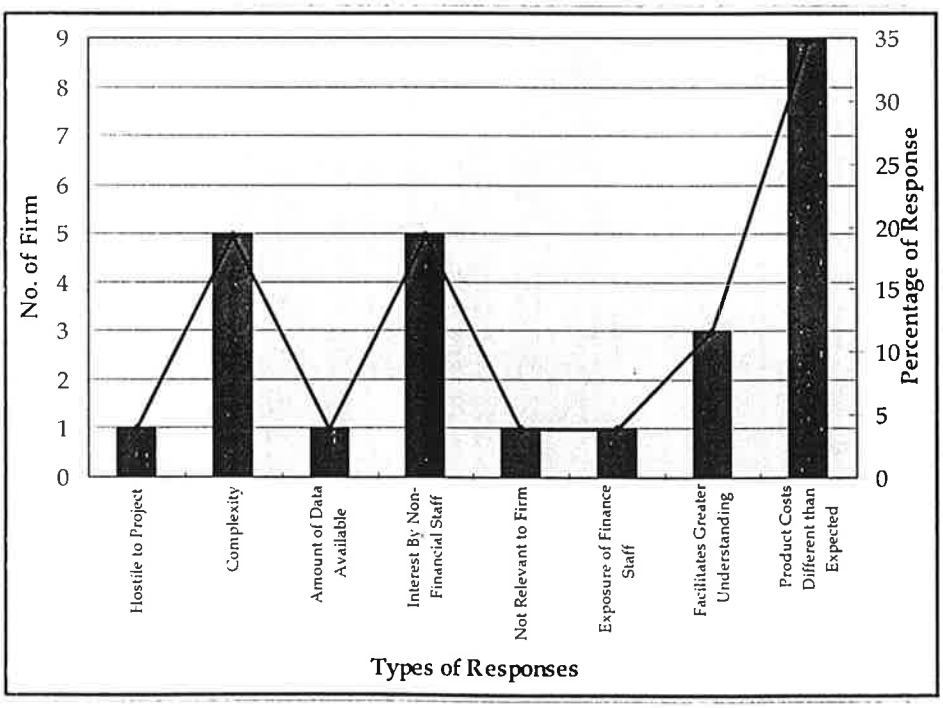


Figure 5.11. Summary of the unexpected outcomes from the introduction of ABCTs

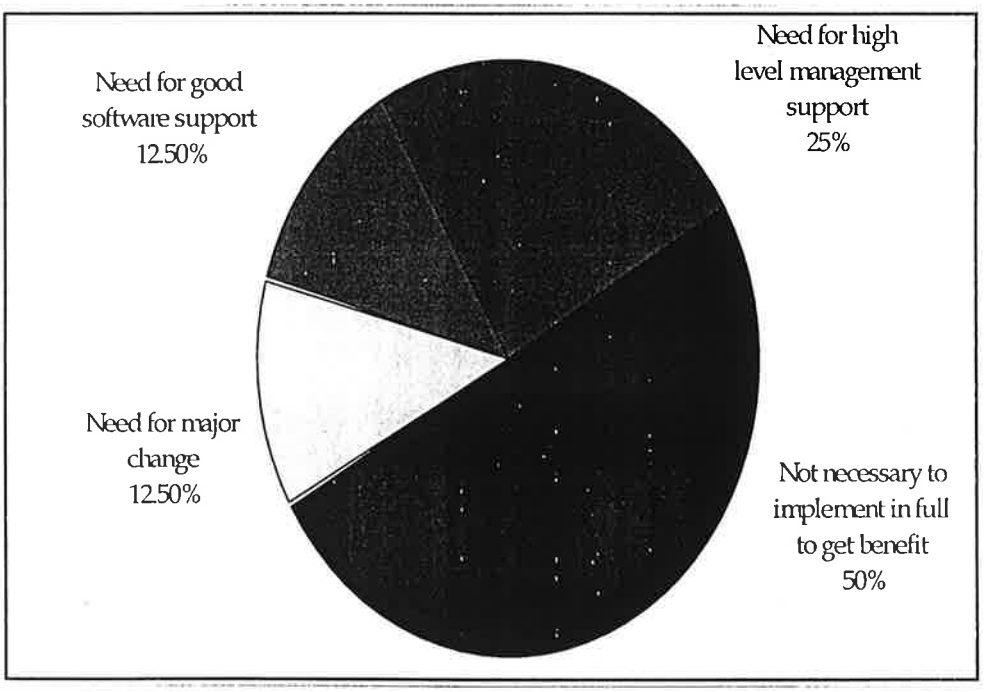


Question 9

Summary of further comments made by respondents.

Given the nature of this question, it was expected that only a small number of respondents would complete it. However, it was deemed worthy of inclusion, in order to capture strongly held views and give the respondents both a direct and personal input to the process. The responses are shown graphically in Figure 5.12. In all 17% (n=8) of the ABCT firms completed this question. Of the respondents supplying "further comments" 50% (n=4) of the ABCT firms stated that "it was not necessary to implement the ABCTs in full in order to gain clear benefit, 25% (n=2) stated "the importance of high level management support", 12.5% (n=1) emphasised "the need for major change as part of the implementation process" and 12.5% (n=1) noted "the need for good software support".

Figure 5.12. Summary of further comments made by respondents



Question 10
Categorisation of respondents who did not adopt the ABCTs and why?

All of the ABCT and non-ABCT firms answered the first part of this question. The results are summarised in Table 5.5. In comparison with the most comparable recent survey (Innes and Mitchell, 1994), this survey indicates a significant drop in the number of firms considering the adoption of the ABCTs and a significant rise in the number of firms who have rejected the ABCTs after assessment. This leads to the conclusion that, despite the widespread interest, the concept/application has engendered in the professional and academic spheres and strong anecdotal evidence, the adoption rates have come close to maturity. It is impossible to offer any sustainable reason for this scenario as an insufficient number of respondents answered the second part of the question. Further, those that did were, to a large extent, either difficult to read or categorise. Worthy of mention are seven firms (15%) who did not consider the ABCTs because "they were too busy" and four (8%) firms who rejected them because "they would be too costly to implement".

Table 5.5. Categorisation of respondents who did not adopt the ABCTs

	n	%
Currently using ABCTs	47	20.1
Currently considering ABCTs adoption	12	5.1
Rejecting ABCTs after assessment	48	20.5
No consideration of ABCTs to date	127	54.3
Total	**234**	**100.0**

5.10. Conclusions

The sample frame chosen for this study embraced the top 1,000 firms in the UK as reported by the *Times 1,000* in 1995 and 1996. These listings were edited to exclude firms not having a public quotation and resulted in a final mailing list of 853 firms. A mail questionnaire was designed to establish the ABCT adopters from the non-ABCT adopters and to source additional information about the nature and characteristics of the ABCTs. A pilot testing process was

carried out in Ireland and some minor changes were made to the live mailing documentation.

Good practice in regard to questionnaire administration was adopted by personally addressing the cover letter to 555 known Finance Directors and by title to the remaining 298. Closed multiple-choice questions were used in the main and a self-sealed prepaid envelope with a return address of Henley Management College was included. A UK reply fax number was also provided. A specific response date was noted after which a telephone follow-up exercise would and did take place.

The questionnaire response rate was a very credible 95%, primarily due to the strategy to adopt and carry out an intensive follow-up process. A detailed analysis of the responses resulted in the identification of 47 ABCT and 187 non-ABCT firms. Supplementary information on attitudes to mail questionnaires was consistent with previously mailed surveys and worth noting is the core number of firms at 24% which have a specific policy not to respond.

As regards the questionnaire responses there is evidence that the ABC process is reaching maturity at an adoption rate of 20% with very modest growth anticipated in the years ahead. This has to be set against the fact that, as no firm has abandoned the techniques to date, new adopters maybe offset by those who decide to abandon them in the future. Allied to that is the significant reduction in the number of firms considering the adoption of the ABCTs from previous surveys and the less than enthusiastic success rating by the firms who adopted the techniques.

The questionnaire responses confirm the dominant role played by expert consultants, in-house accountants and systems personnel in both the design and implementation stages of the ABCT process. The lesser role played by production and marketing personnel in the process is as expected. Cost modelling, performance measurement and cost management issues were the main purposes for which the ABCT were introduced and continue to be used primarily for those purposes. In the main, the ABCTs were used primarily as a parallel costing system and were not adopted as the firm's main costing system.

Also worth noting was the small majority of firms (55%) who experienced "unexpected outcomes" from the introduction of the ABCTs. These unexpected outcomes included "different product costs than expected"; "the degree of complexity experienced"; "the interest shown by non-financial staff", and the ability of the "ABCTs to facilitate a greater understanding of business activity". Finally the general comments made by a small number (17%) of respondents were classified as follows; "it was not necessary to implement the ABCTs in full in order to gain clear benefit (9%); "the importance of high level management support"(4%); "the need for major change as part of the implementation process"(2%) and "the need for good software support"(2%).

CHAPTER 6

6. RESULTS and ANALYSIS - MARKET CAPITALISATION

6.1. Introduction

This chapter reports the results of the primary analysis carried out in order to address the research question. It documents the time series results of the market based and accounting measures of performance for the market capitalisation data set of matched firms. The results are presented for the three year period after the adoption of the ABCTs. In the interests of robustness, the market based performance of the matched firms is also shown for the two year period prior to the adoption of the ABCTs. The results are computed in a number of ways and compared against matched non-ABCT firms and the FTSE all share index.

6.2. Post-Adoption Firm Performance Results

As the primary objective of this study was to identify the nature of the relationship between the introduction of ABCTs and firm performance, it was necessary to control certain other variables in order to obtain a "matched" sample. This strategy increased the likelihood that any differences in performance variables could be attributed to differences in ABCTs adoption. Market capitalisation was used as a key matching measure and resulted in the identification of a high quality control group of non-ABCT firms for comparative purposes. This control group of firms is not statistically different from the ABCT firms in terms of either market capitalisation, market-to-book and net total assets. It also gave rise to the highest number of firms matched (n=43) within the conventional significance level adopted. Further 65% of the firms were matched within the same general industry classification. This chapter concentrates on the results of the market capitalisation data set. Chapters 7 and 8, respectively, document the results of the other two data sets. That analysis was conducted in order to augment the primary results

reported in this chapter and verify the overall robustness of the findings of this study.

Finally in order to test if a difference in performance existed a number of measures were used. These consisted of two types, namely daily stock market returns and a range of accounting measures of performance. The *Datastream* return index was used to compute the daily stock market returns for each firm. This index shows a theoretical growth in the value of each equity over the specified period. It assumes that dividends are re-invested to purchase additional units of an equity at the closing price applicable on the ex-dividend date.

The accounting measures of performance were also sourced from the *Datasteam* service. They were based on the reported published accounts of each firm, were computed annually and in line with financial analysis conventions. They numbered eighteen in all and were summarised under the headings of % change in sales, rates of return, profit margins, turnover/fixed assets, capital gearing %, working capital, productivity ratios and per-share item.

6.2.1. Stock Market Returns Time Series Analysis Process

The matching process became the framework for accessing and downloading the *Datastream* daily stock market returns and accounting data. The data was then analysed in detail using *EXCEL* software. A number of tables were constructed in order to summarise the data. These tables are presented in the same format for the three data sets and are summarised under the headings of monthly average returns (AR), monthly average holding period returns (AHPR) and monthly cumulative average returns (CAR). An overall empirical results table is presented for each data set at the end of the chapter in order to facilitate comparison and interpretation.

The results tables contain four separate information items and are constructed as follows: Section one gives the raw market data under the appropriate heading and shows the difference in 000s between the ABCT firms and the non-ABCT matched firms in real terms. A

positive sign indicates that the ABCT firms outperformed their matched non-ABCT firms for the month in question and *vice versa*.

Section two contains the results of the parametric (paired t-test) analysis. It also shows the significance levels associated with the respective t-values in order to assess the magnitude of the differences in section one in relation to the overall variability within the data. Probability values of 10% and 5% are indicated by the appropriate asterisk(s) and reflect a statistically significant difference in the performance of the matched set of firms. A positive significant t value indicates a statistically significant difference in favour of the ABCT adopting firms.

Section three contains the results of the non-parametric (sign test) analysis. It also shows the significance levels associated with the respective z values in order to assess the direction of the differences, i.e. negative or positive. This procedure ignores both the magnitude of the difference and the variability within the data. Like the parametric tests, probability values of 10% and 5% are indicated by the appropriate asterisk(s) and reflect a statistically significant difference in the performance of the matched set of firms. A positive significant z value indicates a statistically significant difference in favour of the ABCT adopting firms. Section three also shows the proportion of matched firms with positive values.

Section four shows a wealth relative index as a guide to interpreting the market based returns under the various headings. An index greater than 1.00 can be interpreted as the ABCT firms outperforming the set of matched non-ABCT firms. A wealth relative of less than 1.00 indicates that the ABCT firms underperformed the set of matched non-ABCT firms.

6.2.2. Stock Market Measures of Performance

Table 6.1. shows the monthly average returns for the ABCT and non-ABCT firms over a three year (36 month) time period. In reviewing Table 6.1., it is worth noting that the ABCT firms outperformed the non-ABCT firms in 23 of the 36 months studied. Further in the case of the 13 negative monthly average returns, none

have a t-statistic lower than -2.00. The small but evenly distributed negative results shown are more than offset by the series of moderately strong positive average monthly returns, as depicted in Figure 6.1.

Table 6.1. Post-Adoption:

Monthly Average Returns (AR)

ABCT/nonABCT - Market Capitalisation

	Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0241	0.0260	-0.0018	-0.0759	0.5301	0.4419	-0.7625	0.7771	0.9982
M2	0.0235	0.0306	-0.0072	-0.4445	0.6705	0.5116	0.1525	0.4394	0.9931
M3	-0.0104	-0.0219	0.0115	0.8091	0.2115	0.5814	1.0675	0.1429	1.0118
M4	0.0438	0.0439	-0.0001	-0.0085	0.5034	0.4884	-0.1525	0.5606	0.9999
M5	0.0232	0.0186	0.0046	0.2559	0.3996	0.5116	0.1525	0.4394	1.0045
M6	-0.0014	-0.0225	0.0210	1.3076	0.0991 *	0.6047	1.3725	0.0850 *	1.0215
M7	-0.0014	-0.0154	0.0140	0.9603	0.1712	0.5814	1.0675	0.1429	1.0142
M8	0.0146	0.0095	0.0051	0.3765	0.3542	0.4651	-0.4575	0.6763	1.0050
M9	0.0105	0.0053	0.0052	0.2725	0.3933	0.5349	0.4575	0.3237	1.0052
M10	0.0348	0.0069	0.0280	1.5427	0.0652 *	0.6047	1.3725	0.0850 *	1.0278
M11	0.0112	0.0074	0.0038	0.1553	0.4387	0.6512	1.9825	0.0237 **	1.0038
M12	0.0390	0.0244	0.0146	0.4968	0.3110	0.5581	0.7625	0.2229	1.0142
M13	0.0219	0.0417	-0.0198	-1.6368	0.9453	0.3810	-1.5430	0.9386	0.9810
M14	0.0269	0.0420	-0.0151	-0.9450	0.8249	0.5238	0.3086	0.3788	0.9855
M15	0.0053	0.0041	0.0013	0.1189	0.4530	0.4524	-0.6172	0.7315	1.0012
M16	0.0281	0.0193	0.0088	0.5132	0.3053	0.5238	0.3086	0.3788	1.0086
M17	-0.0026	0.0075	-0.0101	-0.7306	0.7654	0.4762	-0.3086	0.6212	0.9900
M18	-0.0063	0.0034	-0.0097	-0.6868	0.7520	0.4524	-0.6172	0.7315	0.9903
M19	0.0049	-0.0103	0.0152	1.0248	0.1557	0.4524	-0.6172	0.7315	1.0153
M20	0.0546	0.0339	0.0207	0.9571	0.1721	0.5000	0.0000	0.5000	1.0200
M21	0.0160	0.0026	0.0134	1.1581	0.1268	0.6190	1.5430	0.0614 *	1.0134
M22	-0.0083	0.0076	-0.0159	-0.6686	0.7462	0.6429	1.8516	0.0320 **	0.9842
M23	-0.0018	-0.0168	0.0149	0.8880	0.1899	0.4286	-0.9258	0.8227	1.0152
M24	0.0045	0.0082	-0.0037	-0.2371	0.5931	0.5238	0.3086	0.3788	0.9963
M25	0.0599	0.0447	0.0151	0.7009	0.2439	0.4737	-0.3244	0.6272	1.0145
M26	0.0335	0.0320	0.0015	0.0728	0.4712	0.4737	-0.3244	0.6272	1.0014
M27	0.0058	-0.0211	0.0269	1.5683	0.0627 *	0.6053	1.2978	0.0972 *	1.0275
M28	-0.0125	-0.0032	-0.0093	-0.4055	0.6563	0.4737	-0.3244	0.6272	0.9907
M29	0.0283	0.0739	-0.0457	-1.7019	0.9514	0.4474	-0.6489	0.7418	0.9575
M30	0.0088	0.0017	0.0071	0.4064	0.3434	0.5789	0.9733	0.1652	1.0071
M31	-0.0009	-0.0125	0.0116	0.9187	0.1821	0.5789	0.9733	0.1652	1.0117
M32	0.0149	0.0372	-0.0222	-1.4546	0.9229	0.4211	-0.9733	0.8348	0.9786
M33	0.0450	0.0236	0.0214	1.1066	0.1378	0.5789	0.9733	0.1652	1.0209
M34	-0.0169	-0.0106	-0.0063	-0.3729	0.6443	0.5526	0.6489	0.2582	0.9937
M35	0.0280	-0.0064	0.0343	2.9202	0.0030 **	0.7368	2.9200	0.0018 **	1.0345
M36	0.0129	-0.0053	0.0182	1.2322	0.1128	0.5526	0.6489	0.2582	1.0183

*Significant at the 10% level

**Significant at the 5% level

Figure 6.1. plots both the monthly average returns of the ABCT and non-ABCT firms and the difference. The difference highlights the consistently strong positive outperformance of the ABCT firms when measured against their matched non-ABCT firms. The small number and magnitude of the negative monthly returns shown in Table 6.1. and Figure 6.1., are more than offset by the high number and magnitude of strong positive monthly returns throughout the 36 month study period.

Figure 6.1. Post-Adoption:

Monthly Average Returns (AR)

ABCT/nonABCT - Market Capitalisation

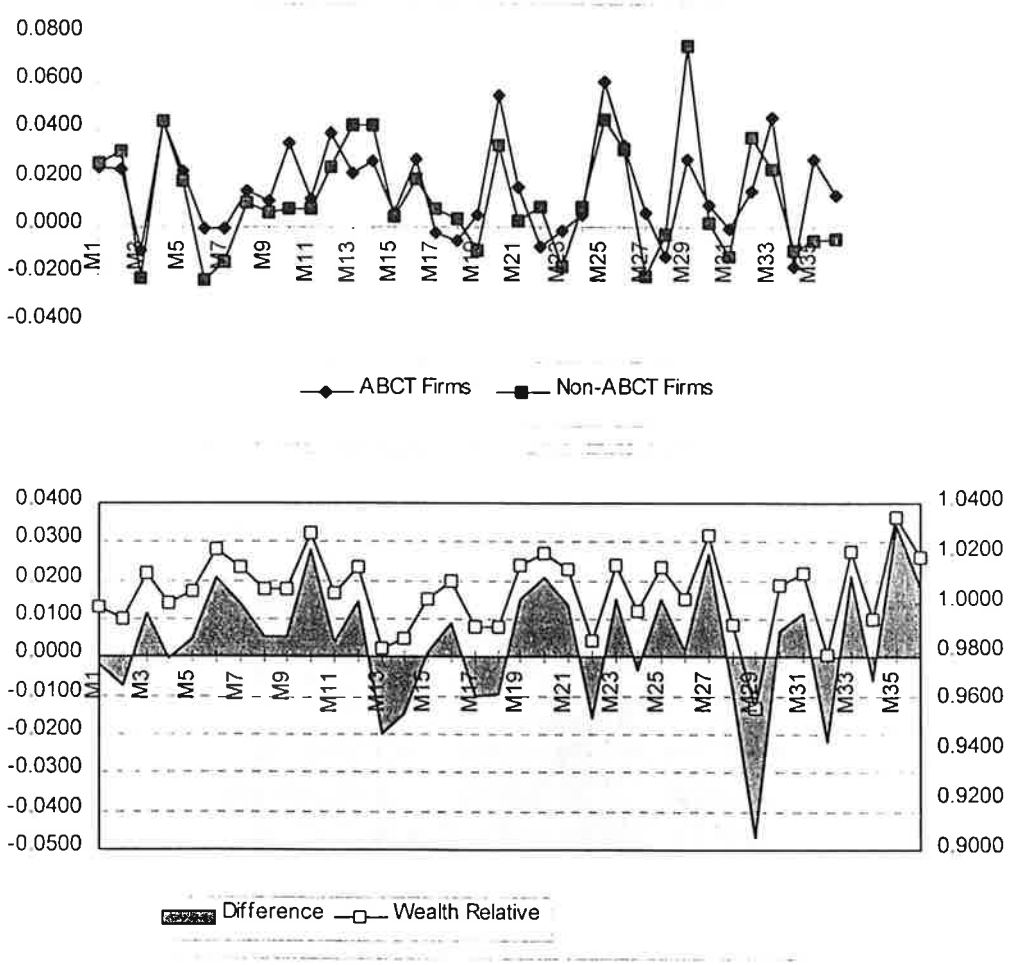


Table 6.2. reports the average holding period returns of the ABCT and non-ABCT firms over a three year period. The difference and appropriate parametric and non-parametric tests are also shown. The consistently positive monthly average returns are reflected in the slow but steady increase in the monthly average holding period returns in Table 6.2. By month 12 the ABCT firms had outperformed

the non-ABCT firms by 4.66%. This had grown to 6.59% by month 24 and accelerated to 19.82% by the end of the study period in month 36.

Table 6.2. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/nonABCT - Market Capitalisation

	Average Holding Period Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0241	0.0260	-0.0018	-0.0759	0.5301	0.4419	-0.7625	0.7771	0.9982
M2	0.0533	0.0608	-0.0075	-0.1987	0.5783	0.5116	0.1525	0.4394	0.9930
M3	0.0418	0.0341	0.0077	0.2149	0.4155	0.5116	0.1525	0.4394	1.0075
M4	0.0911	0.0868	0.0043	0.0896	0.4645	0.5581	0.7625	0.2229	1.0040
M5	0.1123	0.1224	-0.0101	-0.1484	0.5586	0.5814	1.0675	0.1429	0.9910
M6	0.0942	0.0879	0.0063	0.1113	0.4559	0.6047	1.3725	0.0850 *	1.0058
M7	0.0792	0.0666	0.0126	0.2312	0.4091	0.6744	2.2875	0.0111 **	1.0119
M8	0.0962	0.0782	0.0180	0.3069	0.3802	0.6279	1.6775	0.0467 **	1.0167
M9	0.1025	0.0855	0.0170	0.2554	0.3998	0.6279	1.6775	0.0467 **	1.0157
M10	0.1317	0.0842	0.0475	0.7169	0.2387	0.6047	1.3725	0.0850 *	1.0438
M11	0.1490	0.1088	0.0402	0.4445	0.3295	0.6744	2.2875	0.0111 **	1.0363
M12	0.1862	0.1395	0.0466	0.5346	0.2979	0.6279	1.6775	0.0467 **	1.0409
M13	0.2187	0.2002	0.0184	0.1914	0.4246	0.6429	1.8516	0.0320 **	1.0154
M14	0.2552	0.2564	-0.0012	-0.0106	0.5042	0.5714	0.9258	0.1773	0.9991
M15	0.2678	0.2627	0.0051	0.0456	0.4819	0.5952	1.2344	0.1085	1.0041
M16	0.2924	0.2756	0.0168	0.1656	0.4346	0.5952	1.2344	0.1085	1.0132
M17	0.2905	0.2884	0.0021	0.0190	0.4925	0.5952	1.2344	0.1085	1.0016
M18	0.2879	0.2873	0.0006	0.0059	0.4977	0.5000	0.0000	0.5000	1.0005
M19	0.2901	0.2771	0.0130	0.1145	0.4547	0.5238	0.3086	0.3788	1.0102
M20	0.3593	0.3409	0.0184	0.1311	0.4482	0.5000	0.0000	0.5000	1.0138
M21	0.3760	0.3317	0.0443	0.3351	0.3696	0.5476	0.6172	0.2685	1.0333
M22	0.3611	0.3166	0.0445	0.3536	0.3627	0.5000	0.0000	0.5000	1.0338
M23	0.3615	0.3034	0.0581	0.4513	0.3271	0.5476	0.6172	0.2685	1.0446
M24	0.3651	0.2991	0.0659	0.5389	0.2964	0.5714	0.9258	0.1773	1.0508
M25	0.4299	0.3547	0.0752	0.5344	0.2981	0.5526	0.6489	0.2582	1.0555
M26	0.4757	0.3853	0.0904	0.6987	0.2446	0.5789	0.9733	0.1652	1.0652
M27	0.4586	0.3412	0.1174	0.9909	0.1641	0.5263	0.3244	0.3728	1.0875
M28	0.4179	0.2993	0.1187	1.1301	0.1329	0.5789	0.9733	0.1652	1.0913
M29	0.4367	0.3852	0.0515	0.4608	0.3238	0.5000	0.0000	0.5000	1.0371
M30	0.4383	0.3817	0.0565	0.4941	0.3121	0.5263	0.3244	0.3728	1.0409
M31	0.4527	0.3578	0.0949	0.8102	0.2115	0.5263	0.3244	0.3728	1.0699
M32	0.4796	0.4054	0.0742	0.6111	0.2724	0.5789	0.9733	0.1652	1.0528
M33	0.5473	0.4327	0.1145	0.9304	0.1791	0.5526	0.6489	0.2582	1.0799
M34	0.5274	0.4241	0.1033	0.7791	0.2204	0.5263	0.3244	0.3728	1.0726
M35	0.5787	0.4126	0.1660	1.2254	0.1141	0.5789	0.9733	0.1652	1.1175
M36	0.6124	0.4141	0.1982	1.3950	0.0857 *	0.6316	1.6222	0.0524 *	1.1402

*Significant at the 10% level

**Significant at the 5% level

As regards statistical significance, the parametric and non parametric tests in Table 6.2,. show that the superior economic performance of the ABCT firms is statistically significant. By the end of the study period in month 36, 63.16% of the ABCT firms outperformed their matched non-ABCT firm.

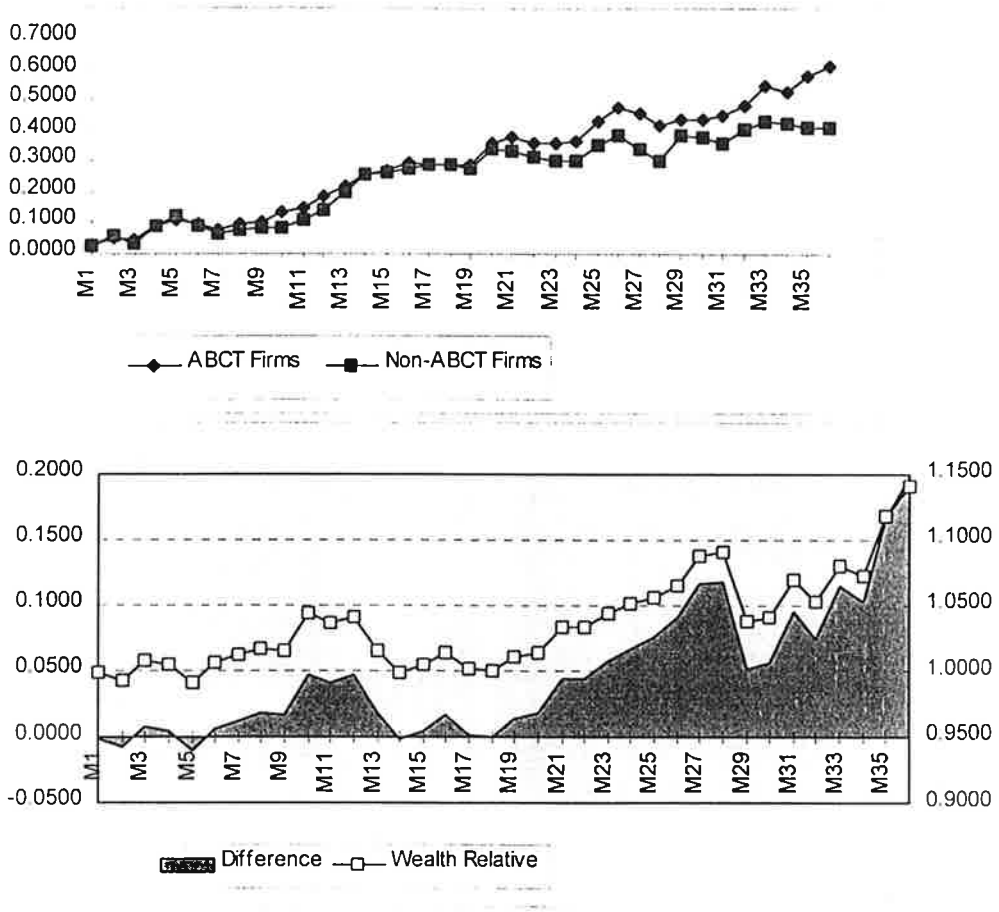
Figure 6.2., in plotting both the monthly average holding period returns of the ABCT firms and the non-ABCT firms, highlights the growing difference in the performance of the two set of firms. The wealth relative index, as a measure of long-run performance, tracks this difference to peak at 14.02% by month 36. Therefore, one can conclude, that the positive difference in favour of the ABCT firms is both economically and statistically significant. This suggests that there is a strong causal link between the adoption of the ABCTs and firm performance as measured in market based terms.

The size of the difference, and the pattern displayed over the study period, is consistent with the authors interpretation of the attributes/characteristics of the ABCTs set out in Figure 1.2 and 3.1. These, allied to the process view of ABC adopted in this study, reflect a system that would bring gradual rather than near-term benefit. This is based on the premise that the decision to adopt an ABC type system is a large project and involves a significant investment of both capital and personnel. Consequently, it is reasonable to conclude that the payback in terms of improved returns will take sometime to accrue and needs to be measured in the long-run. The pattern of results reported is consistent with this view and highlights the dynamic incremental impact of the introduction of the ABCTs, particularly in the later part of the study period under review. The nature of the process and their introduction is such that a "lag" effect is to be expected as documented in Table 6.2.

Figure 6.2. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/nonABCT - Market Capitalisation



6.2.3. Accounting Measures of Performance

In addition to the market based returns, a set of accounting based measures of performance were compiled for each data set. Table 6.4. reports the difference in firm performance under a range of accounting based measures for the market capitalisation data set. Chapters 7 and 8 report the results for the market-to-book and net total assets data sets, respectively.

In compiling Table 6.4. the objective was to summarise three years' accounting year end data for the matched set of firms, beginning with the accounting period one year after the adoption of the ABCTs. However, because of incomplete data, particularly from financial and property based firms, the original set of 43 firms matched by market capitalisation was reduced to 31 firms in the preparation of the accounting measures of performance results in Table 6.4. Further

because a number of the ABCT firms had implemented the ABCTs in 1993 or thereafter a full three years` data was not available. The end result, as summarised in Table 6.3., was that three years` full comparative data was available for 23 firms, two years` data was available for another 4 firms and one years` data was available for another 4 firms. This comprised in all 81 sets of financial comparison opportunities for the 18 different accounting measures of performance used and was the basis of the results summarised in Table 6.4. below.

Table 6.3. Post-Adoption:
Accounting Measures of Performance Data Set
ABCT/nonABCT - Market Capitalisation

No. of Accounting Measures	No. of Firms	No. of Years Data Available	Comparison Opportunities
18	23	3	69
18	4	2	8
18	4	1	4
Total	**31**		**81**

Table 6.4. documents the superior performance of the ABCT firms when measured in accounting based terms. This is reflected in the significantly higher return on shareholders equity achieved by the ABCT firms relative to the non-ABCT firms. The return on capital employed ratio, in offering some support for this conclusion, could be explained by the much higher gearing structure of the ABCT firms.

Focusing first on the profits margins, the introduction of the ABCTs has the greatest impact on the operating profit margin. The result is statistically significant in favour of the ABCT firms. The cash quality of the earnings is also significant. This is evidenced by the cash earnings per share ratio, in particular, and to a lesser extent by the cash flow margin ratio.

In interpreting this result, it is reasonable to anticipate the greatest impact, if any, at the operating profit level. This is based on the conceptually developed strong cost visibility and management decision-making characteristics inherent in the implementation of the ABCTs. Thereafter, the introduction of other variables, such as interest and tax, would be expected to weaken this result. The

operating profit margin % result in this study confirms this expectation and goes further in reporting a statistically significant difference in favour of the ABCT firms at the pre-tax profit margin % level. The net profit margin is also marginally in favour of the ABCT firms. This confirms the capability of the ABCT firms to service higher interest charges consequent upon their highly geared capital structure. They can also sustain higher tax charges following on higher profit results. Both of these aspects are identified under separate ratios.

The importance of the profitability component to the superior overall return performance of the ABCT firms is confirmed by the % change in sales ratio and the turnover to fixed assets ratio. As these are the least statistically significant results, they isolate areas where the ABCTs do not appear to make any difference. It could be that the ABCT firms placed a greater emphasis on sales mix and quality rather than volume. As a result the increased debt, taken on board by the ABCT firms, did not generate any increase in turnover, but also did not impinge on the cost structure of the ABCT firms. This, together with the profitability ratios, suggests that the insightful, attention-directing characteristics of the ABCTs gave rise to significant cost efficiencies for the ABCT firms over the non-ABCT firms. In the final analysis, this strategy and outcome became the basis of the real benefit to the shareholders of the ABCT firms.

In addition to the positive profitability results for the ABCT firms, it appears that they were more efficient managers of working capital. By managing their debtors and stock better, they had a 9 day shorter operating cycle, on average, than their matched counterparts. However the interesting and significant result is the way they appear to maximise support from their creditors. The extra 8 days, on average, additional creditors support in conjunction with the positive operating cycle, translates into much better cash cycles for the ABCT firms, as evidenced by the quick assets ratio. This 17 days, on average, differential in favour of the ABCT firms reduces their dependence on expensive short-term debt and contributes positively to their overall profitability. This suggests that the outperformance of the ABCT firms can also be attributed to the contribution the ABCTs make to the quality of the firms` management information systems and processes. Consequently a more informed management should

make better operational and working capital investment decisions, which will be reflected in better overall accounting measures of performance.

Table 6.4. Post-Adoption:

Accounting Measures of Performance Results Table ABCT/nonABCT - Market Capitalisation

	Average Returns			Paired t-Test		Sign Test		
DESCRIPTION	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z
% Change in Sales	7.8932	9.8337	-1.9405	-0.5651	0.7132	0.4568	-0.7778	0.7817
Rates of Return								
Return on S'Holders Equity %	14.9523	12.6240	2.3284	0.7573	0.2255	0.6420	2.5556	0.0053 **
Return on Capital Employed %	16.4737	16.4617	0.0120	0.0012	0.4995	0.4691	-0.5556	0.7107
Profit Margins								
Operating Profit Margin %	11.7264	10.2869	1.4395	1.4624	0.0738 *	0.5556	1.0000	0.1587
Pre-Tax Profit Margin %	10.2562	9.4636	0.7926	0.7735	0.2207	0.5802	1.4444	0.0743 *
Net Profit Margin %	7.1491	6.7601	0.3890	0.5322	0.2980	0.5679	1.2222	0.1108
Cash Flow Margin %	12.1079	11.2806	0.8273	0.9245	0.1790	0.4568	-0.7778	0.7817
Turnover/Fixed Assets	2.9896	3.5719	-0.5822	-1.3764	0.9137	0.4444	-1.0000	0.8413
Capital Gearing %	38.4348	20.9517	17.4831	0.6050	0.2734	0.6914	3.4444	0.0003 **
Working Capital								
Working Capital Ratio	1.3009	1.3196	-0.0188	-0.2667	0.6048	0.5309	0.5556	0.2893
Quick Assets Ratio	0.9937	0.9414	0.0523	0.8169	0.2082	0.5185	0.3333	0.3694
Stock Ratio (Days)	38.1194	39.7664	-1.6470	-0.5659	0.7135	0.4691	-0.5556	0.7107
Debtors Ratio (Days)	75.1049	82.0484	-6.9435	-0.5144	0.6958	0.5679	1.2222	0.1108
Creditors Ratio (Days)	102.5790	94.1302	8.4488	1.6023	0.0565 *	0.5432	0.7778	0.2183
Productivity Ratios								
Tax Ratio	58.5633	28.8222	29.7411	0.7949	0.2145	0.4815	-0.3333	0.6306
Sales per Employee	110.4072	106.3102	4.0969	0.4777	0.3171	0.5309	0.5556	0.2893
Operating Profit Per Employee	13.8600	13.0163	0.8437	0.3489	0.3640	0.5062	0.1111	0.4558
Per-Share Item								
Cash Earnings per Share	44.7191	32.0644	12.6547	2.8369	0.0029 **	0.5062	0.1111	0.4558

***Significant at the 10% level**

****Significant at the 5% level**

Finally the sales per employee and operating profit per employee ratios are worthy of mention. They were expected to shed some light on the productivity of an important, albeit diminishing, cost component. Eventhough the results document marginal support in favour of the ABCT firms, they are not very illuminating. The fact that they report no significant difference between the ABCT and non-ABCT firms gives rise to concerns about the integrity and consistency of the measurement data. Perhaps the contemporary practice of using more contract employees, allied to various forms of sub-contracting, gave rise to a methodological weakness in this area. The question of inconsistency or rather creativity in the reporting of employee numbers year on year maybe a contributory factor.

Overall, therefore, the ABCT market capitalisation data set of firms outperform the matched non-ABCT firms as measured by the key accounting ratios. This is primarily driven by the profitability profile of the ABCT firms and complemented by better working capital and cash management. This is interpreted to mean that the ABCTs can provide information relevant to the control and monitoring of daily operations, can provide guidance on issues such as cost reduction and non-value added activities and can inform management on questions of product mix and range. This is consistent with the ABCT attributes/characteristics set out in Figure 1.2. and the process perspective of ABC depicted in Figure 1.3. Finally this organic, flexible and task oriented view of a key management accounting function is underpinned by the Wilson and Chua (1993) normative definition adopted in this study.

6.3. Robustness Checks

The pursuit of rigour in this study resulted in a number of sensitivity tests being undertaken. The reliability checks explored were: the computation of results using the cumulative average returns method (CAR), the use of the FTSE all share index as a benchmark and an assessment of the pre-adoption performance of the matched firms. These additional measures of performance contribute to the verification of the primary results shown in section 6.2. above.

6.3.1. Cumulative Average Returns Method

A number of research studies, in financial economics on long-term stock performance, have used the cumulative average returns method for computing long-run stock performance. However, recent research by Conrad and Kaul (1993) and Barber and Lyon (1996), conclude that cumulative average return based metrics lead to biased test statistics in event studies designed to detect long-run abnormal stock returns. As a result, this study gives more credence to the results of the average holding period return method documented in section 6.2. above. Further, based on the findings of Barber and Lyon (1996), this is justified given the nature of the null hypothesis and the use of the control firm approach in this study.

As a result of these concerns, the cumulative average return method is used in this study for comparative purposes. The results computed using that method are documented in Table 6.5. A review of Table 6.5. confirms the positive performance of the ABCT firms, when matched against the non-ABCT firms. It reflect the steady upwards trend to peak at a positive 15.12% difference between the ABCT firms and the non-ABCT firms by the end of month 36. Consistent with the earlier results the outperformance of the ABCT firms is particularly strong in the third and final year of the study period under review. By month 36, the ABCT firms outperformed the non-ABCT firms in the case of 65.79% of the matched firms. The wealth relative mirrors this trend to reach a positive 10.72% outperformance by the ABCT firms by the end of the study period. These results are both economically and statistically significant.

Table 6.5. Post-Adoption:
Monthly Cumulative Average Returns (CAR)
ABCT/nonABCT - Market Capitalisation

	Cumulative Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0241	0.0260	-0.0018	-0.0759	0.5301	0.4419	-0.7625	0.7771	0.9982
M2	0.0476	0.0566	-0.0090	-0.2745	0.6075	0.5116	0.1525	0.4394	0.9915
M3	0.0373	0.0348	0.0025	0.0733	0.4709	0.5349	0.4575	0.3237	1.0024
M4	0.0810	0.0787	0.0024	0.0574	0.4772	0.5116	0.1525	0.4394	1.0022
M5	0.1042	0.0972	0.0070	0.1360	0.4462	0.5814	1.0675	0.1429	1.0064
M6	0.1028	0.0748	0.0280	0.5928	0.2782	0.6047	1.3725	0.0850 *	1.0260
M7	0.1014	0.0594	0.0420	0.8104	0.2111	0.6744	2.2875	0.0111 **	1.0396
M8	0.1160	0.0689	0.0471	0.8093	0.2115	0.6279	1.6775	0.0467 **	1.0440
M9	0.1265	0.0743	0.0523	0.7431	0.2308	0.6047	1.3725	0.0850 *	1.0487
M10	0.1614	0.0811	0.0802	1.1312	0.1322	0.5581	0.7625	0.2229	1.0742
M11	0.1726	0.0886	0.0840	1.0132	0.1584	0.6977	2.5925	0.0048 **	1.0772
M12	0.2115	0.1129	0.0986	1.3023	0.1000 *	0.6279	1.6775	0.0467 **	1.0886
M13	0.2335	0.1547	0.0788	0.9620	0.1708	0.6429	1.8516	0.0320 **	1.0682
M14	0.2603	0.1966	0.0637	0.7484	0.2292	0.5714	0.9258	0.1773	1.0532
M15	0.2656	0.2007	0.0649	0.7354	0.2331	0.5952	1.2344	0.1085	1.0541
M16	0.2937	0.2200	0.0737	0.8842	0.1909	0.6190	1.5430	0.0614 *	1.0604
M17	0.2911	0.2275	0.0636	0.7133	0.2398	0.5952	1.2344	0.1085	1.0518
M18	0.2848	0.2309	0.0539	0.5925	0.2784	0.5476	0.6172	0.2685	1.0438
M19	0.2897	0.2206	0.0691	0.7491	0.2290	0.5476	0.6172	0.2685	1.0566
M20	0.3443	0.2545	0.0898	0.8792	0.1922	0.5476	0.6172	0.2685	1.0716
M21	0.3603	0.2571	0.1032	1.0398	0.1523	0.5714	0.9258	0.1773	1.0821
M22	0.3520	0.2647	0.0873	0.8423	0.2022	0.5714	0.9258	0.1773	1.0690
M23	0.3502	0.2480	0.1022	0.9567	0.1722	0.5714	0.9258	0.1773	1.0819
M24	0.3547	0.2562	0.0986	0.9213	0.1811	0.5952	1.2344	0.1085	1.0785
M25	0.4146	0.3009	0.1137	1.1674	0.1253	0.5789	0.9733	0.1652	1.0874
M26	0.4481	0.3329	0.1152	1.2735	0.1054	0.6053	1.2978	0.0972 *	1.0864
M27	0.4539	0.3118	0.1421	1.5492	0.0649 *	0.5789	0.9733	0.1652	1.1083
M28	0.4414	0.3086	0.1328	1.4949	0.0717 *	0.5789	0.9733	0.1652	1.1015
M29	0.4697	0.3826	0.0871	0.9516	0.1737	0.5526	0.6489	0.2582	1.0630
M30	0.4785	0.3843	0.0943	0.9955	0.1630	0.5789	0.9733	0.1652	1.0681
M31	0.4776	0.3718	0.1058	1.0880	0.1418	0.6053	1.2978	0.0972 *	1.0772
M32	0.4926	0.4090	0.0836	0.8508	0.2002	0.6053	1.2978	0.0972 *	1.0593
M33	0.5375	0.4325	0.1050	1.0724	0.1452	0.6316	1.6222	0.0524 *	1.0733
M34	0.5206	0.4219	0.0987	0.9335	0.1783	0.5789	0.9733	0.1652	1.0694
M35	0.5486	0.4156	0.1330	1.2215	0.1148	0.6053	1.2978	0.0972 *	1.0940
M36	0.5615	0.4103	0.1512	1.3368	0.0947 *	0.6579	1.9467	0.0258 **	1.1072

*Significant at the 10% level

**Significant at the 5% level

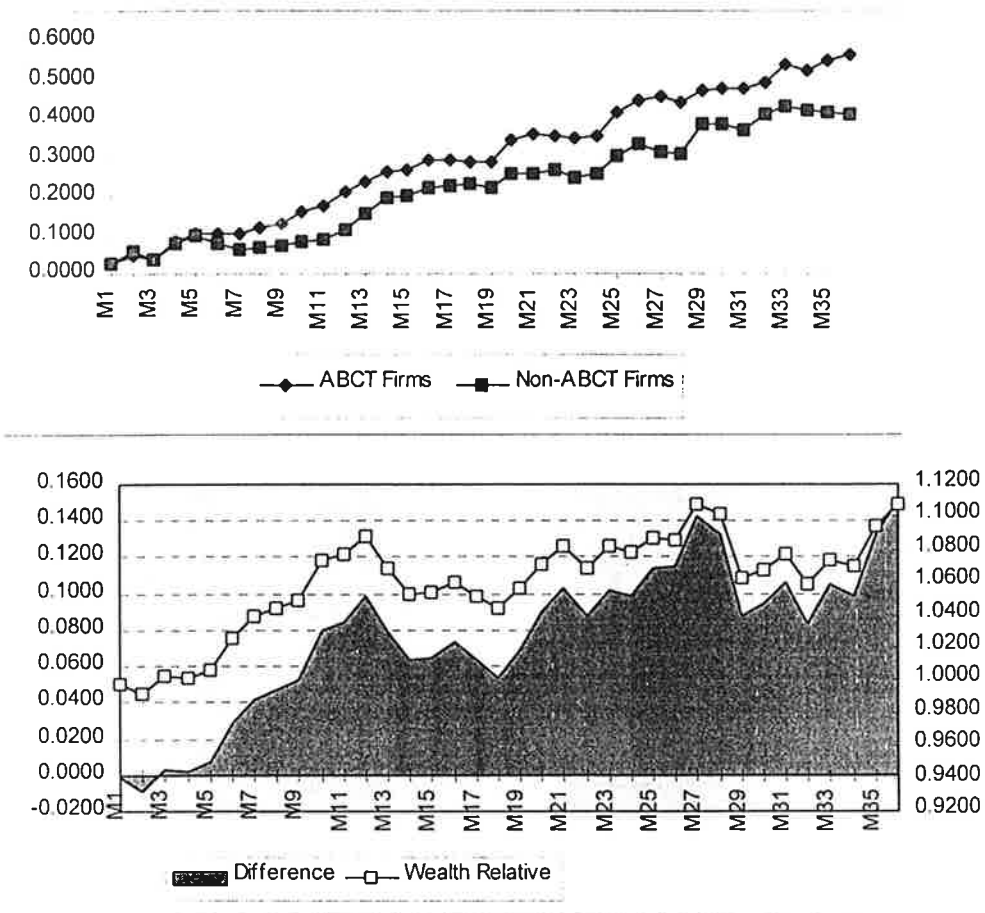
Figure 6.3. plots the monthly cumulative average returns for the ABCT and non-ABCT firms and highlights the difference between them. It shows the consistent outperformance of the ABCT firms after a slow start. The wealth relative captures the sluggish but accelerating fluctuating positive trend upwards in favour of the ABCT firms. Overall the results of the monthly cumulative average return

method support the conclusion reached using the average holding period return method and is further evidence of the positive impact the introduction of the ABCTs have on firm performance. This suggests that the superior performance of the ABCT firms is not sensitive to the computation method used.

Figure 6.3. Post-Adoption:

Monthly Cumulative Average Returns (CAR)

ABCT/nonABCT - Market Capitalisation



6.3.2. FTSE - Market-Adjusted Method

As part of the robust testing process in this study, it was decided to use a reference portfolio of firms as an additional benchmark. The benchmark chosen was the FTSE all share index as computed by the *Datastream* service. This index is calculated daily and based on a representative list of stock returns. As it is weighted by market value, it was deemed the most appropriate one to use. This was due to the sample frame chosen for this study and the expectation that the ABCTs were more likely to be adopted by larger than smaller firms.

Table 6.6. reports the monthly average returns for the ABCT and the FTSE index over a three year (36 month) time period. It shows that the ABCT firms outperformed the index in 23 of the 36 months studied. The nature of this fluctuating pattern of results is positively biased as depicted graphically in Figure 6.4.

Table 6.6. Post-Adoption:

Monthly Average Returns (AR)

ABCT/FTSE - Market Capitalisation

	Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	FTSE	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0241	0.0133	0.0109	0.5478	0.2933	0.3721	-1.6775	0.9533	1.0107
M2	0.0235	0.0078	0.0157	1.3529	0.0917 *	0.6047	1.3725	0.0850 *	1.0156
M3	-0.0104	-0.0074	-0.0030	-0.3704	0.6435	0.4884	-0.1525	0.5606	0.9970
M4	0.0438	0.0260	0.0178	1.5751	0.0614 *	0.5349	0.4575	0.3237	1.0173
M5	0.0232	0.0117	0.0115	1.1407	0.1302	0.5814	1.0675	0.1429	1.0113
M6	-0.0014	-0.0116	0.0102	0.8456	0.2013	0.5116	0.1525	0.4394	1.0103
M7	-0.0014	0.0036	-0.0049	-0.3339	0.6299	0.4419	-0.7625	0.7771	0.9951
M8	0.0146	0.0168	-0.0022	-0.1839	0.5725	0.4884	-0.1525	0.5606	0.9978
M9	0.0105	0.0066	0.0040	0.2682	0.3949	0.5581	0.7625	0.2229	1.0039
M10	0.0348	0.0208	0.0141	1.1807	0.1222	0.6047	1.3725	0.0850 *	1.0138
M11	0.0112	0.0101	0.0011	0.0683	0.4729	0.5814	1.0675	0.1429	1.0011
M12	0.0390	0.0229	0.0161	0.6838	0.2489	0.5116	0.1525	0.4394	1.0157
M13	0.0219	0.0206	0.0013	0.1064	0.4579	0.3810	-1.5430	0.9386	1.0013
M14	0.0269	0.0251	0.0017	0.1521	0.4399	0.5000	0.0000	0.5000	1.0017
M15	0.0053	0.0090	-0.0037	-0.3449	0.6340	0.5000	0.0000	0.5000	0.9963
M16	0.0281	0.0088	0.0193	1.3770	0.0880 *	0.5714	0.9258	0.1773	1.0191
M17	-0.0026	0.0092	-0.0118	-1.1729	0.8762	0.3810	-1.5430	0.9386	0.9883
M18	-0.0063	0.0013	-0.0077	-0.6886	0.7525	0.4762	-0.3086	0.6212	0.9923
M19	0.0049	-0.0025	0.0074	0.8135	0.2103	0.5238	0.3086	0.3788	1.0074
M20	0.0546	0.0293	0.0254	2.0535	0.0232 **	0.5952	1.2344	0.1085	1.0247
M21	0.0160	0.0197	-0.0037	-0.4752	0.6814	0.4048	-1.2344	0.8915	0.9964
M22	-0.0083	-0.0024	-0.0059	-0.5752	0.7158	0.4286	-0.9258	0.8227	0.9941
M23	-0.0018	0.0063	-0.0081	-0.8068	0.7878	0.4048	-1.2344	0.8915	0.9919
M24	0.0045	0.0148	-0.0102	-0.8134	0.7896	0.3810	-1.5430	0.9386	0.9899
M25	0.0599	0.0340	0.0259	1.4708	0.0749 *	0.4474	-0.6489	0.7418	1.0250
M26	0.0335	0.0211	0.0124	0.7917	0.2168	0.4737	-0.3244	0.6272	1.0121
M27	0.0058	-0.0130	0.0188	1.1727	0.1242	0.6053	1.2978	0.0972 *	1.0191
M28	-0.0125	-0.0005	-0.0120	-0.6982	0.7553	0.4474	-0.6489	0.7418	0.9880
M29	0.0283	0.0275	0.0007	0.0665	0.4737	0.3947	-1.2978	0.9028	1.0007
M30	0.0088	-0.0008	0.0096	0.8403	0.2031	0.5789	0.9733	0.1652	1.0096
M31	-0.0009	-0.0137	0.0128	1.1395	0.1309	0.6842	2.2711	0.0116 **	1.0129
M32	0.0149	0.0205	-0.0056	-0.5207	0.6972	0.4737	-0.3244	0.6272	0.9945
M33	0.0450	0.0354	0.0095	0.5874	0.2802	0.5789	0.9733	0.1652	1.0092
M34	-0.0169	-0.0074	-0.0094	-0.7953	0.7842	0.5000	0.0000	0.5000	0.9905
M35	0.0280	0.0126	0.0154	1.5952	0.0596 *	0.6053	1.2978	0.0972 *	1.0152
M36	0.0129	0.0117	0.0012	0.0923	0.4635	0.5000	0.0000	0.5000	1.0012

*Significant at the 10% level

**Significant at the 5% level

Figure 6.4. Post-Adoption:

Monthly Average Returns (AR)

ABCT/FTSE - Market Capitalisation

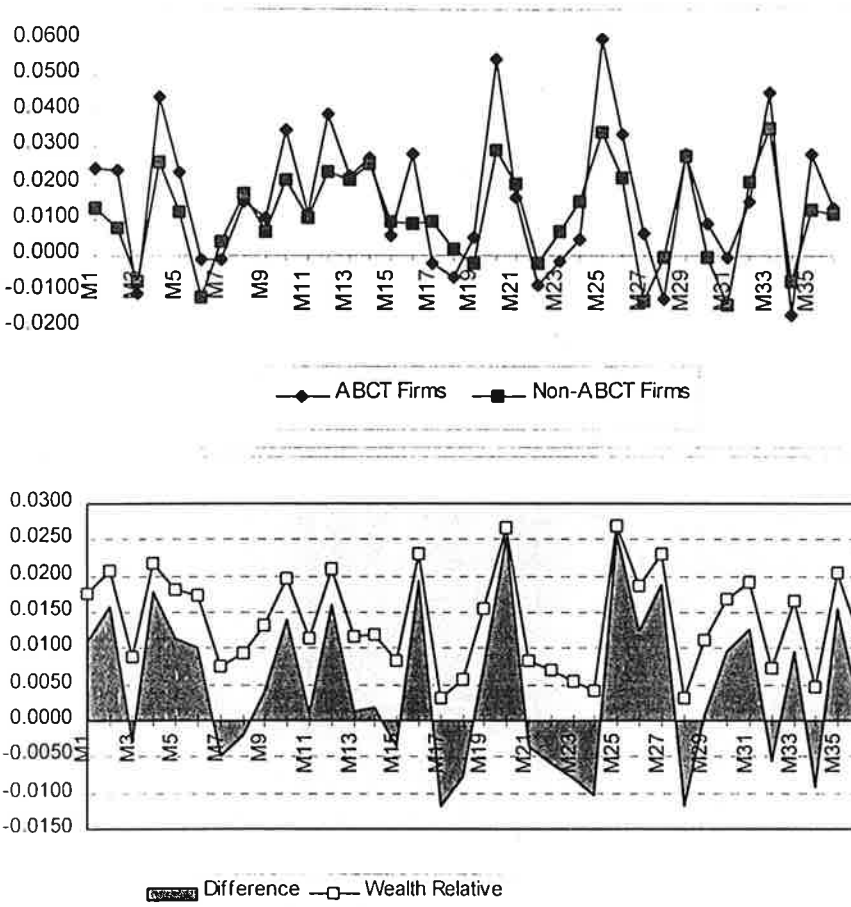


Table 6.7. documents the average holding period returns of the ABCT and the FTSE index over a three year period. The difference and appropriate parametric and non-parametric tests are also shown. The fluctuating pattern of positively biased monthly average returns in Table 6.6. gives rise to the slow but steady outperformance of the FTSE index by the ABCT firms as shown in Table 6.7. By month 12 the ABCT firms had outperformed the index by 6.22%. This had grown to 8.25% by month 24 and reached 19.19% by month 36. This result is both economically and statistically significant. As reported in the earlier results, the greatest impact of the ABCTs is concentrated in the latter part of the study period. By month 36, 60.53% of the ABCT firms outperformed the FTSE index.

Table 6.7. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/FTSE - Market Capitalisation

	Average Holding Period Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	FTSE	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0241	0.0133	0.0109	0.5478	0.2933	0.3721	-1.6775	0.9533	1.0107
M2	0.0533	0.0207	0.0327	1.3041	0.0996 *	0.5116	0.1525	0.4394	1.0320
M3	0.0418	0.0135	0.0283	1.1239	0.1337	0.6279	1.6775	0.0467 **	1.0279
M4	0.0911	0.0399	0.0513	1.8294	0.0372 **	0.5814	1.0675	0.1429	1.0493
M5	0.1123	0.0525	0.0598	2.1696	0.0179 **	0.6512	1.9825	0.0237 **	1.0568
M6	0.0942	0.0393	0.0550	2.1052	0.0206 **	0.6047	1.3725	0.0850 *	1.0529
M7	0.0792	0.0412	0.0379	1.4531	0.0768 *	0.6047	1.3725	0.0850 *	1.0364
M8	0.0962	0.0600	0.0361	1.1388	0.1306	0.5814	1.0675	0.1429	1.0341
M9	0.1025	0.0670	0.0354	1.0409	0.1519	0.5581	0.7625	0.2229	1.0332
M10	0.1317	0.0885	0.0432	1.1946	0.1195	0.5581	0.7625	0.2229	1.0397
M11	0.1490	0.0976	0.0514	1.3004	0.1003	0.6512	1.9825	0.0237 **	1.0468
M12	0.1862	0.1240	0.0622	1.6441	0.0538 *	0.6744	2.2875	0.0111 **	1.0553
M13	0.2187	0.1500	0.0687	1.8772	0.0338 **	0.6429	1.8516	0.0320 **	1.0597
M14	0.2552	0.1763	0.0789	2.2037	0.0166 **	0.6905	2.4689	0.0068 **	1.0671
M15	0.2678	0.1834	0.0844	2.3541	0.0117 **	0.6905	2.4689	0.0068 **	1.0714
M16	0.2924	0.1911	0.1013	2.6454	0.0058 **	0.6905	2.4689	0.0068 **	1.0851
M17	0.2905	0.2016	0.0889	2.2521	0.0149 **	0.5952	1.2344	0.1085	1.0740
M18	0.2879	0.2022	0.0857	2.0771	0.0220 **	0.6190	1.5430	0.0614 *	1.0713
M19	0.2901	0.1978	0.0923	2.0614	0.0228 **	0.5714	0.9258	0.1773	1.0771
M20	0.3593	0.2327	0.1266	2.4372	0.0096 **	0.6190	1.5430	0.0614 *	1.1027
M21	0.3760	0.2568	0.1192	2.1800	0.0175 **	0.6905	2.4689	0.0068 **	1.0948
M22	0.3611	0.2546	0.1066	1.8395	0.0365 **	0.6190	1.5430	0.0614 *	1.0849
M23	0.3615	0.2616	0.0999	1.6574	0.0525 *	0.6429	1.8516	0.0320 **	1.0792
M24	0.3651	0.2826	0.0825	1.2250	0.1138	0.5714	0.9258	0.1773	1.0643
M25	0.4299	0.3136	0.1164	1.5528	0.0645 *	0.5789	0.9733	0.1652	1.0886
M26	0.4757	0.3434	0.1323	1.6817	0.0505 *	0.5526	0.6489	0.2582	1.0985
M27	0.4586	0.3198	0.1389	1.8753	0.0343 **	0.6316	1.6222	0.0524 *	1.1052
M28	0.4179	0.3159	0.1021	1.4992	0.0712 *	0.6053	1.2978	0.0972 *	1.0776
M29	0.4367	0.3485	0.0882	1.3368	0.0947 *	0.5526	0.6489	0.2582	1.0654
M30	0.4383	0.3451	0.0932	1.3475	0.0930 *	0.6053	1.2978	0.0972 *	1.0693
M31	0.4527	0.3278	0.1249	1.5997	0.0591 *	0.6053	1.2978	0.0972 *	1.0941
M32	0.4796	0.3575	0.1221	1.5378	0.0663 *	0.5789	0.9733	0.1652	1.0900
M33	0.5473	0.4073	0.1400	1.6710	0.0516 *	0.6316	1.6222	0.0524 *	1.0995
M34	0.5274	0.3882	0.1393	1.5926	0.0599 *	0.5789	0.9733	0.1652	1.1003
M35	0.5787	0.4056	0.1731	1.7991	0.0401 **	0.6316	1.6222	0.0524 *	1.1231
M36	0.6124	0.4205	0.1919	1.8219	0.0383 **	0.6053	1.2978	0.0972 *	1.1351

Significant at the 10% level

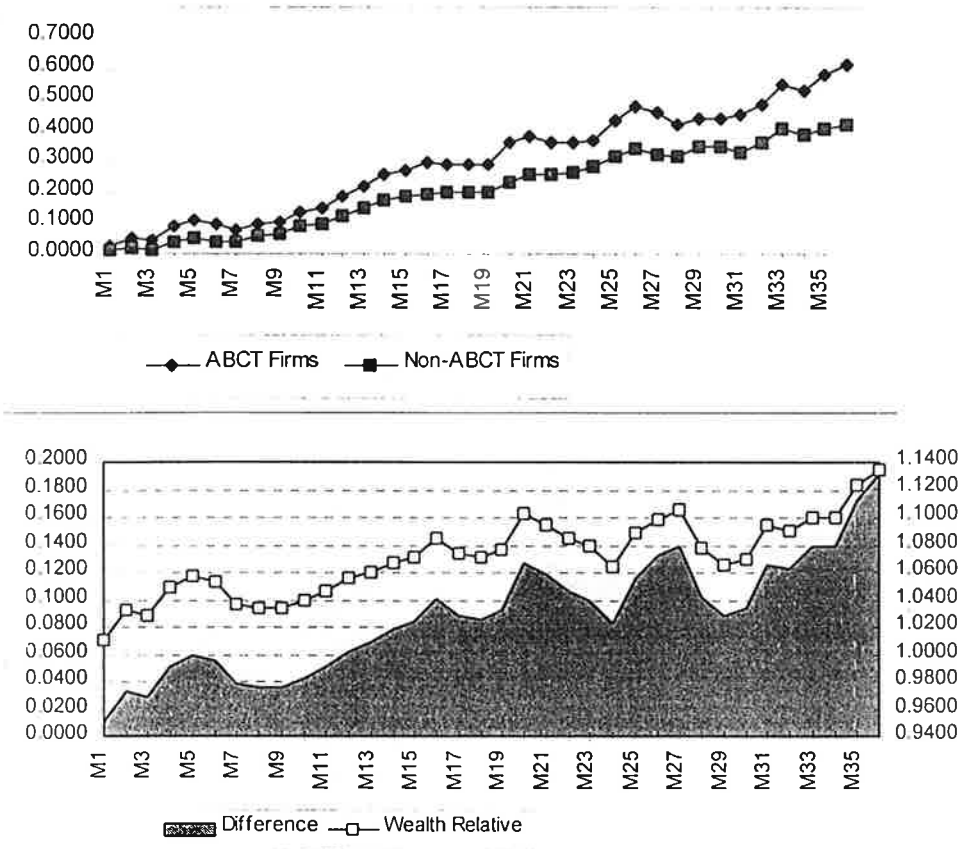
****Significant at the 5% level**

Figure 6.2., plots both the monthly average holding period returns of the ABCT firms and the FTSE index. It highlights the growing difference in the positive performance of the ABCT firms over the FTSE index. The wealth relative index tracks this difference to peak at 13.51% by month 36.

Figure 6.5. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/FTSE - Market Capitalisation



The outcome of the comparison of the ABCT firms with the FTSE all share index is similar to that reported when the ABCT firms were compared with the non-ABCT control group. It demonstrates that the superior performance of the ABCT firms is not sensitive to the control benchmark used. It confirms the size and nature of the impact the ABCTs have on firm performance. The size is clearly evident as the result is both economically and statistically significant. The nature reflects the anticipated time lag from adoption to implementation and ultimately clear benefit. Like the earlier results, whilst clear benefit is evident from quite an early post adoption stage, the significant benefit seems to accrue in the third year. This

is further evidence of the "lag" effect following the introduction of the ABCTs and clear justification for using a long-run window of assessment in this study.

6.3.3. Pre-Adoption Performance

As a continuation of the robust testing process in this study, it was decided to look at the pre-adoption performance of both the ABCT and the non-ABCT firms. The prime reason for doing this was to test for the over-reaction/under-reaction phenomena as identified by De Bondt/Thaler (1985, 1987). The over-reaction phenomena is where there is a tendency for firms who have performed badly in the past, and therefore deemed "losers", to perform better than expected in the future. The under-reaction phenomena is where there is a tendency for firms who have performed well in the past, and therefore deemed "winners" to perform worse than expected in the future. Given that the earlier results show the ABCT firms outperforming both the matched non-ABCT firms and the FTSE index, it is possible that the over-reaction phenomena could be the cause of the outperformance of the ABCT firms following on their adoption of the ABCTs. Therefore in order to eliminate this phenomena as a possible cause, the share price performance of the ABCT and non-ABCT matched firms was reviewed for the two year period (24 months) prior to the adoption of the ABCTs. This was done for the three data sets, namely market capitalisation, market-to-book and net total assets. The results of the market capitalisation data set are shown in Tables 6.8. and 6.9. The results for the market-to-book and net total assets data sets are shown in Chapters 7 and 8, respectively.

Table 6.8 reports the pre-adoption monthly average returns for the ABCT firms and the non-ABCT firms. It shows that the monthly differences are both economically small and evenly balanced - ABCT firms outperform the non-ABCT firms in 14 of the 24 months under review. The small differences recorded are, with a few exceptions, not statistically significant.

Table 6.8. Pre-Adoption:
Monthly Average Returns (AR)
ABCT/nonABCT - Market Capitalisation

	Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0113	0.0156	-0.0043	-0.3503	0.6360	0.4500	-0.6325	0.7365	0.9958
M2	0.0458	0.0327	0.0132	0.8532	0.1994	0.6250	1.5811	0.0569 *	1.0128
M3	0.0094	0.0114	-0.0019	-0.1135	0.5449	0.4750	-0.3162	0.6241	0.9981
M4	-0.0025	0.0164	-0.0189	-1.3515	0.9078	0.5000	0.0000	0.5000	0.9814
M5	0.0168	0.0483	-0.0315	-1.6422	0.9457	0.4000	-1.2649	0.8970	0.9699
M6	0.0252	0.0031	0.0221	1.3145	0.0982 *	0.6250	1.5811	0.0569 *	1.0220
M7	0.0104	-0.0100	0.0203	1.2825	0.1036	0.4500	-0.6325	0.7365	1.0205
M8	-0.0164	-0.0266	0.0102	0.5982	0.2766	0.4250	-0.9487	0.8286	1.0105
M9	-0.0088	-0.0101	0.0013	0.0851	0.4663	0.5000	0.0000	0.5000	1.0013
M10	0.0229	0.0209	0.0020	0.0854	0.4662	0.4000	-1.2649	0.8970	1.0019
M11	-0.0052	-0.0086	0.0034	0.2563	0.3995	0.5000	0.0000	0.5000	1.0034
M12	0.0320	-0.0020	0.0341	1.9482	0.0293 **	0.5500	0.6325	0.2635	1.0341
M13	0.0276	0.0452	-0.0175	-0.8417	0.7974	0.4250	-0.9487	0.8286	0.9832
M14	0.0534	0.0605	-0.0070	-0.4583	0.6754	0.5500	0.6325	0.2635	0.9934
M15	0.0156	0.0625	-0.0469	-2.4922	0.9915	0.3750	-1.5811	0.9431	0.9559
M16	-0.0131	0.0157	-0.0288	-1.8980	0.9674	0.4000	-1.2649	0.8970	0.9716
M17	0.0160	0.0453	-0.0292	-2.3010	0.9866	0.3500	-1.8974	0.9711	0.9720
M18	0.0123	-0.0168	0.0291	1.8466	0.0362 **	0.6250	1.5811	0.0569 *	1.0296
M19	-0.0200	-0.0294	0.0094	0.4813	0.3165	0.6000	1.2649	0.1030	1.0096
M20	0.0156	-0.0005	0.0161	0.8996	0.1869	0.6000	1.2649	0.1030	1.0161
M21	0.0225	0.0105	0.0119	0.6576	0.2573	0.5000	0.0000	0.5000	1.0118
M22	0.0138	0.0013	0.0125	0.5592	0.2896	0.4250	-0.9487	0.8286	1.0125
M23	0.0026	-0.0118	0.0144	1.0025	0.1612	0.5000	0.0000	0.5000	1.0145
M24	0.0018	0.0084	-0.0066	-0.4624	0.6768	0.4250	-0.9487	0.8286	0.9934

*Significant at the 10% level

**Significant at the 5% level

Table 6.9. documents the monthly average holding period returns and presents a clearer picture. It shows that there is no significant difference between the performance of the ABCT and the non-ABCT firms in the two year period prior to the adoption of the ABCTs. Figure 6.6. plots this close similarity in the market based performance of the two sets of firms. It highlights how they interchange slightly positive and slightly negative positions throughout the 24 month period. Consequently it is reasonable to conclude that the superior performance of the ABCT firms did not result from any market over-reaction in the context of the De Bondt/Thaler (1985, 1987) study. The superior performance of the ABCT firms can, therefore, be more directly attributed to the quality of the information and decision-making that followed from their adoption of the ABCTs.

Table 6.9. Pre-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/nonABCT - Market Capitalisation

	Average Holding Period Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0113	0.0156	-0.0043	-0.3503	0.6360	0.4500	-0.6325	0.7365	0.9958
M2	0.0574	0.0467	0.0108	0.5925	0.2785	0.5500	0.6325	0.2635	1.0103
M3	0.0720	0.0600	0.0121	0.5303	0.2995	0.4500	-0.6325	0.7365	1.0114
M4	0.0744	0.0796	-0.0052	-0.1891	0.5745	0.4750	-0.3162	0.6241	0.9952
M5	0.0913	0.1223	-0.0309	-1.0734	0.8552	0.3500	-1.8974	0.9711	0.9724
M6	0.1205	0.1234	-0.0029	-0.0791	0.5313	0.4750	-0.3162	0.6241	0.9974
M7	0.1396	0.1163	0.0233	0.5660	0.2873	0.5500	0.6325	0.2635	1.0208
M8	0.1276	0.0988	0.0287	0.6034	0.2749	0.5500	0.6325	0.2635	1.0262
M9	0.1226	0.1005	0.0221	0.4148	0.3403	0.5000	0.0000	0.5000	1.0201
M10	0.1402	0.1222	0.0180	0.2901	0.3866	0.4750	-0.3162	0.6241	1.0160
M11	0.1300	0.1075	0.0225	0.3561	0.3618	0.4750	-0.3162	0.6241	1.0203
M12	0.1658	0.1091	0.0567	0.8353	0.2043	0.5000	0.0000	0.5000	1.0511
M13	0.2075	0.1577	0.0498	0.6755	0.2517	0.4750	-0.3162	0.6241	1.0430
M14	0.2743	0.2156	0.0586	0.6805	0.2501	0.4500	-0.6325	0.7365	1.0482
M15	0.2848	0.2677	0.0171	0.2092	0.4177	0.4500	-0.6325	0.7365	1.0135
M16	0.2685	0.2925	-0.0241	-0.3057	0.6193	0.4250	-0.9487	0.8286	0.9814
M17	0.2909	0.3420	-0.0511	-0.6620	0.7441	0.4000	-1.2649	0.8970	0.9619
M18	0.2970	0.3276	-0.0306	-0.4086	0.6575	0.4500	-0.6325	0.7365	0.9770
M19	0.2742	0.2997	-0.0255	-0.2861	0.6118	0.5500	0.6325	0.2635	0.9804
M20	0.3026	0.2989	0.0037	0.0412	0.4837	0.5000	0.0000	0.5000	1.0029
M21	0.3263	0.3158	0.0105	0.1139	0.4550	0.5000	0.0000	0.5000	1.0080
M22	0.3392	0.3219	0.0173	0.1808	0.4287	0.5500	0.6325	0.2635	1.0131
M23	0.3571	0.2850	0.0721	0.7972	0.2151	0.5000	0.0000	0.5000	1.0561
M24	0.3620	0.3005	0.0615	0.6716	0.2529	0.4750	-0.3162	0.6241	1.0473

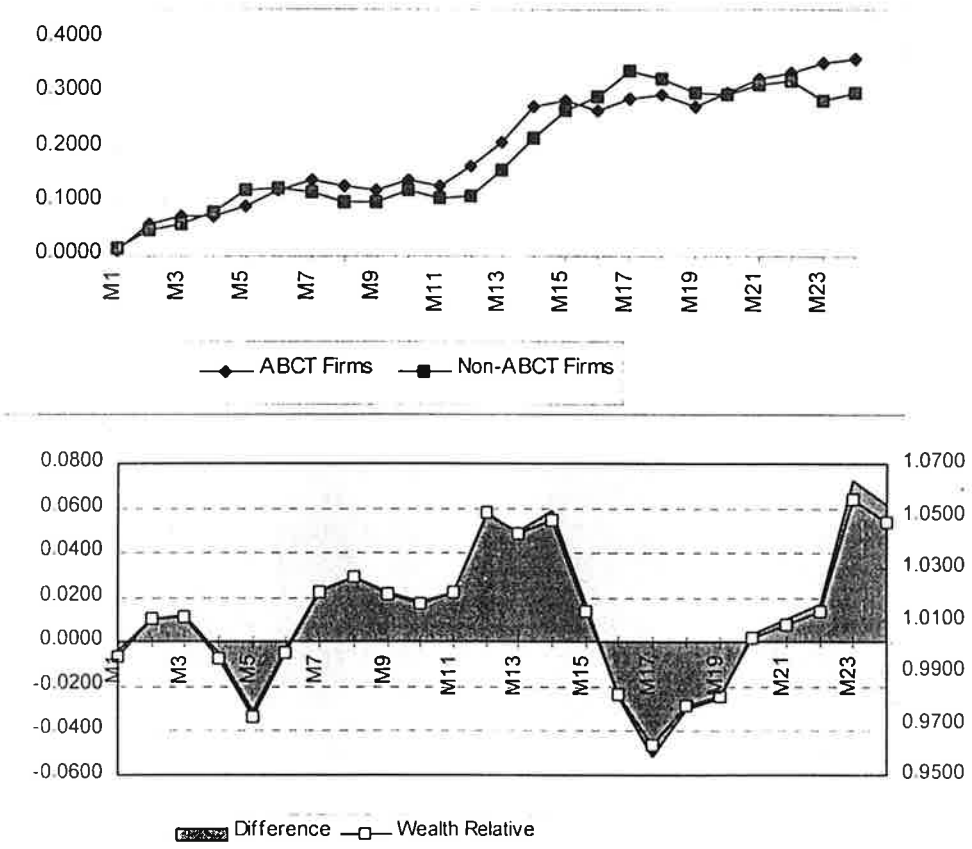
*Significant at the 10% level

**Significant at the 5% level

Figure 6.6. Pre-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/nonABCT - Market Capitalisation



6.4. Conclusions

This chapter summarises the results of the market and accounting based measures of performance for the market capitalisation data set of matched firms.

The market based measures of performances were based on daily returns in the three years after the adoption of the ABCTs. The two year period prior to the adoption of the ABCTs was also recorded in order to test for the existence of the over-reaction/under-reaction market anomaly. The performance of the ABCT firms was compared against a matched control group of firms and the FTSE all share index. In computing a range of results tables, the monthly average returns (AR), monthly average holding period returns (AHPR), monthly cumulative average returns (CAR) and wealth relative methods were used. The empirical results are summarised in Table

6.10. Notwithstanding conceptual difficulties with the monthly cumulative average returns method of computing long-run stock performance, the results from that method were computed for comparative purposes. They were, however, not included in Table 6.10.

The accounting measures of performance cover the three year period after the adoption of the ABCTs. Matched non-ABCT firms were used as the control group to assess the performance of the ABCT firms over a range of investment and profitability ratios. The results of the key ratios are summarised in Table 6.10.

The market based measures of performance in Table 6.10. document the ABCT firms outperforming the non-ABCT firms by 19.83% and the FTSE all share index by 19.19% in the 3 year period under review. Both of these results are statistically significant. The wealth relative confirms this outperformance at 14% against both benchmarks. While not reported in this table, the somewhat discredited monthly cumulative average returns method of computing long-term stock performance offers additional support for this conclusion. It documents the ABCT firms outperforming the non-ABCT firms by 15.12% with a positive wealth relative of 10.72%. This result is also statistically significant. A review of the pre-adoption performance of the matched firms discounts the possibility that the over-reaction phenomena was the cause of the subsequent post-adoption superior performance of the ABCT firms. No significant difference was recorded in the two year pre-adoption performance of the matched set of firms.

As regards the accounting measures of performance, the outperformance of the ABCT firms is statistically significant under the key ratio of return on shareholders equity. A review of the profitability and turnover to fixed asset ratios identify profitability as the primary source of the superior performance of the ABCT firms. Also worth noting is the high quality of the cash earnings associated with the ABCT firms and the liquidity differential in their favour through better working capital management. Of further interest is the apparent ability of the ABCT firms to manage their creditors better and to take on board a higher proportion of cost effective long-term debt.

Table 6.10. Empirical Results: - Market Capitalisation

Measures of Performance	ABCT Firms Mean	Non-ABCT Firms Mean	Diff.		Prop. of ABCT Firms > non-ABCT Firms		Wealth Relative
Market Based							
Post-Adoption							
3 Year AHPR							
ABCT v non-ABCT	61.24%	41.41%	19.83%	*	.6316	*	1.14
ABCT v FTSE	61.24%	42.05%	19.19%	**	.6053	*	1.14
Pre-Adoption							
2 Year AHPR							
ABCT v non-ABCT	36.20%	30.05%	6.15%		.4750		1.05
Accounting Based							
3 Year AR							
Return on S`Holders Equity	14.95%	12.62%	2.33%		.6420	**	1.02
Operating Profit Margin %	11.73%	10.29%	1.44%	*	.5556		1.01
Pre-Tax Profit Margin %	10.26%	9.46%	0.80%		.5802	*	1.01
Turnover/Fixed Assets	2.99	3.57	-0.58		.4444		0.87
Capital Gearing %	38.43%	20.95%	17.48%		.6914	**	1.14
Quick Assets Ratio	0.9937	0.9414	0.0523		.5185		1.03
Creditors Ratio (Days)	102.58	94.13	8.45	*	.5432		1.09
Cash Earnings per Share	44.72	32.06	12.66	**	.5062	**	1.38

*Significant at the 10% level

**Significant at the 5% level

These results suggest that the implementation of the ABCTs contribute in a meaningful and significant way to the overall performance of the firm. It is reasonable to interpret this contribution in terms of enhanced product cost accuracy, more comprehensive cost data and information for managerial decision-making. Perhaps it could also be presented as the benefits accruing from the introduction of a "new technology" with the potential to accommodate and promote greater interdisciplinary participation and interaction. The cynical might see this in the context of the decentering of the managerial accounting function and the need for a closer involvement by that profession in the key operational and strategic decision-making activities of the firm.

Whatever the orientation, the results of the market capitalisation primary matched data set of firms suggest that there is a strong causal link between the adoption of the ABCTs and firm performance. This conclusion derives from the clearly documented outperformance of the ABCT firms as measured in both market and accounting based terms. This post-adoption outperformance is

confirmed by the sensitivity tests undertaken in pursuit of rigour in this study. Consequently we reject the null hypothesis H_o as stated, namely*: the adoption of ABCTs does* ***not*** *significantly improve a firm's relative performance* and accept the alternative hypothesis H_a as stated, namely*: the adoption of ABCTs does significantly improve a firm's relative performance*. The evidence in this study is consistent with the view that the positive impact is likely to be gradual, to take time to mature and, therefore, must be viewed in the long term.

CHAPTER 7

7. RESULTS and ANALYSIS - MARKET-TO-BOOK

7.1. Introduction

This chapter reports the results of the market-to-book data set of matched firms. The results were computed in order to contribute to the overall integrity of the findings in this study and in recognition of the importance of matching firms under the market-to-book criteria (Fama and French, 1992). The results are the outcome of a time series analysis of market and accounting based measures of performance. This chapter begins with a summary of the three year post-adoption performance of the matched firms. It continues with a number of robustness checks before concluding with an interpretation of the results. These results are presented as secondary to the primary analysis carried out in Chapter 6 on the market capitalisation data set.

7.2. Post-Adoption Firm Performance Results

The matching process set out to achieve the best possible match between the ABCT classified firms and the non-ABCT classified firms. Three different criteria were used, namely, market capitalisation, market-to-book and net total assets, resulting in the formation of three different data sets. When the best match was achieved under each criteria, the relevant information under the other criteria was added in order to access the robustness of the matching result. In the case of the market-to-book data set, there was no statistical difference between the ABCT experimental firms and the non-ABCT control firms under that criteria. A high quality match was achieved in this regard. However, when the additional information of market capitalisation and net total assets was added, the quality of the match was significantly reduced. The ABCT set of firms tended to be larger than their matched counterparts. This means that the results maybe biased upwards in favour of the ABCT firms. A compensating factor is the fact that 84% of the firms were matched within the same general industry classification.

Notwithstanding the high quality of the match achieved using the market-to-book criteria, caution is recommended in interpreting the findings in this chapter. Consequently less weight is given to the conclusion reached.

The results for the market-to-book matched firms are computed in a same way as the market capitalisation data set in the interests of comparability. They are presented in the same format and subjected to the same parametric and non-parametric tests. The same type of graphs are used for illustrating the results.

7.2.1. Stock Market Measures of Performance

Table 7.1. documents the monthly average returns for the ABCT and non-ABCT firms over the three year (36 month) period studied. It shows that the ABCT firms outperformed the non-ABCT firms in 22 of the 36 months under review. None of the 14 negative monthly average returns have a t-statistic lower than -2.00. The small and evenly distributed negative returns are more than offset by a pattern of significantly positive average returns. Figure 7.1. plots the monthly average returns difference and the predominately positive wealth relative index on the same graph.

Table 7.1. Post-Adoption:
Monthly Average Returns (AR)
ABCT/nonABCT - Market-to-Book

	Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0156	0.0335	-0.0178	-0.9645	0.8295	0.4474	-0.6489	0.7418	0.9827
M2	0.0113	0.0027	0.0086	0.5744	0.2846	0.5526	0.6489	0.2582	1.0085
M3	-0.0152	-0.0309	0.0158	1.1255	0.1338	0.6053	1.2978	0.0972 *	1.0163
M4	0.0487	0.0346	0.0141	0.9685	0.1695	0.5000	0.0000	0.5000	1.0136
M5	0.0247	0.0280	-0.0033	-0.2443	0.5958	0.3684	-1.6222	0.9476	0.9968
M6	-0.0042	-0.0033	-0.0009	-0.0574	0.5227	0.4211	-0.9733	0.8348	0.9991
M7	-0.0046	-0.0137	0.0091	0.4727	0.3196	0.6053	1.2978	0.0972 *	1.0092
M8	0.0288	0.0069	0.0219	1.3243	0.0968 *	0.5263	0.3244	0.3728	1.0217
M9	0.0020	0.0017	0.0003	0.0145	0.4942	0.6053	1.2978	0.0972 *	1.0003
M10	0.0390	-0.0101	0.0491	2.2361	0.0157 **	0.7632	3.2444	0.0006 **	1.0496
M11	0.0194	0.0275	-0.0081	-0.5244	0.6984	0.5000	0.0000	0.5000	0.9921
M12	0.0584	0.0054	0.0530	2.3607	0.0118 **	0.6579	1.9467	0.0258 **	1.0528
M13	0.0372	0.0489	-0.0118	-0.7566	0.7729	0.4865	-0.1644	0.5653	0.9888
M14	0.0452	0.0275	0.0178	1.1913	0.1207	0.5946	1.1508	0.1249	1.0173
M15	0.0215	0.0209	0.0006	0.0495	0.4804	0.5135	0.1644	0.4347	1.0006
M16	0.0313	0.0070	0.0243	1.3124	0.0989 *	0.6216	1.4796	0.0695 *	1.0241
M17	0.0144	0.0231	-0.0087	-0.7051	0.7573	0.4324	-0.8220	0.7945	0.9915
M18	0.0053	0.0343	-0.0290	-0.9036	0.8139	0.5135	0.1644	0.4347	0.9719
M19	0.0049	-0.0196	0.0245	1.8168	0.0388 **	0.6757	2.1372	0.0163 **	1.0250
M20	0.0484	0.0358	0.0126	0.6512	0.2595	0.5135	0.1644	0.4347	1.0122
M21	0.0127	0.0208	-0.0081	-0.6260	0.7324	0.4054	-1.1508	0.8751	0.9920
M22	-0.0102	-0.0081	-0.0021	-0.1354	0.5535	0.4324	-0.8220	0.7945	0.9979
M23	-0.0007	-0.0213	0.0206	1.3336	0.0954 *	0.6216	1.4796	0.0695 *	1.0210
M24	-0.0080	-0.0114	0.0034	0.1890	0.4256	0.4865	-0.1644	0.5653	1.0034
M25	0.0463	0.0314	0.0149	0.5450	0.2948	0.5152	0.1741	0.4309	1.0145
M26	0.0262	0.0301	-0.0038	-0.2112	0.5830	0.5152	0.1741	0.4309	0.9963
M27	0.0042	0.0040	0.0002	0.0098	0.4961	0.5152	0.1741	0.4309	1.0002
M28	-0.0302	0.0037	-0.0339	-1.8346	0.9621	0.4545	-0.5222	0.6992	0.9662
M29	0.0259	0.0410	-0.0150	-0.7911	0.7826	0.3939	-1.2185	0.8885	0.9855
M30	-0.0012	-0.0154	0.0141	1.1062	0.1384	0.6061	1.2185	0.1115	1.0144
M31	0.0058	-0.0222	0.0280	1.6243	0.0571 *	0.6970	2.2630	0.0118 **	1.0286
M32	0.0224	0.0308	-0.0084	-0.4037	0.6554	0.5455	0.5222	0.3008	0.9919
M33	0.0322	0.0233	0.0088	0.5656	0.2878	0.5758	0.8704	0.1920	1.0086
M34	-0.0086	-0.0028	-0.0058	-0.4220	0.6621	0.5152	0.1741	0.4309	0.9942
M35	0.0311	-0.0234	0.0546	2.7779	0.0045 **	0.6364	1.5667	0.0586 *	1.0559
M36	0.0064	-0.0186	0.0250	1.1643	0.1265	0.6364	1.5667	0.0586 *	1.0255

*Significant at the 10% level

**Significant at the 5% level

Figure 7.1. Post-Adoption:

Monthly Average Returns (AR)

ABCT/nonABCT - Market-to-Book

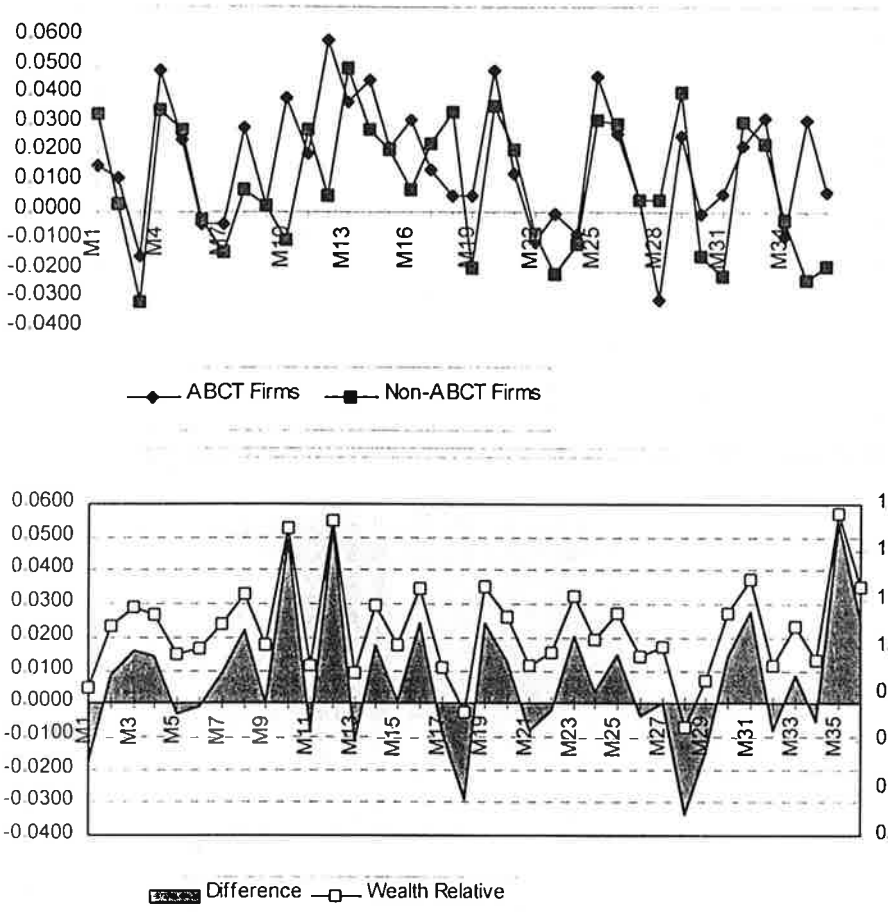


Table 7.2. reports the average holding period returns of the ABCT and non-ABCT firms over a three year period. The difference and appropriate parametric and non-parametric tests are also shown. The pattern of significantly positive monthly average returns is reflected in the upward trend in the average holding period returns over the 36 month period. Consistent with the market capitalisation results, the outperformance of the ABCT firms accelerated in the third year. By month 12 it had reached 7.29%, grown to 12.91% by month 24 and reached its peak at 22.64% by month 36. This post-implementation superior performance of the ABCT firms is also reflected by the wealth relative index of 16.64% in month 36. These results are both economically and statistically significant. Figure 7.2., by profiling both the pattern of results for both sets of firms and the difference, highlights the strong positive outperformance of the ABCT firms.

Table 7.2. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

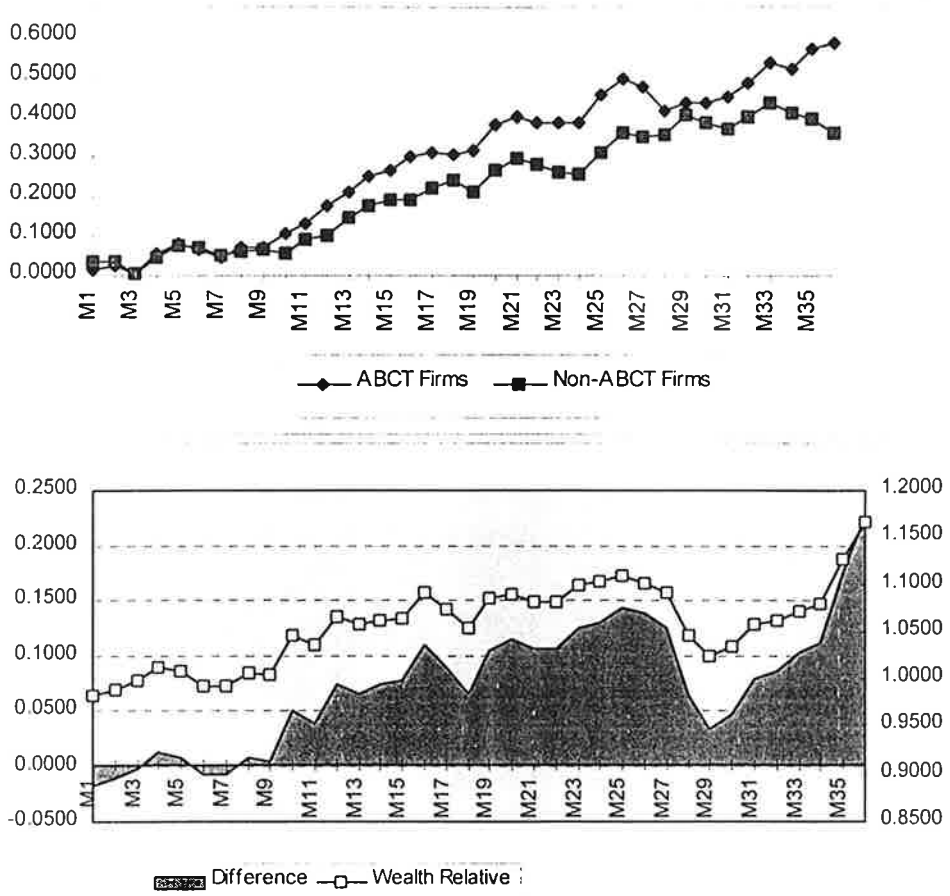
ABCT/nonABCT - Market-to-Book

	Average Holding Period Returns			Paired t-Test			Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z		Wealth Relative
M1	0.0156	0.0335	-0.0178	-0.9645	0.8295	0.4474	-0.6489	0.7418		0.9827
M2	0.0252	0.0369	-0.0116	-0.5159	0.6955	0.4474	-0.6489	0.7418		0.9888
M3	0.0040	0.0066	-0.0027	-0.1010	0.5400	0.4211	-0.9733	0.8348		0.9973
M4	0.0574	0.0448	0.0126	0.3768	0.3542	0.5000	0.0000	0.5000		1.0121
M5	0.0809	0.0731	0.0078	0.2135	0.4161	0.4474	-0.6489	0.7418		1.0072
M6	0.0629	0.0712	-0.0083	-0.2198	0.5864	0.4211	-0.9733	0.8348		0.9923
M7	0.0425	0.0507	-0.0082	-0.2855	0.6116	0.4474	-0.6489	0.7418		0.9922
M8	0.0688	0.0617	0.0071	0.2174	0.4145	0.4474	-0.6489	0.7418		1.0067
M9	0.0682	0.0645	0.0037	0.0937	0.4629	0.4737	-0.3244	0.6272		1.0034
M10	0.1065	0.0572	0.0493	1.1105	0.1370	0.4737	-0.3244	0.6272		1.0467
M11	0.1298	0.0914	0.0384	0.7567	0.2270	0.4474	-0.6489	0.7418		1.0351
M12	0.1733	0.1004	0.0729	1.4055	0.0841 *	0.5526	0.6489	0.2582		1.0663
M13	0.2085	0.1435	0.0650	1.1981	0.1194	0.5405	0.4932	0.3109		1.0568
M14	0.2480	0.1745	0.0735	1.2754	0.1052	0.5135	0.1644	0.4347		1.0625
M15	0.2673	0.1910	0.0763	1.2901	0.1026	0.5405	0.4932	0.3109		1.0641
M16	0.3004	0.1912	0.1092	1.8366	0.0373 **	0.6486	1.8084	0.0353 **		1.0917
M17	0.3083	0.2185	0.0898	1.3892	0.0866 *	0.6216	1.4796	0.0695 *		1.0737
M18	0.3063	0.2404	0.0659	1.0472	0.1510	0.5676	0.8220	0.2055		1.0531
M19	0.3152	0.2114	0.1038	1.7229	0.0467 **	0.6216	1.4796	0.0695 *		1.0857
M20	0.3793	0.2653	0.1140	1.6642	0.0524 *	0.6216	1.4796	0.0695 *		1.0901
M21	0.3982	0.2926	0.1056	1.4857	0.0730 *	0.5676	0.8220	0.2055		1.0817
M22	0.3870	0.2818	0.1052	1.3483	0.0930 *	0.6486	1.8084	0.0353 **		1.0821
M23	0.3861	0.2614	0.1247	1.5354	0.0667 *	0.5946	1.1508	0.1249		1.0989
M24	0.3864	0.2573	0.1291	1.4088	0.0837 *	0.5946	1.1508	0.1249		1.1027
M25	0.4545	0.3108	0.1437	1.5245	0.0686 *	0.6364	1.5667	0.0586 *		1.1096
M26	0.4967	0.3584	0.1383	1.4261	0.0818 *	0.5758	0.8704	0.1920		1.1018
M27	0.4753	0.3509	0.1244	1.2161	0.1164	0.6061	1.2185	0.1115		1.0921
M28	0.4157	0.3526	0.0632	0.5787	0.2834	0.5152	0.1741	0.4309		1.0467
M29	0.4356	0.4032	0.0324	0.2878	0.3877	0.4848	-0.1741	0.5691		1.0231
M30	0.4329	0.3867	0.0463	0.4069	0.3434	0.4545	-0.5222	0.6992		1.0334
M31	0.4483	0.3688	0.0795	0.6854	0.2490	0.5152	0.1741	0.4309		1.0581
M32	0.4841	0.3993	0.0848	0.7642	0.2252	0.5455	0.5222	0.3008		1.0606
M33	0.5373	0.4347	0.1027	0.9177	0.1828	0.5455	0.5222	0.3008		1.0716
M34	0.5216	0.4107	0.1109	0.9400	0.1771	0.5152	0.1741	0.4309		1.0786
M35	0.5721	0.3958	0.1763	1.4672	0.0760 *	0.5455	0.5222	0.3008		1.1263
M36	0.5866	0.3602	0.2264	1.7981	0.0408 **	0.5455	0.5222	0.3008		1.1664

*Significant at the 10% level

**Significant at the 5% level

Figure 7.2. Post-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/nonABCT - Market-to-Book



7.2.2. Accounting Measures of Performance

Table 7.4 summarises the accounting based measures of performance results for the market-to-book data set.

In compiling Table 7.4., the objective was to summarise three years` accounting year end data for the matched set of firms beginning with the accounting period one year after the adoption of the ABCTs. However, because of incomplete data, particularly from financial and property based firms, the original set of 38 firms was reduced to 30. In addition a full three years` data was not available for all those firms due to the timing of the implementation of the ABCTs. The end result, as summarised in Table 7.3., was that three years` full comparative data was available for 20 firms, two years` data was available for another 6 firms and one years` data was available for

another 4 firms. This comprised in all 76 sets of financial comparison opportunities for the 18 different accounting measures of performance used and was the basis of the results summarised in Table 7.4., below.

Table 7.3. Post-Adoption:
Accounting Measures of Performance Data Set
ABCT/nonABCT - Market-to-Book

No. of Accounting Measures	No. of Firms	No. of Years Data Available	Comparison Opportunities
18	20	3	60
18	6	2	12
18	4	1	4
Total	**30**		**76**

Table 7.4. documents the superior performance of the ABCTs firms, consistent with the market capitalisation results in Chapter 6. Of particular interest is the return on shareholders equity and the profit margin ratios. They report very strong support for the superior performance of the ABCT firms. The results are statistically significant at all levels of evaluation. The cash quality of the earnings generated by the ABCT firms is also evidenced as is the high debt and tax profile of the ABCT firms.

A review of the turnover/fixed assets ratio, identifies profitability as the driving force behind the superior shareholders return achieved by the ABCT firms. As the % change in sales result is not significant, the superior performance of the ABCT firms can be largely attributed to the cost management capabilities of the ABCTs as reflected in the profitability results.

In terms of working capital management, the dominant feature is the better overall liquidity position of the ABCT firms. This is achieved by securing significantly better credit terms from their suppliers, maintaining parity in terms of stock levels and overcoming the very commendable debtors days outstanding result achieved by the non-ABCT firms. The latter result is interesting and worthy of comment. It may be due to an industry effect following on the much higher proportion of firms matched at level 4 (see Table 4.2.) in compiling the market-to-book data set. Nevertheless, the end result is that the

ABCT firms turn a negative operating cycle difference of, on average, 13 days into a positive cash cycle difference of, on average, 10 days. This reflects well on the operational performance of the ABCT firms and in turn impacts the accounting measures of performance.

Table 7.4. Post-Adoption:
Accounting Measures of Performance Results Table
ABCT/nonABCT - Market-to-Book

	Average Returns			Paired t-Test		Sign Test		
DESCRIPTION	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z
% Change in Sales	8.3561	6.0954	2.2607	0.8271	0.2054	0.5132	0.2294	0.4093
Rates of Return								
Return on S'Holders Equity %	16.4550	13.9941	2.4609	0.3249	0.3731	0.6184	2.0647	0.0195 **
Return on Capital Employed %	18.9345	18.9088	0.0257	0.0199	0.4921	0.5000	0.0000	0.5000
Profit Margins								
Operating Profit Margin %	13.6321	11.0993	2.5328	2.8744	0.0026 **	0.5526	0.9177	0.1794
Pre-Tax Profit Margin %	12.3747	10.2100	2.1647	2.4377	0.0086 **	0.5395	0.6882	0.2456
Net Profit Margin %	8.5270	6.8934	1.6336	2.5819	0.0059 **	0.5658	1.1471	0.1257
Cash Flow Margin %	13.3372	11.3479	1.9893	2.0673	0.0211 **	0.5132	0.2294	0.4093
Turnover/Fixed Assets	3.2730	4.4255	-1.1525	-2.7607	0.9964	0.4211	-1.3765	0.9157
Capital Gearing %	36.3614	30.6895	5.6720	1.9489	0.0275 **	0.6053	1.8353	0.0332 **
Working Capital								
Working Capital Ratio	1.2739	1.3437	-0.0697	-1.0865	0.8596	0.4342	-1.1471	0.8743
Quick Assets Ratio	0.9605	0.9376	0.0229	0.4502	0.3269	0.5526	0.9177	0.1794
Stock Ratio (Days)	38.6713	40.3513	-1.6800	-0.5399	0.7046	0.4342	-1.1471	0.8743
Debtors Ratio (Days)	77.8018	62.8155	14.9863	4.0881	0.0001 **	0.6579	2.7530	0.0030 **
Creditors Ratio (Days)	105.5955	81.9207	23.6749	4.3607	0.0000 **	0.6711	2.9824	0.0014 **
Productivity Ratios								
Tax Ratio	59.9255	26.6537	33.2718	0.8252	0.2059	0.5658	1.1471	0.1257
Sales per Employee	105.3617	129.4486	-24.0868	-1.7321	0.9563	0.5000	0.0000	0.5000
Operating Profit Per Employee	16.2920	17.2239	-0.9320	-0.2928	0.6148	0.6053	1.8353	0.0332 **
Per-Share Item								
Cash Earnings per Share	47.1487	34.3947	12.7539	3.7552	0.0002 **	0.6053	1.8353	0.0332 **

***Significant at the 10% level**

****Significant at the 5% level**

The employee productivity ratios, like those reported for the market capitalisation data set, are puzzling. They are at variance with the main thrust of the other performance indicators and add to the concerns already raised in this area. Practice would suggest that firms display some ingenuity in reporting employee numbers and this may explain the inconsistencies reported. In the final analysis, these ratios are incidental to the main rate of return and profitability indicators and do not merit serious consideration. The results reported do not undermine the strong accounting based performance difference in favour of the ABCT market-to-book data set of firms.

7.3. Robustness Checks

In this section, the robustness of the market-to-book data set secondary findings are examined. This was done in order to facilitate comparison across all three data sets and add to the overall integrity of the results. Specifically three issues were explored: the computation of results using the cumulative average returns method, the comparison of the ABCT firms with the FTSE all share index and a review of the pre-adoption performance of the matched firms.

7.3.1. Cumulative Average Returns Method

The superior performance of the ABCT firms when matched against the non-ABCT firms is even more apparent when measured by the cumulative average monthly results. These are shown in Table 7.5. and the difference is depicted graphically in Figure 7.3. They both show a very strong positive trend in favour of the ABCT firms. The pattern is again worth noting. By month 12 the ABCT firms had outperformed the non-ABCT firms by 14.16%. This had grown by a relatively modest amount to 18.56% by month 24. However consistent with prior results it accelerated to 26.42% by month 36. The wealth relative index in Table 7.5. confirms this upward monthly trend to peak at 19.98% by the end of month 36. These results are both economically and statistically significant. The supporting non-parametric analysis reflects the same pattern.

Figure 7.3., plots this result. It highlights the fact that once a significant difference occurs in the magnitude of the monthly average returns, as evidenced in month 10 on Table 7.1., the cumulative process retains this ripple or knock-on effect for the remainder of the study period, particularly as the subsequent months were, in the main, positive.

Table 7.5. Post-Adoption:
Monthly Cumulative Average Returns (CAR)
ABCT/nonABCT - Market-to-Book

	Cumulative Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0156	0.0335	-0.0178	-0.9645	0.8295	0.4474	-0.6489	0.7418	0.9827
M2	0.0269	0.0362	-0.0093	-0.4002	0.6544	0.4474	-0.6489	0.7418	0.9911
M3	0.0117	0.0052	0.0065	0.2271	0.4108	0.4737	-0.3244	0.6272	1.0065
M4	0.0604	0.0398	0.0206	0.5862	0.2806	0.5000	0.0000	0.5000	1.0198
M5	0.0851	0.0679	0.0173	0.4622	0.3233	0.4737	-0.3244	0.6272	1.0162
M6	0.0809	0.0645	0.0164	0.3923	0.3485	0.4474	-0.6489	0.7418	1.0154
M7	0.0763	0.0509	0.0255	0.6397	0.2631	0.4737	-0.3244	0.6272	1.0242
M8	0.1051	0.0578	0.0473	0.9659	0.1702	0.4474	-0.6489	0.7418	1.0447
M9	0.1072	0.0595	0.0476	0.8802	0.1922	0.4737	-0.3244	0.6272	1.0449
M10	0.1462	0.0495	0.0967	1.5768	0.0617 *	0.5000	0.0000	0.5000	1.0921
M11	0.1655	0.0769	0.0886	1.3541	0.0920 *	0.4474	-0.6489	0.7418	1.0822
M12	0.2240	0.0823	0.1416	2.1844	0.0177 **	0.6579	1.9467	0.0258 **	1.1308
M13	0.2611	0.1313	0.1299	2.2132	0.0167 **	0.5946	1.1508	0.1249	1.1148
M14	0.3063	0.1587	0.1476	2.3762	0.0115 **	0.5946	1.1508	0.1249	1.1274
M15	0.3279	0.1796	0.1482	2.4489	0.0097 **	0.5946	1.1508	0.1249	1.1257
M16	0.3591	0.1866	0.1725	2.6657	0.0057 **	0.6757	2.1372	0.0163 **	1.1454
M17	0.3735	0.2097	0.1638	2.4613	0.0094 **	0.7027	2.4660	0.0068 **	1.1354
M18	0.3788	0.2440	0.1348	2.0510	0.0238 **	0.6216	1.4796	0.0695 *	1.1083
M19	0.3837	0.2244	0.1592	2.3539	0.0121 **	0.6216	1.4796	0.0695 *	1.1301
M20	0.4321	0.2603	0.1719	2.4878	0.0088 **	0.6216	1.4796	0.0695 *	1.1364
M21	0.4448	0.2810	0.1637	2.4391	0.0099 **	0.6216	1.4796	0.0695 *	1.1278
M22	0.4346	0.2730	0.1616	2.2568	0.0151 **	0.6216	1.4796	0.0695 *	1.1270
M23	0.4339	0.2517	0.1822	2.3700	0.0116 **	0.6216	1.4796	0.0695 *	1.1455
M24	0.4258	0.2403	0.1856	2.2066	0.0169 **	0.6216	1.4796	0.0695 *	1.1496
M25	0.4721	0.2716	0.2005	2.4774	0.0094 **	0.6364	1.5667	0.0586 *	1.1576
M26	0.4983	0.3017	0.1966	2.3577	0.0123 **	0.6667	1.9149	0.0278 **	1.1511
M27	0.5025	0.3057	0.1968	2.3014	0.0140 **	0.6970	2.2630	0.0118 **	1.1508
M28	0.4723	0.3094	0.1629	1.8628	0.0358 **	0.5758	0.8704	0.1920	1.1244
M29	0.4982	0.3503	0.1479	1.6094	0.0587 *	0.5455	0.5222	0.3008	1.1095
M30	0.4970	0.3350	0.1620	1.6738	0.0520 *	0.5455	0.5222	0.3008	1.1214
M31	0.5028	0.3128	0.1900	1.5537	0.0650 *	0.6061	1.2185	0.1115	1.1447
M32	0.5251	0.3435	0.1816	1.6544	0.0539 *	0.6061	1.2185	0.1115	1.1352
M33	0.5573	0.3668	0.1905	1.7418	0.0456 **	0.6061	1.2185	0.1115	1.1393
M34	0.5487	0.3640	0.1846	1.6046	0.0592 *	0.6061	1.2185	0.1115	1.1354
M35	0.5798	0.3406	0.2392	1.9384	0.0307 **	0.6061	1.2185	0.1115	1.1784
M36	0.5862	0.3221	0.2642	2.2548	0.0156 **	0.6061	1.2185	0.1115	1.1998

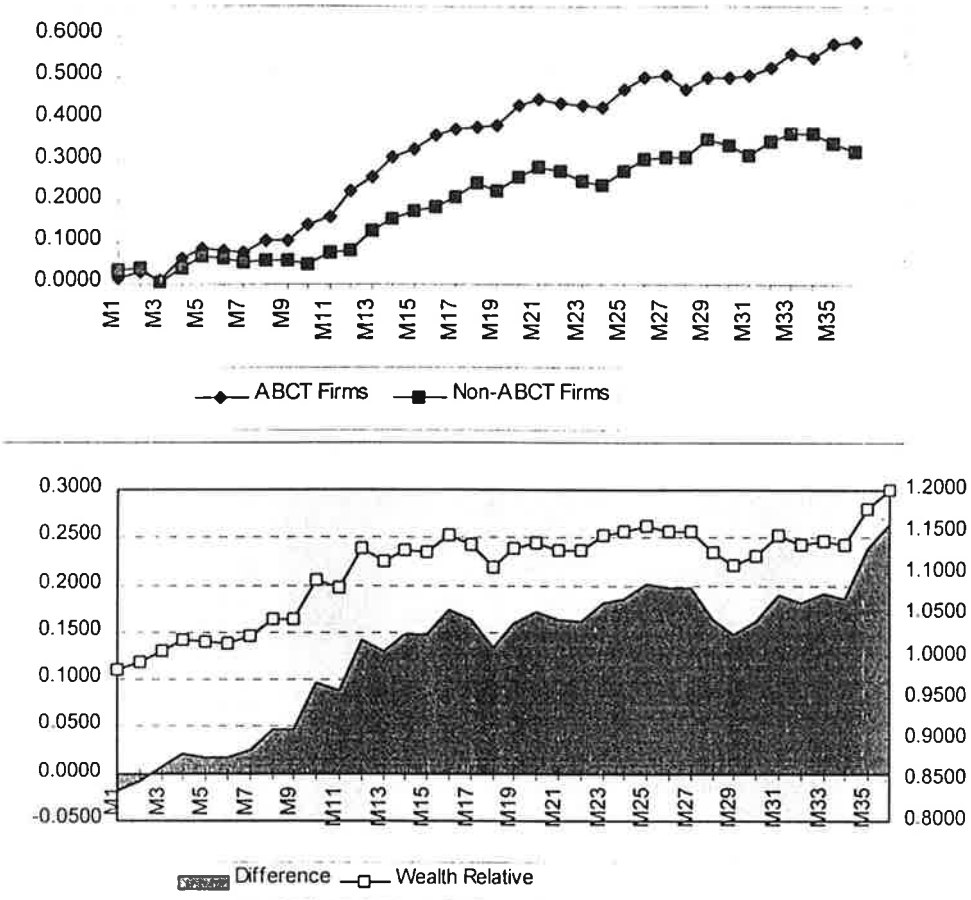
*Significant at the 10% level

**Significant at the 5% level

Figure 7.3. Post-Adoption:

Monthly Cumulative Average Returns (CAR)

ABCT/nonABCT - Market-to-Book



7.3.2. FTSE - Market-Adjusted Method

In order to evaluate further the performance of the ABCT firms, the FTSE all share index was used as a benchmark. The results of that comparison are shown in Table 7.6. It documents the superior performance of the ABCT firms in 24 of the 36 months studied. The positive bias in favour of the ABCT firms is depicted graphically in Figure 7.4. It highlights a pattern of slow but significantly positive results with the occasional small and insignificant negative result.

Table 7.6. Post-Adoption:

Monthly Average Returns (AR)

ABCT/FTSE - Market-to-Book

	Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	FTSE	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0156	0.0170	-0.0014	-0.0993	0.5393	0.3947	-1.2978	0.9028	0.9987
M2	0.0113	-0.0004	0.0117	1.0214	0.1569	0.6053	1.2978	0.0972 *	1.0117
M3	-0.0152	-0.0120	-0.0031	-0.3321	0.6292	0.5000	0.0000	0.5000	0.9968
M4	0.0487	0.0286	0.0200	1.6588	0.0528 *	0.5526	0.6489	0.2582	1.0195
M5	0.0247	0.0084	0.0163	1.6736	0.0513 *	0.6316	1.6222	0.0524 *	1.0162
M6	-0.0042	-0.0142	0.0100	0.6977	0.2449	0.5263	0.3244	0.3728	1.0101
M7	-0.0046	0.0060	-0.0105	-0.6741	0.7478	0.4211	-0.9733	0.8348	0.9895
M8	0.0288	0.0176	0.0112	1.1821	0.1223	0.5789	0.9733	0.1652	1.0110
M9	0.0020	0.0055	-0.0034	-0.2361	0.5927	0.5263	0.3244	0.3728	0.9966
M10	0.0390	0.0196	0.0194	1.3339	0.0952 *	0.7105	2.5955	0.0047 **	1.0190
M11	0.0194	0.0142	0.0052	0.3160	0.3769	0.6053	1.2978	0.0972 *	1.0051
M12	0.0584	0.0209	0.0375	1.5022	0.0708 *	0.6053	1.2978	0.0972 *	1.0368
M13	0.0372	0.0191	0.0180	1.3344	0.0952 *	0.4595	-0.4932	0.6891	1.0177
M14	0.0452	0.0243	0.0209	1.5857	0.0608 *	0.5135	0.1644	0.4347	1.0204
M15	0.0215	0.0092	0.0123	1.1881	0.1213	0.5946	1.1508	0.1249	1.0122
M16	0.0313	0.0093	0.0219	1.5533	0.0645 *	0.5946	1.1508	0.1249	1.0217
M17	0.0144	0.0094	0.0050	0.4646	0.3225	0.4595	-0.4932	0.6891	1.0050
M18	0.0053	0.0044	0.0009	0.0636	0.4748	0.4865	-0.1644	0.5653	1.0009
M19	0.0049	0.0020	0.0029	0.3523	0.3633	0.4865	-0.1644	0.5653	1.0029
M20	0.0484	0.0320	0.0164	1.3367	0.0949 *	0.5676	0.8220	0.2055	1.0159
M21	0.0127	0.0210	-0.0083	-1.0091	0.8402	0.4054	-1.1508	0.8751	0.9919
M22	-0.0102	-0.0056	-0.0046	-0.5020	0.6906	0.4324	-0.8220	0.7945	0.9954
M23	-0.0007	0.0033	-0.0040	-0.3950	0.6524	0.4324	-0.8220	0.7945	0.9960
M24	-0.0080	0.0173	-0.0254	-2.0241	0.9748	0.2703	-2.7948	0.9974	0.9751
M25	0.0463	0.0331	0.0132	0.8037	0.2137	0.3939	-1.2185	0.8885	1.0127
M26	0.0262	0.0220	0.0042	0.3357	0.3696	0.4848	-0.1741	0.5691	1.0041
M27	0.0042	-0.0141	0.0182	1.4150	0.0834 *	0.5758	0.8704	0.1920	1.0185
M28	-0.0302	-0.0009	-0.0293	-1.7719	0.9570	0.3636	-1.5667	0.9414	0.9707
M29	0.0259	0.0274	-0.0015	-0.1587	0.5625	0.3939	-1.2185	0.8885	0.9986
M30	-0.0012	-0.0030	0.0018	0.2129	0.4164	0.5758	0.8704	0.1920	1.0018
M31	0.0058	-0.0141	0.0199	2.4756	0.0094 **	0.6970	2.2630	0.0118 **	1.0202
M32	0.0224	0.0200	0.0023	0.2088	0.4180	0.5455	0.5222	0.3008	1.0023
M33	0.0322	0.0367	-0.0045	-0.3824	0.6477	0.5455	0.5222	0.3008	0.9957
M34	-0.0086	-0.0096	0.0010	0.0977	0.4614	0.5152	0.1741	0.4309	1.0010
M35	0.0311	0.0107	0.0204	2.1096	0.0214 **	0.6364	1.5667	0.0586 *	1.0202
M36	0.0064	0.0130	-0.0066	-0.6390	0.7363	0.4545	-0.5222	0.6992	0.9935

**Significant at the 5% level

*Significant at the 10% level

Figure 7.4. Post-Adoption:
Monthly Average Returns (AR)
ABCT/FTSE - Market-to-Book

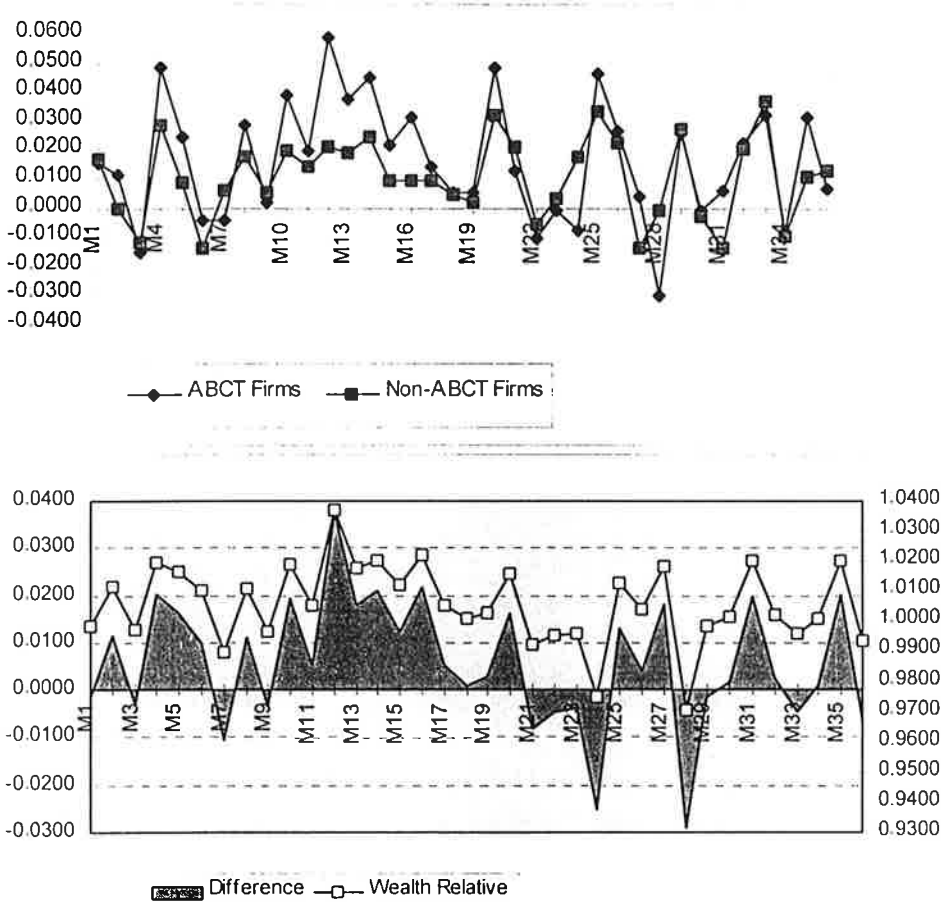


Table 7.7. presents a clearer picture in documenting the average holding period returns against the same benchmark. It shows that by month 12, the ABCT firms had outperformed the index by 5.93%. This reached 10.69% by month 24 and peaks at 18.20% by month 36. The wealth relative reflects this strong positive trend to reach 12.96% by month 36. Further by month 36, 63.64% of the ABCT firms were outperforming the index. Despite the variation in the monthly pattern of results, the consistent feature is the magnitude of the outperformance of the ABCT firms in the last 12 months of the 36 month period studied. This is further confirmation of the "lag" effect anticipated in the theoretical development of this study.

Figure 7.5. plots the returns of the ABCT firms and the FTSE all share index. It highlights the difference and the wealth relative. The difference in favour of the ABCT firms is both economically and

statistically significant. Consequently it adds to the robustness of the results reported earlier.

Table 7.7. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

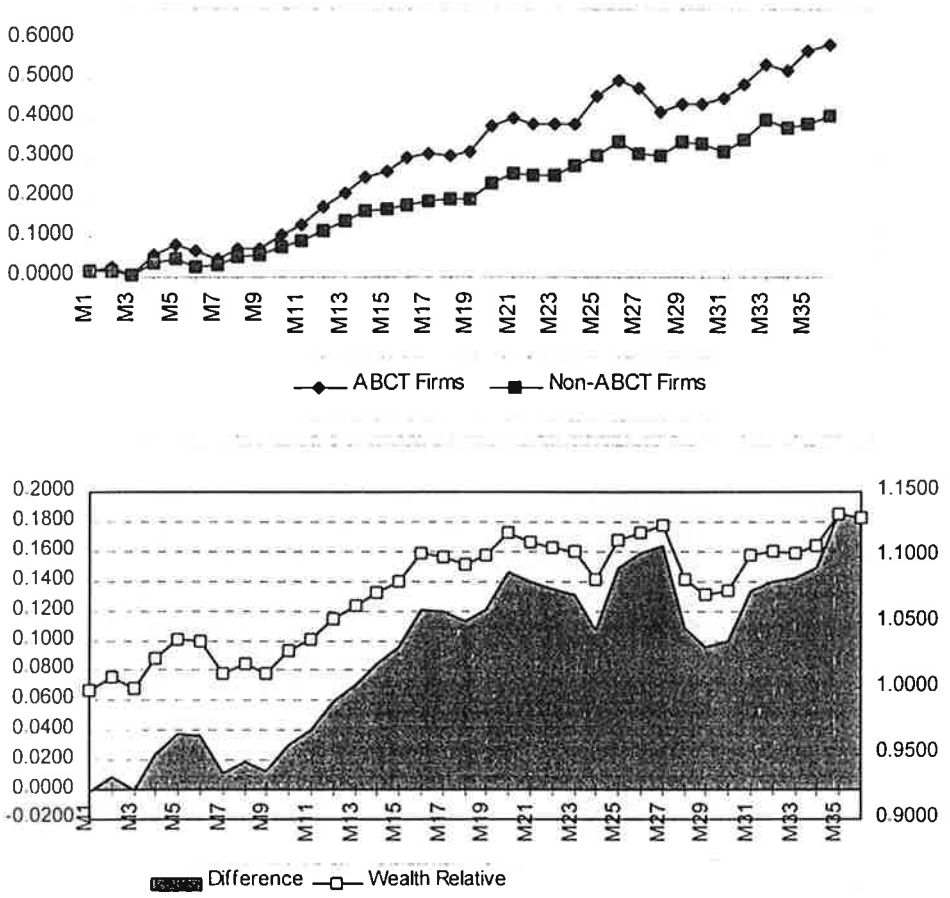
ABCT/FTSE - Market-to-Book

	Average Holding Period Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	FTSE	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0156	0.0170	-0.0014	-0.0993	0.5393	0.3947	-1.2978	0.9028	0.9987
M2	0.0252	0.0162	0.0090	0.5681	0.2867	0.4474	-0.6489	0.7418	1.0088
M3	0.0040	0.0041	-0.0002	-0.0118	0.5047	0.5526	0.6489	0.2582	0.9998
M4	0.0574	0.0331	0.0243	1.1498	0.1288	0.5526	0.6489	0.2582	1.0236
M5	0.0809	0.0426	0.0383	1.5487	0.0650 *	0.6053	1.2978	0.0972 *	1.0367
M6	0.0629	0.0270	0.0360	1.3289	0.0960 *	0.5526	0.6489	0.2582	1.0350
M7	0.0425	0.0306	0.0120	0.5030	0.3090	0.5526	0.6489	0.2582	1.0116
M8	0.0688	0.0498	0.0190	0.6526	0.2590	0.5526	0.6489	0.2582	1.0181
M9	0.0682	0.0556	0.0125	0.3871	0.3504	0.5000	0.0000	0.5000	1.0119
M10	0.1065	0.0759	0.0307	0.8267	0.2069	0.5526	0.6489	0.2582	1.0285
M11	0.1298	0.0896	0.0401	0.9435	0.1758	0.6316	1.6222	0.0524 *	1.0368
M12	0.1733	0.1140	0.0593	1.4914	0.0722 *	0.6579	1.9467	0.0258 **	1.0532
M13	0.2085	0.1377	0.0707	1.9403	0.0301 **	0.6757	2.1372	0.0163 **	1.0622
M14	0.2480	0.1637	0.0843	2.3738	0.0115 **	0.7027	2.4660	0.0068 **	1.0724
M15	0.2673	0.1713	0.0960	2.7184	0.0050 **	0.7027	2.4660	0.0068 **	1.0819
M16	0.3004	0.1790	0.1214	3.1244	0.0018 **	0.7297	2.7948	0.0026 **	1.1029
M17	0.3083	0.1890	0.1193	3.1367	0.0017 **	0.6757	2.1372	0.0163 **	1.1003
M18	0.3063	0.1935	0.1127	2.8011	0.0041 **	0.6757	2.1372	0.0163 **	1.0945
M19	0.3152	0.1945	0.1207	2.7251	0.0049 **	0.6216	1.4796	0.0695 *	1.1010
M20	0.3793	0.2329	0.1464	2.7407	0.0047 **	0.6486	1.8084	0.0353 **	1.1187
M21	0.3982	0.2585	0.1397	2.4608	0.0094 **	0.7027	2.4660	0.0068 **	1.1110
M22	0.3870	0.2526	0.1344	2.2641	0.0148 **	0.6486	1.8084	0.0353 **	1.1073
M23	0.3861	0.2556	0.1305	2.1180	0.0206 **	0.6757	2.1372	0.0163 **	1.1039
M24	0.3864	0.2795	0.1069	1.5197	0.0687 *	0.5946	1.1508	0.1249	1.0835
M25	0.4545	0.3066	0.1479	1.8495	0.0368 **	0.6061	1.2185	0.1115	1.1132
M26	0.4967	0.3377	0.1589	1.8813	0.0345 **	0.6061	1.2185	0.1115	1.1188
M27	0.4753	0.3120	0.1633	2.1244	0.0207 **	0.6667	1.9149	0.0278 **	1.1245
M28	0.4157	0.3074	0.1084	1.6180	0.0577 *	0.6667	1.9149	0.0278 **	1.0829
M29	0.4356	0.3402	0.0954	1.4507	0.0783 *	0.6061	1.2185	0.1115	1.0712
M30	0.4329	0.3337	0.0993	1.4241	0.0820 *	0.6364	1.5667	0.0586 *	1.0744
M31	0.4483	0.3155	0.1328	1.7391	0.0458 **	0.6364	1.5667	0.0586 *	1.1009
M32	0.4841	0.3446	0.1395	1.8300	0.0383 **	0.6364	1.5667	0.0586 *	1.1037
M33	0.5373	0.3946	0.1428	1.7828	0.0421 **	0.6364	1.5667	0.0586 *	1.1024
M34	0.5216	0.3732	0.1484	1.7448	0.0453 **	0.6061	1.2185	0.1115	1.1080
M35	0.5721	0.3873	0.1848	1.9991	0.0271 **	0.6667	1.9149	0.0278 **	1.1332
M36	0.5866	0.4046	0.1820	1.8091	0.0399 **	0.6364	1.5667	0.0586 *	1.1296

Significant at the 10% level

****Significant at the 5% level**

Figure 7.5. Post-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/FTSE - Market-to-Book



7.3.3. Pre-Adoption Performance

As in the case of the market capitalisation data set, the pre-adoption performance of the market-to-book data set was reviewed in order to test for the over-reaction/under-reaction phenomena. The raw returns are documented in Table 7.8. and the average holding period results in Table 7.9. Figure 7.6. plots these results. In contrast with the market capitalisation data set, it shows how the non-ABCT outperformed the ABCT firms over the two year period. However, the difference was not economically or statistically significant. This allows one to eliminate the over-reaction/under-reaction phenomena as a possible cause of the subsequent superior performance of the ABCTs. It is further evidence of the contribution the ABCTs make to the managerial attention directing and decision making processes of the firm.

Table 7.8. Pre-Adoption:

Monthly Average Returns (AR)

ABCT/nonABCT - Market-to-Book

	Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0135	0.0149	-0.0013	-0.0969	0.5383	0.4444	-0.6667	0.7475	0.9987
M2	0.0336	0.0577	-0.0241	-1.0532	0.8503	0.5000	0.0000	0.5000	0.9772
M3	-0.0017	0.0306	-0.0323	-1.9004	0.9672	0.3611	-1.6667	0.9522	0.9686
M4	0.0083	0.0004	0.0078	0.5391	0.2966	0.6111	1.3333	0.0912 *	1.0078
M5	0.0149	0.0545	-0.0396	-2.0941	0.9782	0.4444	-0.6667	0.7475	0.9624
M6	0.0034	0.0225	-0.0191	-1.0544	0.8505	0.4722	-0.3333	0.6306	0.9813
M7	0.0093	-0.0109	0.0202	0.9941	0.1635	0.5833	1.0000	0.1587	1.0204
M8	-0.0177	-0.0197	0.0020	0.1387	0.4452	0.5556	0.6667	0.2525	1.0020
M9	0.0022	-0.0046	0.0068	0.4104	0.3420	0.4722	-0.3333	0.6306	1.0069
M10	0.0081	-0.0079	0.0159	0.7429	0.2312	0.4722	-0.3333	0.6306	1.0161
M11	0.0068	-0.0216	0.0284	1.6167	0.0575 *	0.5833	1.0000	0.1587	1.0290
M12	0.0206	0.0256	-0.0050	-0.2496	0.5978	0.4722	-0.3333	0.6306	0.9952
M13	0.0232	0.0600	-0.0368	-1.7598	0.9564	0.3611	-1.6667	0.9522	0.9653
M14	0.0485	0.0435	0.0050	0.2378	0.4067	0.4444	-0.6667	0.7475	1.0048
M15	0.0264	0.0554	-0.0289	-1.8609	0.9644	0.3889	-1.3333	0.9088	0.9726
M16	-0.0189	-0.0184	-0.0005	-0.0306	0.5121	0.5000	0.0000	0.5000	0.9995
M17	0.0216	0.0345	-0.0129	-1.0036	0.8388	0.4444	-0.6667	0.7475	0.9875
M18	0.0119	0.0083	0.0036	0.2356	0.4076	0.4444	-0.6667	0.7475	1.0036
M19	-0.0170	-0.0069	-0.0101	-0.5599	0.7105	0.5000	0.0000	0.5000	0.9898
M20	0.0155	-0.0137	0.0292	1.3223	0.0973 *	0.6667	2.0000	0.0228 **	1.0296
M21	0.0333	0.0363	-0.0031	-0.1603	0.5632	0.4722	-0.3333	0.6306	0.9971
M22	0.0082	0.0127	-0.0044	-0.2672	0.6045	0.4167	-1.0000	0.8413	0.9956
M23	-0.0099	-0.0123	0.0024	0.1606	0.4367	0.5000	0.0000	0.5000	1.0025
M24	0.0039	-0.0129	0.0168	0.9399	0.1769	0.5556	0.6667	0.2525	1.0170

*Significant at the 10% level

**Significant at the 5% level

Table 7.9. Pre-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/nonABCT - Market-to-Book

	Average Holding Period Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0135	0.0149	-0.0013	-0.0969	0.5383	0.4444	-0.6667	0.7475	0.9987
M2	0.0473	0.0759	-0.0285	-0.9656	0.8296	0.5000	0.0000	0.5000	0.9735
M3	0.0457	0.1160	-0.0703	-1.5173	0.9309	0.3889	-1.3333	0.9088	0.9370
M4	0.0538	0.1148	-0.0610	-1.3740	0.9109	0.4722	-0.3333	0.6306	0.9453
M5	0.0754	0.1738	-0.0984	-1.8664	0.9648	0.3889	-1.3333	0.9088	0.9162
M6	0.0808	0.2115	-0.1307	-1.7246	0.9533	0.3056	-2.3333	0.9902	0.8921
M7	0.0962	0.2399	-0.1437	-1.1288	0.8667	0.5000	0.0000	0.5000	0.8841
M8	0.0796	0.1970	-0.1174	-1.1542	0.8719	0.4444	-0.6667	0.7475	0.9019
M9	0.0809	0.2054	-0.1245	-1.1937	0.8797	0.4722	-0.3333	0.6306	0.8967
M10	0.0937	0.1935	-0.0998	-0.9804	0.8332	0.5278	0.3333	0.3694	0.9164
M11	0.1001	0.1258	-0.0257	-0.4038	0.6556	0.5833	1.0000	0.1587	0.9772
M12	0.1263	0.1471	-0.0208	-0.3301	0.6284	0.5000	0.0000	0.5000	0.9818
M13	0.1580	0.2109	-0.0529	-0.7444	0.7692	0.5278	0.3333	0.3694	0.9563
M14	0.2101	0.2664	-0.0563	-0.7209	0.7621	0.5000	0.0000	0.5000	0.9556
M15	0.2303	0.3258	-0.0955	-1.1672	0.8745	0.4444	-0.6667	0.7475	0.9280
M16	0.2042	0.3012	-0.0970	-1.2317	0.8869	0.4444	-0.6667	0.7475	0.9255
M17	0.2286	0.3515	-0.1229	-1.4318	0.9195	0.4722	-0.3333	0.6306	0.9091
M18	0.2429	0.3603	-0.1174	-1.2921	0.8976	0.5278	0.3333	0.3694	0.9137
M19	0.2261	0.3501	-0.1240	-1.2931	0.8978	0.5556	0.6667	0.2525	0.9082
M20	0.2526	0.3281	-0.0755	-0.7471	0.7700	0.5556	0.6667	0.2525	0.9432
M21	0.2874	0.3603	-0.0730	-0.7487	0.7705	0.5833	1.0000	0.1587	0.9464
M22	0.3005	0.3741	-0.0736	-0.7339	0.7660	0.5278	0.3333	0.3694	0.9464
M23	0.2957	0.3514	-0.0556	-0.5455	0.7056	0.5833	1.0000	0.1587	0.9588
M24	0.2982	0.3433	-0.0451	-0.4413	0.6691	0.5556	0.6667	0.2525	0.9664

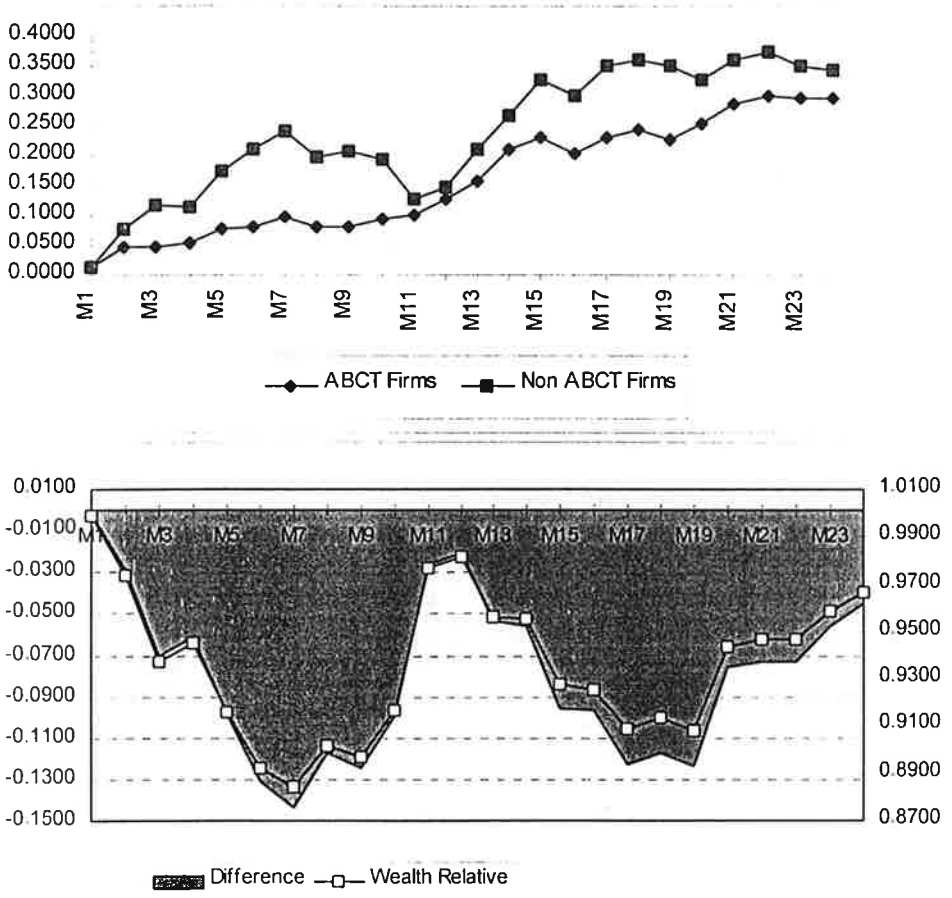
*Significant at the 10% level

**Significant at the 5% level

Figure 7.6. Pre-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/nonABCT - Market-to-Book



7.4. Conclusions

The empirical results are summarised in Table 7.10. for the market to book data set of firms. For brevity, it does not include the results of the monthly average returns or the monthly cumulative average returns methods. The results of the monthly average returns method are captured in the more statistically sustainable monthly average holding period returns method. The data is drawn from earlier tables in this chapter and categorised under the two main headings of market and accounting based measures of performance.

Table 7.10. shows that, in terms of market based measures, the ABCT firms outperformed the non-ABCT firms by 22.64% and the FTSE all share index 18.20%. The wealth relative confirms this outperformance at 17% and 13%, respectively. It is also worth noting

that the results computed using the monthly cumulative average returns method are consistent with these results.

A review of the pre-adoption performance of the matched firms was undertaken to test if the over-reaction phenomena was the cause of the subsequent post-adoption superior performance of the ABCT firms. There is no evidence of this phenomena, as the monthly average holding period returns computed for that period report no significant difference in the two year pre-adoption performance of the matched set of firms.

Table 7.10. Empirical Results: - Market-to-Book

Measures of Performance	ABCT Firms Mean	Non-ABCT Firms Mean	Diff.	Prop. of ABCT Firms > non-ABCT Firms	Wealth Relative
Market Based					
Post-Adoption					
3 Year AHPR					
ABCT v non-ABCT	58.66%	36.02%	22.64% **	.5455	1.17
ABCT v FTSE	58.66%	40.46%	18.20% **	.6364 *	1.13
Pre-Adoption					
2 Year AHPR					
ABCT v non-ABCT	29.82%	34.33%	-4.51%	.5556	0.97
Accounting Based					
3 Year AR					
Return on S`Holders Equity	16.46%	13.99%	2.47%	.6184 **	1.02
Operating Profit Margin %	13.63%	11.10%	2.53% **	.5526	1.02
Pre-Tax Profit Margin %	12.37%	10.21%	2.16% **	.5395	1.02
Turnover/Fixed Assets	3.27	4.43	-1.16	.4211	0.79
Capital Gearing %	36.36%	30.69%	5.67% **	.6053 **	1.04
Quick Assets Ratio	0.9605	0.9376	0.0229	.5526	1.01
Creditors Ratio (Days)	105.60	81.92	23.68 **	.6711 **	1.29
Cash Earnings per Share	47.15	34.39	12.76 **	.6053 **	1.36

***Significant at the 10% level**

****Significant at the 5% level**

The accounting based measures of performance confirm the superior performance of the ABCT firms. The key return on shareholders equity ratio is statistically significant in favour of the ABCT firms. Profitability rather than capital turnover is identified as the primary source of that superior performance. The efficient management of working capital contributes in a positive way to that result and is reflected in the better overall liquidity profile of the

ABCT firms. In this regard the high creditors days outstanding is worthy of note as is the high gearing structure of the ABCT firms.

Taken together, the results computed for the market-to-book data set, indicate strong support for the positive impact of the ABCTs on firm performance. They support the results of the primary analysis undertaken for the market capitalisation data set. This adds further credence to the suggestion that the introduction of the ABCTs adds value beyond their cost, as reflected in both market and accounting based terms.

Finally, in comparing this conclusion with that reached in regard to the market capitalisation data set in Chapter 6, it is worth noting the findings of Fama and French (1992). Their conclusion, while controversial, that stock price returns are influenced by the market-to book-value of the firm has gained increasing acceptance in the market. Therefore, by controlling for this potential bias adds credibility and/or robustness to the results of this study, notwithstanding the concerns raised about the quality of the market-to-book data set matching result.

CHAPTER 8

8. RESULTS and ANALYSIS - NET TOTAL ASSETS

8.1. Introduction

This chapter reports the results of the net total assets data set. This analysis was carried out in order to supplement the results of the primary analysis presented in Chapter 6. It deals specifically with the results of the market and accounting based measures of performance. It begins with a summary of the three year post-adoption period results. This is followed by a number of robustness checks before concluding with an interpretation of the results for the net total assets data set.

8.2. Post-Adoption Firm Performance Results

The net total assets data set was created as a result of a matching process against that primary criteria. That process resulted in a control set of firms that was not statistically different from the ABCT firms. It was also well matched in terms of the secondary criteria of market capitalisation and market-to-book. In addition 79% of the firms were matched within the same general industry classification. Worth noting is the fact that the ABCT firms were slightly larger than their matched counterparts. This is not of great concern as the matched result is not significant at conventional levels.

The results for the net total assets matched firms are computed in a same way as the other data set in the interests of comparability. They are presented in the same format and subjected to the same parametric and non-parametric tests. The same type of graphs are used to illustrate the results.

8.2.1. Stock Market Measures of Performance

Table 8.1. reports the monthly average returns for the ABCT and non-ABCT firms over a three year (36 month) period. It shows that the ABCT firms outperformed the non-ABCT firms in 23 of the 36

months under review. Further in the case of the 13 negative monthly average returns none have a t-statistic lower than -2.00. The high number and magnitude of monthly positive results more than offset the small number of negative results throughout the 36 month study period.

Table 8.1. Post-Adoption:

Monthly Average Returns (AR)

ABCT/nonABCT - Net Total Assets

	Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0201	0.0238	-0.0037	-0.2257	0.5886	0.4706	-0.3430	0.6342	0.9964
M2	0.0124	0.0101	0.0023	0.1665	0.4344	0.5294	0.3430	0.3658	1.0023
M3	-0.0180	-0.0093	-0.0087	-0.5073	0.6924	0.3824	-1.3720	0.9150	0.9912
M4	0.0579	0.0410	0.0169	1.1280	0.1337	0.4706	-0.3430	0.6342	1.0163
M5	0.0225	0.0272	-0.0047	-0.2479	0.5971	0.6176	1.3720	0.0850 *	0.9955
M6	-0.0056	-0.0225	0.0169	0.9153	0.1833	0.5588	0.6860	0.2464	1.0173
M7	-0.0030	-0.0230	0.0200	0.8038	0.2136	0.5588	0.6860	0.2464	1.0205
M8	0.0282	0.0082	0.0200	1.1542	0.1284	0.5294	0.3430	0.3658	1.0198
M9	0.0012	-0.0165	0.0177	1.0773	0.1446	0.5588	0.6860	0.2464	1.0180
M10	0.0319	0.0258	0.0061	0.3209	0.3752	0.5882	1.0290	0.1517	1.0059
M11	0.0177	0.0388	-0.0211	-1.0859	0.8573	0.5294	0.3430	0.3658	0.9797
M12	0.0623	0.0162	0.0461	1.3258	0.0970 *	0.5588	0.6860	0.2464	1.0454
M13	0.0370	0.0297	0.0073	0.4853	0.3154	0.5152	0.1741	0.4309	1.0071
M14	0.0454	0.0427	0.0026	0.1375	0.4458	0.4545	-0.5222	0.6992	1.0025
M15	0.0163	-0.0095	0.0258	2.2207	0.0168 **	0.6061	1.2185	0.1115	1.0261
M16	0.0304	0.0142	0.0162	0.9237	0.1813	0.4545	-0.5222	0.6992	1.0160
M17	0.0137	0.0186	-0.0050	-0.3616	0.6400	0.5152	0.1741	0.4309	0.9951
M18	0.0111	-0.0022	0.0133	0.7685	0.2239	0.4848	-0.1741	0.5691	1.0133
M19	0.0042	-0.0121	0.0163	0.8758	0.1938	0.5152	0.1741	0.4309	1.0165
M20	0.0438	0.0408	0.0030	0.2015	0.4208	0.4545	-0.5222	0.6992	1.0029
M21	0.0082	0.0342	-0.0261	-1.9482	0.9699	0.3333	-1.9149	0.9722	0.9748
M22	-0.0080	-0.0046	-0.0034	-0.1916	0.5754	0.4242	-0.8704	0.8080	0.9966
M23	0.0008	-0.0069	0.0077	0.4762	0.3186	0.5152	0.1741	0.4309	1.0078
M24	-0.0053	0.0178	-0.0231	-1.2525	0.8903	0.4242	-0.8704	0.8080	0.9773
M25	0.0473	0.0336	0.0137	0.5492	0.2936	0.4828	-0.1857	0.5737	1.0133
M26	0.0260	0.0272	-0.0012	-0.0575	0.5227	0.4138	-0.9285	0.8234	0.9989
M27	-0.0021	-0.0336	0.0315	1.7794	0.0430 **	0.5517	0.5571	0.2887	1.0326
M28	-0.0272	0.0014	-0.0286	-1.3788	0.9106	0.4138	-0.9285	0.8234	0.9714
M29	0.0139	0.0395	-0.0257	-1.2343	0.8863	0.4828	-0.1857	0.5737	0.9753
M30	-0.0021	-0.0158	0.0136	0.8076	0.2131	0.5862	0.9285	0.1766	1.0138
M31	0.0078	-0.0185	0.0264	1.8786	0.0354 **	0.5862	0.9285	0.1766	1.0269
M32	0.0224	0.0356	-0.0132	-0.8133	0.7885	0.4138	-0.9285	0.8234	0.9872
M33	0.0249	0.0250	-0.0001	-0.0065	0.5026	0.5517	0.5571	0.2887	0.9999
M34	-0.0151	-0.0194	0.0042	0.2339	0.4084	0.4828	-0.1857	0.5737	1.0043
M35	0.0343	0.0036	0.0307	1.9759	0.0290 **	0.6552	1.6713	0.0473 **	1.0306
M36	0.0029	-0.0351	0.0380	1.9521	0.0305 **	0.5862	0.9285	0.1766	1.0394

*Significant at the 10% level

**Significant at the 5% level

Figure 8.1. plots the monthly average returns difference between the performance of the ABCT firms and the matched non-ABCT firms. The monthly wealth relative index is also shown on the same graph. It presents a very strong picture of the positive performance of the ABCT firms when measured against their matched non-ABCT firms.

Figure 8.1. Post-Adoption:
Monthly Average Returns (AR)
ABCT/nonABCT - Net Total Assets

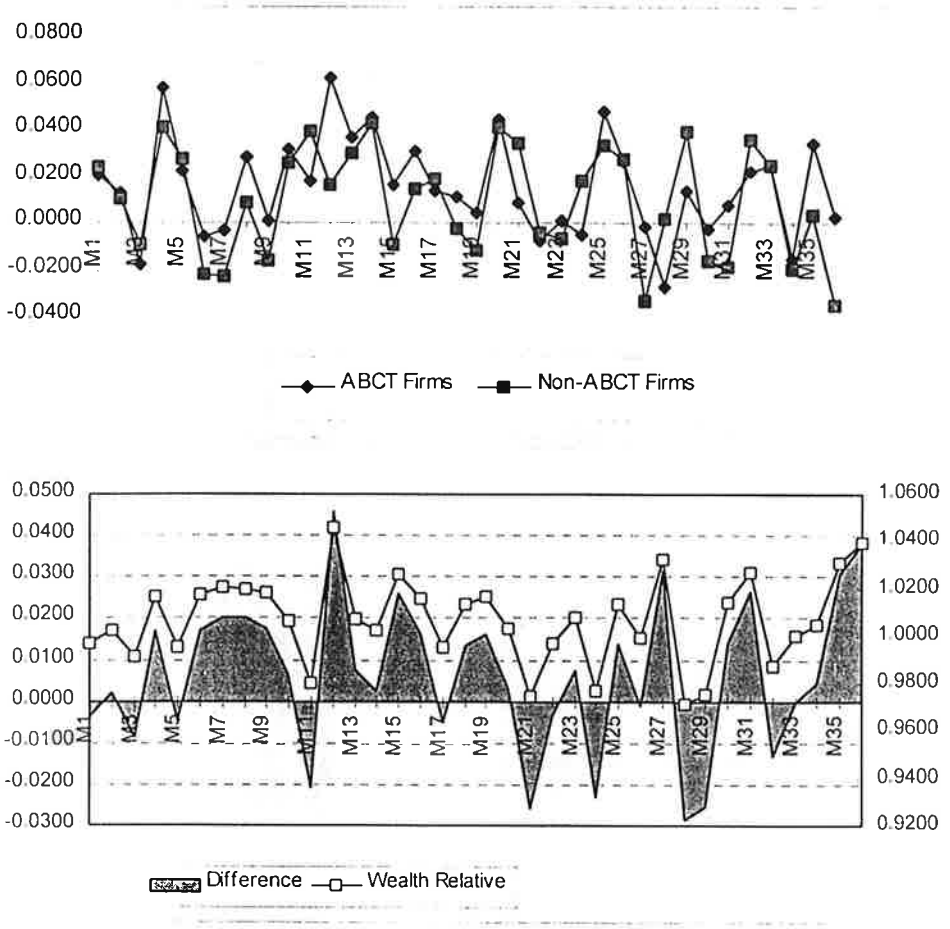


Table 8.2. shows the average holding period returns of the ABCT and non-ABCT firms over a three year period. The difference and appropriate parametric and non-parametric tests are also shown. The pattern of improved post-implementation performance achieved by the ABCT firms is consistent with the findings for the other data sets. The superior performance of the ABCT firms reaches 8.53% by month 12, grows modestly to 11.92% by month 24 and accelerates to peak at 29.04% by month 36. By the end of the study period, the ABCT firms outperformed the non-ABCT firms in the case of 62.07% of the matched firms. These results are both economically and

statistically significant and reflected in the wealth relative index of 21.86% in month 36.

Table 8.2. Post-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/nonABCT - Net Total Assets

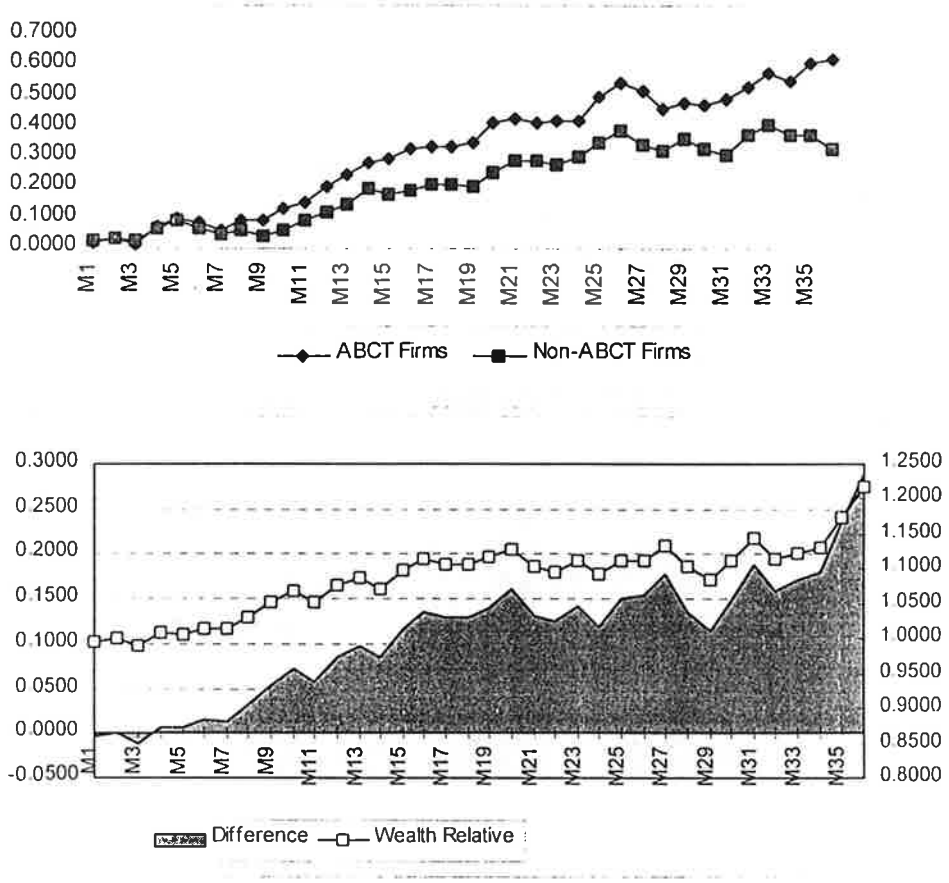
	Average Holding Period Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0201	0.0238	-0.0037	-0.2257	0.5886	0.4706	-0.3430	0.6342	0.9964
M2	0.0328	0.0332	-0.0004	-0.0148	0.5059	0.5000	0.0000	0.5000	0.9997
M3	0.0121	0.0237	-0.0116	-0.3970	0.6530	0.4706	-0.3430	0.6342	0.9887
M4	0.0747	0.0668	0.0079	0.2283	0.4104	0.4706	-0.3430	0.6342	1.0075
M5	0.1010	0.0942	0.0068	0.1649	0.4350	0.5000	0.0000	0.5000	1.0063
M6	0.0821	0.0675	0.0146	0.3254	0.3735	0.4118	-1.0290	0.8483	1.0137
M7	0.0574	0.0432	0.0141	0.3035	0.3817	0.5000	0.0000	0.5000	1.0135
M8	0.0886	0.0564	0.0322	0.6094	0.2732	0.4706	-0.3430	0.6342	1.0305
M9	0.0940	0.0399	0.0541	0.9324	0.1790	0.5000	0.0000	0.5000	1.0521
M10	0.1301	0.0578	0.0723	1.1795	0.1233	0.5588	0.6860	0.2464	1.0683
M11	0.1497	0.0920	0.0578	0.9361	0.1780	0.5294	0.3430	0.3658	1.0529
M12	0.2004	0.1151	0.0853	1.3888	0.0871 *	0.5882	1.0290	0.1517	1.0765
M13	0.2408	0.1424	0.0984	1.6661	0.0527 *	0.6364	1.5667	0.0586 *	1.0861
M14	0.2785	0.1936	0.0848	1.3777	0.0889 *	0.6061	1.2185	0.1115	1.0711
M15	0.2942	0.1780	0.1162	1.7947	0.0411 **	0.5758	0.8704	0.1920	1.0986
M16	0.3264	0.1913	0.1351	2.0202	0.0259 **	0.6061	1.2185	0.1115	1.1134
M17	0.3366	0.2082	0.1283	1.8626	0.0359 **	0.6061	1.2185	0.1115	1.1062
M18	0.3351	0.2069	0.1282	1.7200	0.0475 **	0.6364	1.5667	0.0586 *	1.1063
M19	0.3436	0.2029	0.1408	1.7567	0.0443 **	0.6364	1.5667	0.0586 *	1.1170
M20	0.4099	0.2493	0.1606	1.8717	0.0352 **	0.6364	1.5667	0.0586 *	1.1286
M21	0.4226	0.2905	0.1320	1.4734	0.0752 *	0.6061	1.2185	0.1115	1.1023
M22	0.4125	0.2883	0.1242	1.3410	0.0947 *	0.5455	0.5222	0.3008	1.0964
M23	0.4159	0.2739	0.1420	1.4814	0.0741 *	0.5758	0.8704	0.1920	1.1115
M24	0.4170	0.2979	0.1192	1.2360	0.1127	0.5455	0.5222	0.3008	1.0918
M25	0.4972	0.3477	0.1495	1.2682	0.1076	0.5862	0.9285	0.1766	1.1109
M26	0.5405	0.3860	0.1546	1.2449	0.1117	0.5862	0.9285	0.1766	1.1115
M27	0.5177	0.3401	0.1777	1.4100	0.0848 *	0.5862	0.9285	0.1766	1.1326
M28	0.4595	0.3237	0.1359	1.1801	0.1239	0.6207	1.2999	0.0968 *	1.1027
M29	0.4769	0.3619	0.1150	1.0568	0.1498	0.5862	0.9285	0.1766	1.0844
M30	0.4733	0.3249	0.1484	1.3708	0.0907 *	0.6207	1.2999	0.0968 *	1.1120
M31	0.4922	0.3048	0.1874	1.5968	0.0608 *	0.6552	1.6713	0.0473 **	1.1436
M32	0.5294	0.3714	0.1580	1.2489	0.1110	0.6552	1.6713	0.0473 **	1.1152
M33	0.5759	0.4053	0.1706	1.3122	0.1001	0.6207	1.2999	0.0968 *	1.1214
M34	0.5522	0.3731	0.1791	1.2850	0.1047	0.5862	0.9285	0.1766	1.1304
M35	0.6070	0.3702	0.2367	1.6292	0.0572 *	0.6207	1.2999	0.0968 *	1.1728
M36	0.6186	0.3283	0.2904	1.8391	0.0383 **	0.6207	1.2999	0.0968 *	1.2186

Significant at the 10% level

****Significant at the 5% level**

Figure 8.2., profiles the pattern of market based results for the matched set of firms. By plotting the difference between the ABCT and non-ABCT firms, highlights the strong positive outperformance of the ABCT firms. This outperformance is consistent with earlier results reported. It is interpreted as confirmation of a strong causal link between the introduction of the ABCTs and firm performance.

Figure 8.2. Post-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/nonABCT - Net Total Assets



8.2.2. Accounting Measures of Performance

Table 8.4. summarises the accounting based measures of performance for the net total assets data set.

In compiling Table 8.4. the objective was to summarise three years' accounting year end data for the matched set of firms beginning with the accounting period one year after the adoption of the ABCTs. However, because of incomplete data, particularly from financial and

property based firms, the original set of 34 firms matched by net total assets was reduced to 28 firms in the preparation of the accounting measures of performance results Table 8.4. Further, because a number of the ABCT firms had implemented the ABCTs in 1993 or thereafter a full three years` data was not available. The end result, as summarised in Table 8.3., was that three years` full comparative data was available for 19 firms, two years` data was available for another 5 firms and one years` data was available for another 4 firms. This comprised in all 71 sets of financial comparison opportunities for the 18 different accounting measures of performance used and was the basis of the results summarised in Table 8.4., below.

Table 8.3. Post-Adoption:
Accounting Measures of Performance Data Set
ABCT/nonABCT - Net Total Assets

No. of Accounting Measures	No. of Firms	No. of Years Data Available	Comparison Opportunities
18	19	3	57
18	5	2	10
18	4	1	4
Total	**28**		**71**

Table 8.4. reports the ABCT firms outperforming the non-ABCT firms under the key return on shareholders equity ratio. This is consistent with the results of the market capitalisation and market-to-book data sets. It is statistically significant within conventional levels. The manner by which it is achieved is also consistent in that it derives primarily from superior profitability rather than capital turnover. This is based on the statistically significant profit margin ratios in favour of the ABCT firms and the opposite in the case of the turnover/fixed assets ratio. The % change in sales ratio also discounts volume as a significant factor in the superior return earned by the ABCT firms for their shareholders. Consequently, it is reasonable to suggest that cost management initiatives, developed in the context of a broader ABC framework, are at the heart of this superior return earned by the ABCT firm shareholders. Worth noting is the cash quality of those earnings, as evidenced by the statistically significant cash earnings per share and the cash flow margin % results in favour of the ABCT firms.

Table 8.4. Post-Adoption:
Accounting Measures of Performance Results Table
ABCT/nonABCT - Net Total Assets

	Average Returns			Paired t-Test		Sign Test		
DESCRIPTION	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z
% Change in Sales	8.2238	8.9594	-0.7356	-0.2231	0.5880	0.4366	-1.0681	0.8573
Rates of Return								
Return on S`Holders Equity %	16.5199	15.9399	0.5800	0.2415	0.4049	0.5775	1.3055	0.0959 *
Return on Capital Employed %	19.1525	17.4268	1.7258	1.0203	0.1556	0.5211	0.3560	0.3609
Profit Margins								
Operating Profit Margin %	13.2608	10.9342	2.3266	1.9005	0.0307 **	0.5915	1.5428	0.0614 *
Pre-Tax Profit Margin %	12.0755	10.2570	1.8185	1.5174	0.0668 *	0.6197	2.0175	0.0218 **
Net Profit Margin %	8.3259	7.4687	0.8572	1.0218	0.1552	0.5915	1.5428	0.0614 *
Cash Flow Margin %	12.7987	11.3352	1.4635	1.3754	0.0867 *	0.5775	1.3055	0.0959 *
Turnover/Fixed Assets	3.4445	5.3268	-1.8823	-1.6026	0.9432	0.4789	-0.3560	0.6391
Capital Gearing %	37.0275	31.1563	5.8711	2.2656	0.0133 **	0.6620	2.7296	0.0032 **
Working Capital								
Working Capital Ratio	1.2941	1.3542	-0.0601	-0.6974	0.7561	0.4507	-0.8307	0.7969
Quick Assets Ratio	0.9655	0.9410	0.0245	0.3419	0.3667	0.5070	0.1187	0.4528
Stock Ratio (Days)	40.4275	41.1463	-0.7189	-0.1577	0.5624	0.4225	-1.3055	0.9041
Debtors Ratio (Days)	77.4396	74.4407	2.9989	0.1942	0.4233	0.7324	3.9164	0.0000 **
Creditors Ratio (Days)	104.6601	85.9276	18.7325	2.8983	0.0025 **	0.6761	2.9670	0.0015 **
Productivity Ratios								
Tax Ratio	61.4707	30.9480	30.5227	0.7037	0.2420	0.4648	-0.5934	0.7235
Sales per Employee	104.4482	159.5168	-55.0686	-3.3051	0.9993	0.3944	-1.7802	0.9625
Operating Profit Per Employee	15.9152	20.2390	-4.3238	-1.1767	0.8783	0.5493	0.8307	0.2031
Per-Share Item								
Cash Earnings per Share	47.0842	33.3365	13.7477	2.9797	0.0020 **	0.6056	1.7802	0.0375 **

***Significant at the 10% level**

****Significant at the 5% level**

Table 8.4. also documents the better working capital liquidity position of the ABCT firms. It reports a close to parity operating cycle augmented by a very positive differential of 19 days credit in favour of the ABCT firms. This result is statistically significant. It reflects well on the operational performance of the ABCT firms and ultimately has a positive impact on the key accounting measures of performance. As this result is remarkably robust across all three data sets, it lends support to the claim that it can be attributed to the implementation of the ABCTs.

The capital gearing result is also consistent with prior results. It confirms the ability of the ABCT firms to service a higher debt structure without impinging on profitability and/or return to shareholders. The sales performance ratios continue to give conflicting signals. They are not consistent with the main thrust of the key ratios and confirm earlier concerns about the integrity and consistency of the measurement data. Given the possibility of a methodological weakness in this area, their interpretation is not of value. Despite this minor concern, on average, the ABCT firms exhibit better accounting and operating performance than their matched counterparts. Therefore, it is reasonable to conclude that the adoption of the ABCTs maybe the driving force behind the better market and accounting based performance of the ABCT net assets data set of firms. This adds to the growing evidence that there is a strong causal link between the introduction of the ABCTs and overall firm performance.

8.3. Robustness Checks

As with the two other data sets, the net total assets data set was subjected to a series of robustness checks in order to test the overall integrity of the findings of this study. These consisted of computing results using the cumulative average return method, comparing the ABCT firms with the FTSE all share index and reviewing the pre-adoption performance of the matched firms.

8.3.1. Cumulative Average Returns Method

The outperformance of the ABCT firms, is further evidenced by the cumulative average monthly performance results documented in Table 8.5. Consistent with earlier results, it reflects a pattern of positive results upwards in favour of the ABCT firms. By month 12 the ABCT firms had outperformed the non-ABCT firms by 10.79%. This settled at 14.28% by month 24 and then accelerated to peak at 23.21% by month 36. The wealth relative index confirms this upward monthly performance to reach 17.50% by the end of month 36. These results are both economically and statistically significant.

The non-parametric analysis in Table 8.5. supports this view. It shows that, in month one, 47.06% of the ABCT firms outperformed their matched counterpart. By the end of the study period, in month 36, this pattern applied to 62.07% of the matched firms and was significant at conventional levels. It shows that the superior performance of the ABCT firms was not sensitive to the method of computation used.

Figure 8.3. plots both the returns of the matched firms and the difference. It presents a clear picture of the profile of the superior performance of the ABCT firms. It reflects the dynamic nature of the positive results, in cumulative terms, particularly in the latter part of the period under review.

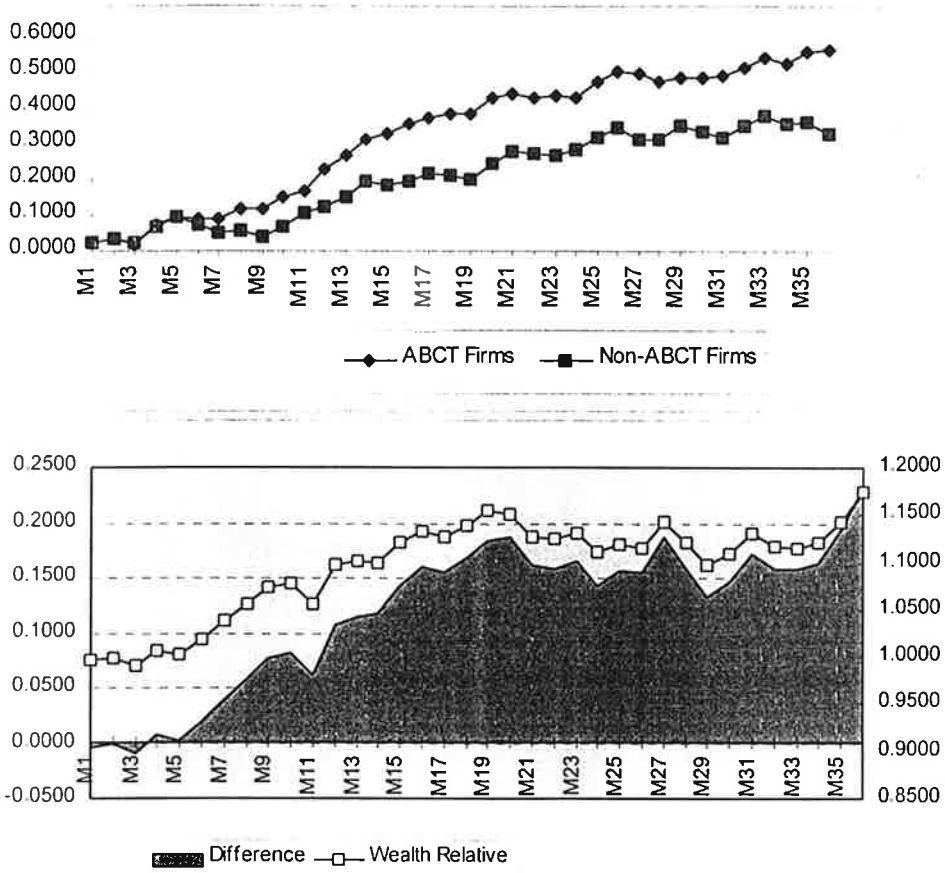
Table 8.5. Post-Adoption:
Monthly Cumulative Average Returns (CAR)
ABCT/nonABCT - Net Total Assets

	Cumulative Average Returns			Paired t-Test			Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z		Wealth Relative
M1	0.0201	0.0238	-0.0037	-0.2257	0.5886	0.4706	-0.3430	0.6342		0.9964
M2	0.0325	0.0339	-0.0014	-0.0606	0.5240	0.5000	0.0000	0.5000		0.9986
M3	0.0145	0.0246	-0.0101	-0.3382	0.6313	0.4706	-0.3430	0.6342		0.9901
M4	0.0724	0.0656	0.0068	0.1939	0.4237	0.4706	-0.3430	0.6342		1.0064
M5	0.0949	0.0928	0.0021	0.0510	0.4798	0.4706	-0.3430	0.6342		1.0019
M6	0.0894	0.0703	0.0190	0.4000	0.3459	0.3824	-1.3720	0.9150		1.0178
M7	0.0863	0.0473	0.0390	0.6577	0.2577	0.5000	0.0000	0.5000		1.0373
M8	0.1146	0.0555	0.0591	0.8518	0.2002	0.4706	-0.3430	0.6342		1.0559
M9	0.1157	0.0390	0.0767	0.9936	0.1638	0.4706	-0.3430	0.6342		1.0738
M10	0.1476	0.0648	0.0828	1.0708	0.1460	0.5294	0.3430	0.3658		1.0778
M11	0.1653	0.1036	0.0618	0.7987	0.2151	0.5000	0.0000	0.5000		1.0560
M12	0.2276	0.1197	0.1079	1.5291	0.0679	*	0.5588	0.6860	0.2464	1.0964
M13	0.2646	0.1494	0.1152	1.7435	0.0454	**	0.6364	1.5667	0.0586 *	1.1002
M14	0.3100	0.1921	0.1178	1.8016	0.0405	**	0.6061	1.2185	0.1115	1.0988
M15	0.3263	0.1826	0.1437	2.1343	0.0203	**	0.5758	0.8704	0.1920	1.1215
M16	0.3567	0.1969	0.1599	2.2015	0.0175	**	0.6061	1.2185	0.1115	1.1336
M17	0.3704	0.2155	0.1549	2.2092	0.0172	**	0.6364	1.5667	0.0586 *	1.1275
M18	0.3816	0.2133	0.1682	2.2673	0.0151	**	0.6061	1.2185	0.1115	1.1387
M19	0.3858	0.2012	0.1845	2.2853	0.0145	**	0.6364	1.5667	0.0586 *	1.1536
M20	0.4296	0.2421	0.1876	2.3354	0.0130	**	0.6061	1.2185	0.1115	1.1510
M21	0.4378	0.2763	0.1615	1.9764	0.0284	**	0.5758	0.8704	0.1920	1.1265
M22	0.4298	0.2717	0.1582	1.9485	0.0301	**	0.6061	1.2185	0.1115	1.1244
M23	0.4306	0.2648	0.1659	2.0284	0.0255	**	0.6061	1.2185	0.1115	1.1312
M24	0.4254	0.2826	0.1428	1.9069	0.0328	**	0.5758	0.8704	0.1920	1.1113
M25	0.4727	0.3162	0.1565	1.8993	0.0339	**	0.5517	0.5571	0.2887	1.1189
M26	0.4988	0.3434	0.1553	1.8573	0.0369	**	0.5862	0.9285	0.1766	1.1156
M27	0.4967	0.3099	0.1868	2.0637	0.0242	**	0.5862	0.9285	0.1766	1.1426
M28	0.4695	0.3113	0.1582	1.9042	0.0336	**	0.5862	0.9285	0.1766	1.1207
M29	0.4833	0.3508	0.1325	1.7312	0.0472	**	0.5862	0.9285	0.1766	1.0981
M30	0.4812	0.3350	0.1462	1.8427	0.0380	**	0.5862	0.9285	0.1766	1.1095
M31	0.4890	0.3165	0.1725	2.0250	0.0262	**	0.6207	1.2999	0.0968 *	1.1311
M32	0.5114	0.3521	0.1593	1.7805	0.0429	**	0.5862	0.9285	0.1766	1.1178
M33	0.5363	0.3771	0.1592	1.7360	0.0468	**	0.5862	0.9285	0.1766	1.1156
M34	0.5212	0.3578	0.1634	1.6188	0.0584	*	0.5517	0.5571	0.2887	1.1204
M35	0.5555	0.3614	0.1941	1.8948	0.0342	**	0.5862	0.9285	0.1766	1.1426
M36	0.5584	0.3263	0.2321	2.1058	0.0222	**	0.6207	1.2999	0.0968 *	1.1750

*Significant at the 10% level

**Significant at the 5% level

Figure 8.3. Post-Adoption:
Monthly Cumulative Average Returns (CAR)
ABCT/nonABCT - Net Total Assets



8.3.2. FTSE - Market-Adjusted Method

As with the other data sets, it was deemed appropriate to test the sensitivity of the matched firm results against another benchmark, namely, the FTSE all share index. The results of that comparison are shown in Table 8.6. It documents the superior performance of the ABCT firms in 23 of the 36 months studied. The positive bias in favour of the ABCT firms is depicted graphically in Figure 8.4. It highlights a pattern of significantly positive results with the occasional small insignificant negative result.

Table 8.6. Post-Adoption:
Monthly Average Returns (AR)
ABCT/FTSE - Net Total Assets

	Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	FTSE	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0201	0.0168	0.0033	0.2196	0.4138	0.4118	-1.0290	0.8483	1.0033
M2	0.0124	0.0031	0.0092	0.7555	0.2276	0.5882	1.0290	0.1517	1.0092
M3	-0.0180	-0.0098	-0.0082	-0.8181	0.7904	0.4412	-0.6860	0.7536	0.9917
M4	0.0579	0.0298	0.0281	2.0633	0.0235 **	0.5882	1.0290	0.1517	1.0273
M5	0.0225	0.0098	0.0127	1.2385	0.1121	0.5882	1.0290	0.1517	1.0126
M6	-0.0056	-0.0141	0.0085	0.5727	0.2854	0.5000	0.0000	0.5000	1.0087
M7	-0.0030	0.0042	-0.0072	-0.4346	0.6667	0.4706	-0.3430	0.6342	0.9928
M8	0.0282	0.0214	0.0068	0.6376	0.2641	0.5588	0.6860	0.2464	1.0066
M9	0.0012	0.0082	-0.0071	-0.4373	0.6676	0.5000	0.0000	0.5000	0.9930
M10	0.0319	0.0200	0.0118	0.7607	0.2261	0.6471	1.7150	0.0432 **	1.0116
M11	0.0177	0.0128	0.0049	0.2762	0.3920	0.5882	1.0290	0.1517	1.0049
M12	0.0623	0.0228	0.0395	1.4172	0.0829 *	0.5882	1.0290	0.1517	1.0386
M13	0.0370	0.0220	0.0149	1.0375	0.1536	0.4242	-0.8704	0.8080	1.0146
M14	0.0454	0.0227	0.0227	1.5932	0.0605 *	0.5455	0.5222	0.3008	1.0222
M15	0.0163	0.0056	0.0107	0.9596	0.1722	0.5758	0.8704	0.1920	1.0107
M16	0.0304	0.0076	0.0228	1.4959	0.0722 *	0.6364	1.5667	0.0586 *	1.0227
M17	0.0137	0.0089	0.0048	0.4083	0.3429	0.5152	0.1741	0.4309	1.0048
M18	0.0111	0.0031	0.0080	0.6492	0.2604	0.5152	0.1741	0.4309	1.0080
M19	0.0042	0.0006	0.0036	0.3853	0.3513	0.4848	-0.1741	0.5691	1.0036
M20	0.0438	0.0324	0.0115	0.8567	0.1990	0.5455	0.5222	0.3008	1.0111
M21	0.0082	0.0197	-0.0116	-1.2982	0.8983	0.3636	-1.5667	0.9414	0.9887
M22	-0.0080	-0.0054	-0.0026	-0.2562	0.6003	0.4848	-0.1741	0.5691	0.9974
M23	0.0008	0.0033	-0.0025	-0.2313	0.5907	0.3939	-1.2185	0.8885	0.9975
M24	-0.0053	0.0181	-0.0234	-1.6851	0.9491	0.3030	-2.2630	0.9882	0.9770
M25	0.0473	0.0327	0.0146	0.7980	0.2158	0.3793	-1.2999	0.9032	1.0142
M26	0.0260	0.0213	0.0048	0.3387	0.3687	0.4828	-0.1857	0.5737	1.0047
M27	-0.0021	-0.0152	0.0132	0.9485	0.1755	0.5517	0.5571	0.2887	1.0134
M28	-0.0272	0.0021	-0.0293	-1.5783	0.9371	0.3793	-1.2999	0.9032	0.9707
M29	0.0139	0.0248	-0.0110	-1.1641	0.8729	0.3448	-1.6713	0.9527	0.9893
M30	-0.0021	-0.0023	0.0002	0.0205	0.4919	0.5517	0.5571	0.2887	1.0002
M31	0.0078	-0.0127	0.0205	2.2465	0.0164 **	0.6552	1.6713	0.0473 **	1.0208
M32	0.0224	0.0243	-0.0019	-0.1530	0.5602	0.5172	0.1857	0.4263	0.9981
M33	0.0249	0.0364	-0.0115	-0.9051	0.8134	0.5172	0.1857	0.4263	0.9889
M34	-0.0151	-0.0136	-0.0015	-0.1433	0.5564	0.4828	-0.1857	0.5737	0.9984
M35	0.0343	0.0101	0.0242	2.3088	0.0143 **	0.6552	1.6713	0.0473 **	1.0240
M36	0.0029	0.0131	-0.0101	-0.9005	0.8122	0.4138	-0.9285	0.8234	0.9900

*Significant at the 10% level

**Significant at the 5% level

Figure 8.4. Post-Adoption:

Monthly Average Returns (AR)

ABCT/FTSE - Net Total Assets

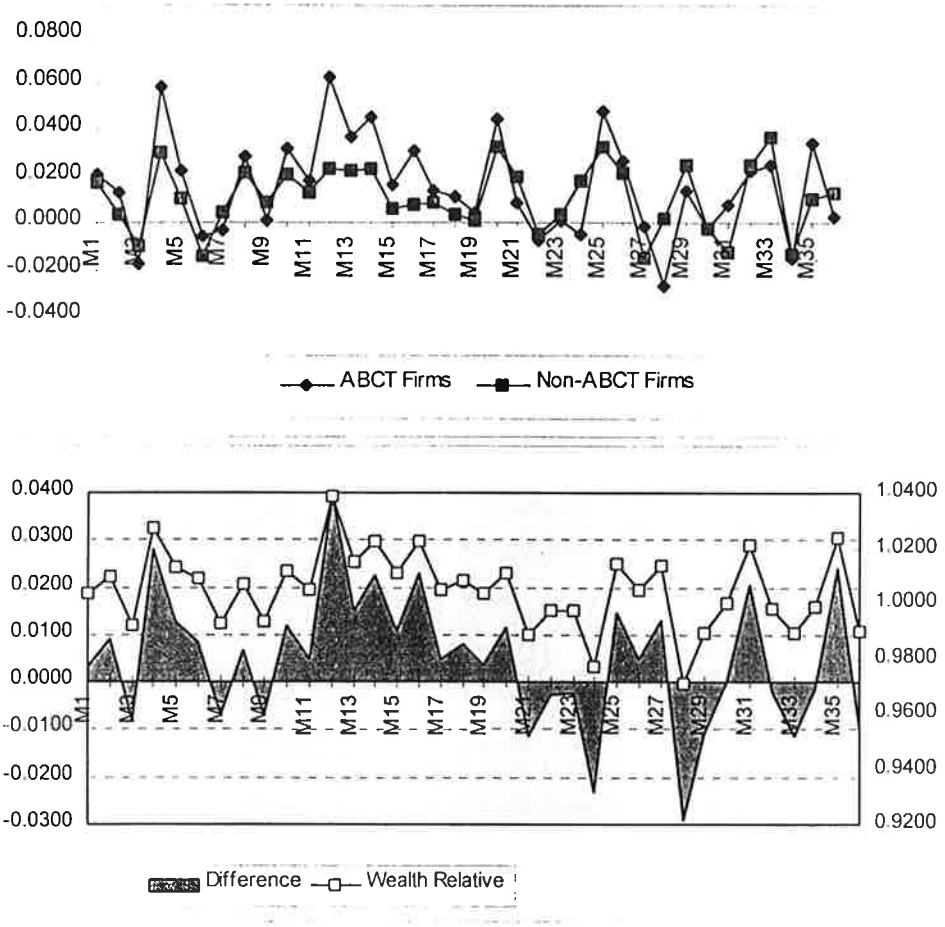


Table 8.7. documents the average holding period returns against the same benchmark. The predominately positive monthly returns documented in Table 8.6. dictate the familiar pattern of average holding period returns in Table 8.7. The first 12 months end with the ABCT firms outperforming the non-ABCT firms by 7.11%. This increases to a very credible 12.81% by month 24 and peaks at 20.47% by month 36. The wealth relative at 14.48%, in month 36, is another way of documenting the superior performance of the ABCT firms. The non-parametric analysis shows that, by the end of the study period, 65.52% of the ABCT firms outperform the index. These results are economically and statistically significant. Again, the notable feature is the magnitude of the outperformance of the ABCT firms in the last 12 months of the 36 month period studied. This is further evidence of the anticipated "lag" effect in firm performance following on the introduction of the ABCTs.

Table 8.7. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/FTSE - Net Total Assets

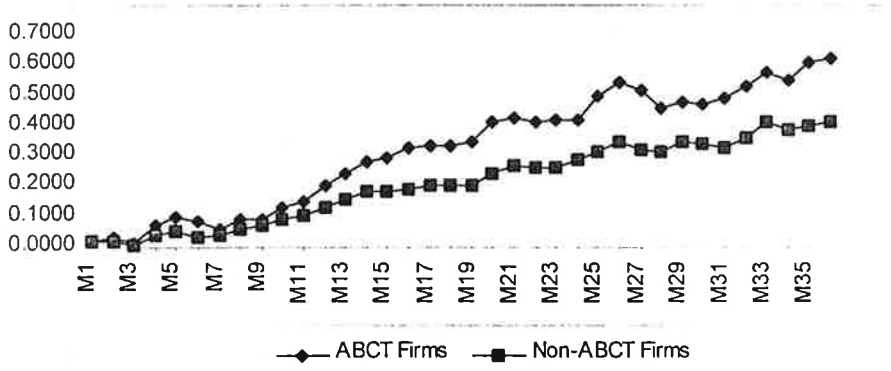
	Average Holding Period Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	FTSE	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0201	0.0168	0.0033	0.2196	0.4138	0.4118	-1.0290	0.8483	1.0033
M2	0.0328	0.0196	0.0132	0.7860	0.2187	0.4706	-0.3430	0.6342	1.0130
M3	0.0121	0.0097	0.0024	0.1410	0.4444	0.5882	1.0290	0.1517	1.0024
M4	0.0747	0.0398	0.0349	1.5429	0.0662 *	0.5882	1.0290	0.1517	1.0336
M5	0.1010	0.0509	0.0501	1.8768	0.0347 **	0.6471	1.7150	0.0432 **	1.0477
M6	0.0821	0.0354	0.0467	1.5776	0.0621 *	0.5882	1.0290	0.1517	1.0451
M7	0.0574	0.0376	0.0198	0.7543	0.2280	0.5882	1.0290	0.1517	1.0191
M8	0.0886	0.0609	0.0277	0.8638	0.1970	0.6176	1.3720	0.0850 *	1.0261
M9	0.0940	0.0694	0.0246	0.6932	0.2465	0.5588	0.6860	0.2464	1.0230
M10	0.1301	0.0903	0.0397	0.9656	0.1706	0.5882	1.0290	0.1517	1.0365
M11	0.1497	0.1026	0.0471	0.9937	0.1638	0.6471	1.7150	0.0432 **	1.0427
M12	0.2004	0.1293	0.0711	1.6201	0.0574 *	0.7059	2.4010	0.0082 **	1.0630
M13	0.2408	0.1567	0.0840	2.0879	0.0224 **	0.7273	2.6112	0.0045 **	1.0727
M14	0.2785	0.1815	0.0970	2.4784	0.0093 **	0.7576	2.9593	0.0015 **	1.0821
M15	0.2942	0.1852	0.1090	2.8080	0.0042 **	0.7273	2.6112	0.0045 **	1.0920
M16	0.3264	0.1912	0.1352	3.1670	0.0017 **	0.7273	2.6112	0.0045 **	1.1135
M17	0.3366	0.2008	0.1357	3.2708	0.0013 **	0.7273	2.6112	0.0045 **	1.1130
M18	0.3351	0.2039	0.1312	2.9995	0.0026 **	0.7273	2.6112	0.0045 **	1.1089
M19	0.3436	0.2034	0.1403	2.9157	0.0032 **	0.6667	1.9149	0.0278 **	1.1166
M20	0.4099	0.2423	0.1676	2.8621	0.0037 **	0.6970	2.2630	0.0118 **	1.1349
M21	0.4226	0.2667	0.1559	2.4855	0.0092 **	0.6970	2.2630	0.0118 **	1.1231
M22	0.4125	0.2610	0.1515	2.3119	0.0137 **	0.6667	1.9149	0.0278 **	1.1202
M23	0.4159	0.2640	0.1519	2.2537	0.0156 **	0.6970	2.2630	0.0118 **	1.1202
M24	0.4170	0.2889	0.1281	1.6606	0.0533 *	0.6061	1.2185	0.1115	1.0994
M25	0.4972	0.3148	0.1823	2.0648	0.0242 **	0.6552	1.6713	0.0473 **	1.1387
M26	0.5405	0.3452	0.1953	2.0906	0.0229 **	0.6552	1.6713	0.0473 **	1.1452
M27	0.5177	0.3178	0.1999	2.3615	0.0127 **	0.7241	2.4140	0.0079 **	1.1517
M28	0.4595	0.3167	0.1428	1.9444	0.0310 **	0.7241	2.4140	0.0079 **	1.1085
M29	0.4769	0.3468	0.1301	1.8153	0.0401 **	0.6552	1.6713	0.0473 **	1.0966
M30	0.4733	0.3412	0.1321	1.7323	0.0471 **	0.6897	2.0426	0.0205 **	1.0985
M31	0.4922	0.3248	0.1674	1.9972	0.0278 **	0.6897	2.0426	0.0205 **	1.1264
M32	0.5294	0.3592	0.1702	2.0278	0.0261 **	0.6552	1.6713	0.0473 **	1.1252
M33	0.5759	0.4090	0.1669	1.8826	0.0351 **	0.6552	1.6713	0.0473 **	1.1185
M34	0.5522	0.3831	0.1691	1.7962	0.0416 **	0.6207	1.2999	0.0968 *	1.1223
M35	0.6070	0.3965	0.2105	2.0683	0.0240 **	0.6897	2.0426	0.0205 **	1.1507
M36	0.6186	0.4140	0.2047	1.8287	0.0391 **	0.6552	1.6713	0.0473 **	1.1448

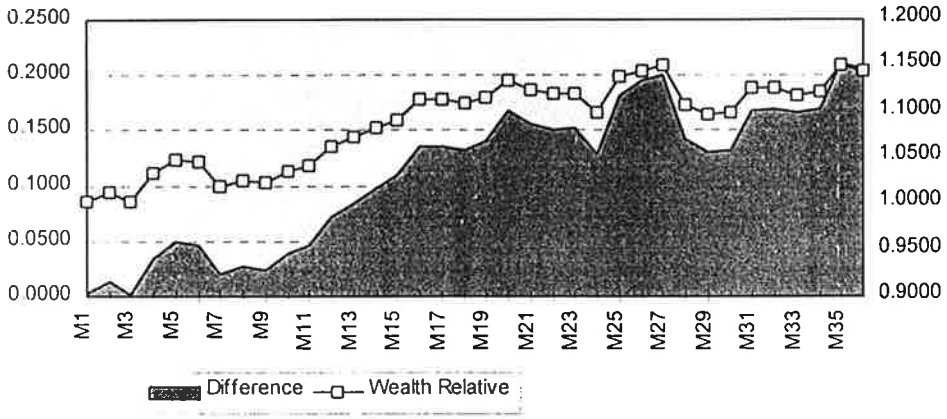
*Significant at the 10% level

**Significant at the 5% level

Figure 8.5. plots the returns for the ABCT firms and the FTSE index. It also shows the difference and the wealth relative. The widening gap in the latter part of the study period is clearly evident. It confirms that the superior performance of the ABCT firms is not sensitive to the data set or benchmark used and adds to the robustness of the overall results.

Figure 8.5. Post-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/FTSE - Net Total Assets





8.3.3. Pre-Adoption Performance

Consistent with the other data sets and as the final test of the robustness of the results, the pre-adoption performance of the net total assets data set was reviewed in order to test for the over-reaction/under-reaction phenomena. The raw returns are documented in Table 8.8. and the average holding period results in Table 8.9. Figure 8.6. plots these results. They show how the ABCT firms slightly underperformed the non-ABCT firms over the two year

pre-adoption period. The difference was not economically or statistically significant. Consequently, one can rule out the over-reaction/under-reaction phenomena as a possible cause of the subsequent post-adoption superior performance of the ABCT firms. This result, whilst different in profile, is consistent with the findings reported for the two other data sets. It contributes to the integrity of the overall findings in this study.

Table 8.8. Pre-Adoption:
Monthly Average Returns (AR)
ABCT/nonABCT - Net Total Assets

	Average Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0140	0.0264	-0.0124	-0.6717	0.7465	0.4839	-0.1796	0.5713	0.9880
M2	0.0377	0.0316	0.0061	0.2856	0.3886	0.5484	0.5388	0.2950	1.0059
M3	-0.0038	0.0038	-0.0075	-0.5029	0.6907	0.4516	-0.5388	0.7050	0.9925
M4	-0.0037	0.0297	-0.0334	-1.3501	0.9065	0.4194	-0.8980	0.8154	0.9676
M5	0.0217	0.0408	-0.0190	-0.9718	0.8305	0.4516	-0.5388	0.7050	0.9817
M6	0.0046	-0.0032	0.0078	0.4968	0.3115	0.5484	0.5388	0.2950	1.0078
M7	0.0142	-0.0133	0.0275	1.7159	0.0482 **	0.5484	0.5388	0.2950	1.0279
M8	-0.0202	-0.0213	0.0011	0.0841	0.4668	0.4194	-0.8980	0.8154	1.0011
M9	0.0039	0.0219	-0.0180	-1.0887	0.8575	0.4516	-0.5388	0.7050	0.9824
M10	0.0133	0.0165	-0.0032	-0.1528	0.5602	0.5161	0.1796	0.4287	0.9969
M11	-0.0025	-0.0172	0.0147	0.8939	0.1893	0.6129	1.2572	0.1043	1.0150
M12	0.0232	0.0342	-0.0110	-0.5193	0.6963	0.4516	-0.5388	0.7050	0.9894
M13	0.0248	0.0561	-0.0312	-1.4228	0.9174	0.4194	-0.8980	0.8154	0.9704
M14	0.0441	0.0624	-0.0183	-1.2416	0.8880	0.4516	-0.5388	0.7050	0.9828
M15	0.0207	0.0378	-0.0170	-0.6653	0.7445	0.4194	-0.8980	0.8154	0.9836
M16	-0.0110	-0.0037	-0.0072	-0.4224	0.6621	0.5484	0.5388	0.2950	0.9927
M17	0.0207	0.0203	0.0005	0.0262	0.4896	0.4516	-0.5388	0.7050	1.0005
M18	0.0102	-0.0095	0.0197	1.5953	0.0606 *	0.5806	0.8980	0.1846	1.0199
M19	-0.0203	-0.0366	0.0163	1.0271	0.1563	0.5161	0.1796	0.4287	1.0169
M20	0.0053	0.0113	-0.0060	-0.2785	0.6087	0.5484	0.5388	0.2950	0.9941
M21	0.0289	0.0288	0.0000	0.0017	0.4993	0.5161	0.1796	0.4287	1.0000
M22	-0.0031	0.0178	-0.0209	-0.9420	0.8232	0.4194	-0.8980	0.8154	0.9795
M23	-0.0087	-0.0174	0.0087	0.6884	0.2482	0.4839	-0.1796	0.5713	1.0088
M24	-0.0007	-0.0317	0.0311	1.5090	0.0709 *	0.5806	0.8980	0.1846	1.0321

*Significant at the 10% level

**Significant at the 5% level

Table 8.9. Pre-Adoption:

Monthly Average Holding Period Returns (AHPR)

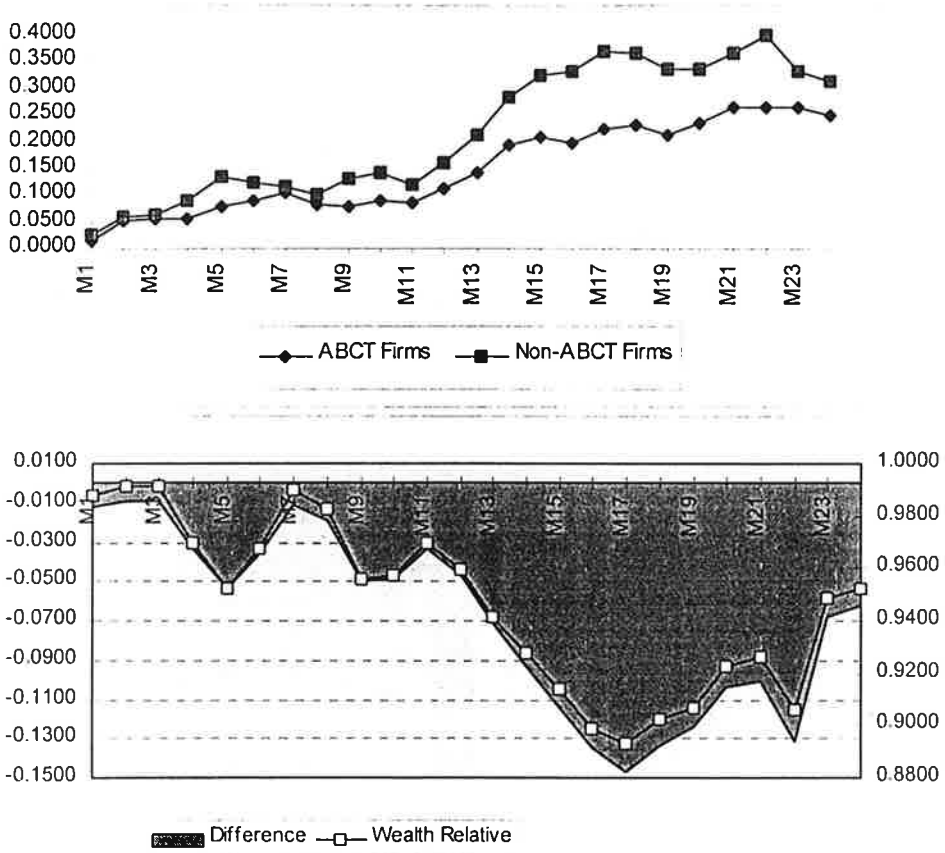
ABCT/nonABCT - Net Total Assets

	Average Holding Period Returns			Paired t-Test		Sign Test			
Month	ABCT Firms	Non-ABCT Firms	Diff.	t-Value	t-Prob.	Prop.	Z Value	Prob. of Z	Wealth Relative
M1	0.0140	0.0264	-0.0124	-0.6717	0.7465	0.4839	-0.1796	0.5713	0.9880
M2	0.0517	0.0607	-0.0089	-0.2928	0.6141	0.5161	0.1796	0.4287	0.9916
M3	0.0553	0.0645	-0.0092	-0.2751	0.6074	0.5161	0.1796	0.4287	0.9913
M4	0.0577	0.0911	-0.0334	-0.8657	0.8032	0.4194	-0.8980	0.8154	0.9694
M5	0.0801	0.1341	-0.0539	-1.2699	0.8931	0.3871	-1.2572	0.8957	0.9524
M6	0.0883	0.1249	-0.0366	-0.8288	0.7931	0.4194	-0.8980	0.8154	0.9675
M7	0.1044	0.1156	-0.0111	-0.2302	0.5903	0.5161	0.1796	0.4287	0.9900
M8	0.0808	0.0998	-0.0190	-0.3329	0.6292	0.5484	0.5388	0.2950	0.9827
M9	0.0798	0.1294	-0.0496	-0.7846	0.7806	0.4839	-0.1796	0.5713	0.9561
M10	0.0915	0.1404	-0.0489	-0.7115	0.7589	0.5161	0.1796	0.4287	0.9571
M11	0.0864	0.1202	-0.0338	-0.5084	0.6926	0.5484	0.5388	0.2950	0.9698
M12	0.1125	0.1596	-0.0470	-0.6318	0.7339	0.4839	-0.1796	0.5713	0.9594
M13	0.1435	0.2143	-0.0708	-0.8955	0.8112	0.4516	-0.5388	0.7050	0.9417
M14	0.1931	0.2859	-0.0927	-1.0567	0.8505	0.4194	-0.8980	0.8154	0.9279
M15	0.2104	0.3248	-0.1144	-1.1628	0.8730	0.4516	-0.5388	0.7050	0.9136
M16	0.1977	0.3322	-0.1345	-1.2898	0.8965	0.4516	-0.5388	0.7050	0.8990
M17	0.2243	0.3712	-0.1469	-1.2140	0.8829	0.4839	-0.1796	0.5713	0.8928
M18	0.2334	0.3672	-0.1338	-1.0040	0.8383	0.5484	0.5388	0.2950	0.9021
M19	0.2127	0.3369	-0.1242	-0.8541	0.8001	0.6129	1.2572	0.1043	0.9071
M20	0.2344	0.3381	-0.1037	-0.7360	0.7663	0.6129	1.2572	0.1043	0.9225
M21	0.2669	0.3679	-0.1010	-0.7055	0.7570	0.5806	0.8980	0.1846	0.9262
M22	0.2670	0.3986	-0.1316	-0.8034	0.7860	0.6129	1.2572	0.1043	0.9059
M23	0.2655	0.3337	-0.0681	-0.5354	0.7018	0.5161	0.1796	0.4287	0.9489
M24	0.2522	0.3145	-0.0623	-0.4413	0.6689	0.5161	0.1796	0.4287	0.9526

*Significant at the 10% level

**Significant at the 5% level

Figure 8.6. Pre-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/nonABCT - Net Total Assets



8.4. Conclusions

The empirical results are summarised in Table 8.10. for the net total assets data set of firms. The data is drawn from earlier tables in this chapter and categorised under the two main headings of stock market and accounting based measures of performance.

In reviewing Table 8.10., under market based measures, the ABCT firms outperformed the non-ABCT firms by 29.03% and the FTSE all share index by 20.46%. Wealth relatives at 22% and 14%, respectively, highlight the magnitude of these statistically significant results. It is also worth noting that the results of the cumulative average returns method, though conceptually flawed (Barber and Lyon, 1996), are consistent with the market based results, as reported in Table 8.10.

The pre-adoption performance of the matched firms was assessed using the average holding period returns method. The results indicate that the over-reaction phenomena was not the cause of the subsequent post-adoption superior performance of the ABCT firms. This is due to the finding that no significant difference existed between the matched set of firms in the two year period prior to the introduction of the ABCTs.

Table 8.10. Empirical Results: - Net Total Assets

Measures of Performance	ABCT Firms Mean	Non-ABCT Firms Mean	Diff.	Prop. of ABCT Firms > non-ABCT Firms	Wealth Relative
Market Based					
Post-Adoption					
3 Year AHPR					
ABCT v non-ABCT	61.86%	32.83%	29.03% **	.6207 *	1.22
ABCT v FTSE	61.86%	41.40%	20.46% **	.6552 **	1.14
Pre-Adoption					
2 Year AHPR					
ABCT v non-ABCT	25.22%	31.45%	-6.23%	.5161	0.95
Accounting Based					
3 Year AR					
Return on S`Holders Equity	16.52%	15.94%	0.58%	.5775 *	1.01
Operating Profit Margin %	13.26%	10.93%	2.33% **	.5915 *	1.02
Pre-Tax Profit Margin %	12.08%	10.26%	1.82% *	.6197 **	1.02
Turnover/Fixed Assets	3.44	5.32	-1.88	.4789	0.70
Capital Gearing %	37.03%	31.16%	5.87% **	.6620 **	1.04
Quick Assets Ratio	0.9655	0.9410	0.0245	.5070	1.01
Creditors Ratio (Days)	104.66	85.93	18.73 **	.6761 **	1.22
Cash Earnings per Share	47.08	33.34	13.74 **	.6056 **	1.40

**Significant at the 5% level

*Significant at the 10% level

The accounting measures of performance confirm the superior performance of the ABCT net assets data set of firms. This is evidenced by the statistically significant results for the key ratios, namely: return on shareholders equity and operating profit margin %. Additional support is forthcoming from the pre-tax profit margin % result. The bias in favour of profitability as the driving force behind the superior performance of the ABCT firms is confirmed by the result of the turnover/assets employed ratio. The propensity for higher gearing by the ABCT firms is consistent with prior results. The superior liquidity position of the ABCT firms is highlighted in working capital terms with the unique contribution made by creditors again

evident. Also worth noting is the statistically significant cash earnings per share result in favour of the ABCT firms.

In conclusion, Table 8.10. documents support for a positive causal link between the introduction of the ABCTs and firm performance. It confirms the findings in regard to the market capitalisation and market-to-book data sets. It reports the outperformance of the ABCT firms under a range of measures and against different benchmarks. These results are both economically and statistically significant. The robustness of the results addresses some possible concerns. This is further evidence of the capability of the ABCTs to add value beyond their cost, as reflected in both market and accounting based terms.

CHAPTER 9

9. DISCUSSION and RECOMMENDATIONS

9.1. Introduction

The previous chapters have detailed the theory, methodology and analysis of the empirical research data. This concluding chapter presents a summary of the major research findings. It continues with a discussion of the contribution this study makes to the development of the ABC concept and its implications for the development of management accounting practice. The limitations are then summarised before concluding with recommendations as to future research in this area.

9.2. Major Research Findings

This study set out with the objective of adding a new dimension to the testing of ABC as a framework for the design and management of costing systems. It endeavoured to achieve that objective by empirically examining the association between firm performance and the introduction of ABCTs. A positivist quasi -experimental research model was adopted. In addition, descriptive data was gathered about the nature of the ABC process and added a qualitative dimension to the study. The theoretical argument underpinning the efficient market hypothesis was used as the basis for assessing long-run firm performance. A model of the relationship between the ABCTs and market value was developed from the shareholder value analysis concept. This model included an explicit statement of the key attributes or characteristics of the ABCTs.

The major research findings of this study are a combination of the analysis of the descriptive data and the empirical findings. The descriptive data results are summarised as follows:

A 95% survey response rate was achieved primarily as a result of the comprehensive telephone follow up process and gave strong credibility to the results generated therefrom.

- 24% of the firms surveyed have a specific policy not to respond to surveys because of the time consuming nature of the process.

- An adoption rate for the ABCTs of 20% of respondents was found. This reflected the maturing nature of the concepts and their application following on the high growth period between 1992 and 1994.

- It was found that no firm has abandoned the ABCTs to date. This was anticipated given the age of the concept and the degree of investigation and investment required prior to the decision to implement.

- Expert consultants, in-house accountants and systems personnel were confirmed as the dominant players in both the design and implementation stages of the ABCT process. Production and, to a lesser extent, marketing personnel were involved primarily at the implementation stage.

- Cost modelling, performance measurement and cost management issues were identified as the main purposes for which the ABCTs were introduced. These continue to be the main purposes underpinning the ABCTs and reflect a more broadly based process rather than cost view.

- The ABCTs are used primarily as a parallel costing system and are only adopted as the firm's main costing system by 15% of the ABCT firms.

- A substantial majority (62%) of the ABCT firms considered the introduction of the techniques to have been fairly successful.

- A majority (55%) of the ABCT firms experienced unexpected outcomes from the introduction of the ABCTs. These were described as follows; "different product costs than expected; the degree of complexity experienced; the interest shown by non-

financial staff and the ABCTs facilitate a greater understanding of business activity".

- Respondents had the opportunity to record any comments they thought fit about the subject matter under review. Those worth noting were as follows; "it was not necessary to implement the ABCTs in full in order to gain clear benefit; the importance of high level management support; the need for major change as part of the implementation process and the need for good software support".

- The number of firms currently considering the adoption of the ABCTs at 5% was a significant reduction from previous surveys and confirms the maturing nature of the process.

The market based empirical findings for the three matched data sets are summarised in Table 9.1. with the accounting based findings documented in Table 9.2. The market based findings report the stock return difference in performance between the ABCT firms and both their matched counterparts and the FTSE all share index. This difference calculated using the well specified average holding period return method. The pre-adoption performance of the matched firms was also computed as part of the robustness testing process. Statistically significant outcomes are also shown.

The primary analysis of the results was undertaken on the market capitalisation data set. This was due to the high quality of the matching result achieved under that criteria. The results of the market-to-book and net total assets data sets are used in a secondary and robustness testing context. It is worth noting here that the results of the market-to-book matching process were less than satisfactory and, therefore, carry less weight in terms of the overall conclusions reached. However, because of the consistency of the results across all data sets, this aspect does not merit serious consideration.

The three year post-adoption market based results in Table 9.1. clearly indicate the outperformance of the ABCT firms, when compared with their matched counterparts. The three data sets document economically positive results in favour of the ABCT firms,

ranging from 19.83% to 29.03%. These results are statistically significant at conventional levels. A wealth relative ranging from 14% to 22% highlights the magnitude of the difference over the three year period studied.

Table 9.1. Post and Pre-Adoption Empirical Results: Market Based Measures of Performance

Description	ABCT Firms Mean	Non-ABCT Firms Mean	Diff.		Prop. of ABCT Firms > non-ABCT Firms		Wealth Relative
Post-Adoption							
ABCT v non-ABCT							
3 Year AHPR							
- Market Capitalisation	61.24%	41.41%	19.83%	*	.6316	*	1.14
- Market-to-Book	58.66%	36.02%	22.64%	**	.5455		1.17
- Net Total Assets	61.86%	32.83%	29.03%	**	.6207	*	1.22
ABCT v FTSE							
3 Year AHPR							
- Market Capitalisation	61.24%	42.05%	19.19%	**	.6053	*	1.14
- Market-to-Book	58.66%	40.46%	18.20%	**	.6364	*	1.13
- Net Total Assets	61.86%	41.40%	20.46%	**	.6552	**	1.14
Pre-Adoption							
ABCT v non-ABCT							
2 Year AHPR							
- Market Capitalisation	36.20%	30.05%	6.15%		.4750		1.05
- Market-to-Book	29.82%	34.33%	-4.51%		.5556		0.97
- Net Total Assets	25.22%	31.45%	-6.23%		.5161		0.95

*Significant at the 10% level

**Significant at the 5% level

Figures 9.1., 9.2. and 9.3. present a strong visual impact of the three year post-adoption performance of the three matched data sets. They highlight the magnitude of the positive difference in favour of the ABCT firms and its profile over the 36 months. Not surprisingly, the largest positive abnormal returns are observed in the last 12 months of the study period under review in each case. This suggests that the upper bound to the post-implementation performance of the ABCTs may not have been reached by the end of the study period. It is clear evidence of a "lag" effect in how the benefits accrue to the firm following on the adoption of the ABCTs.

Figure 9.1. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/nonABCT - Market Capitalisation

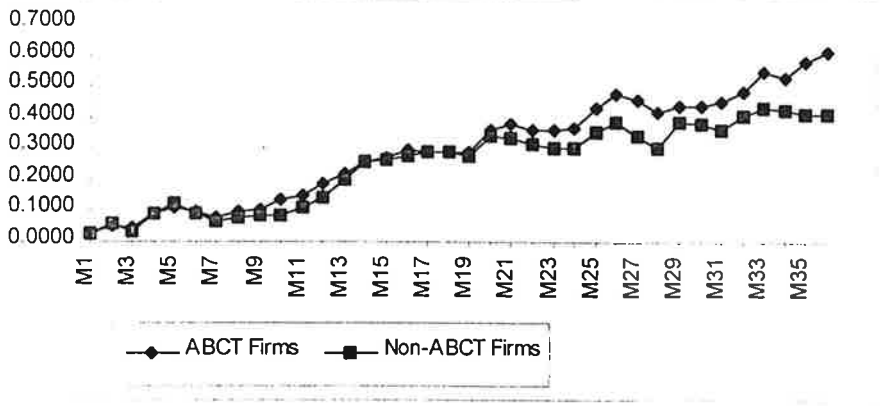


Figure 9.2. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/nonABCT - Market-to-Book

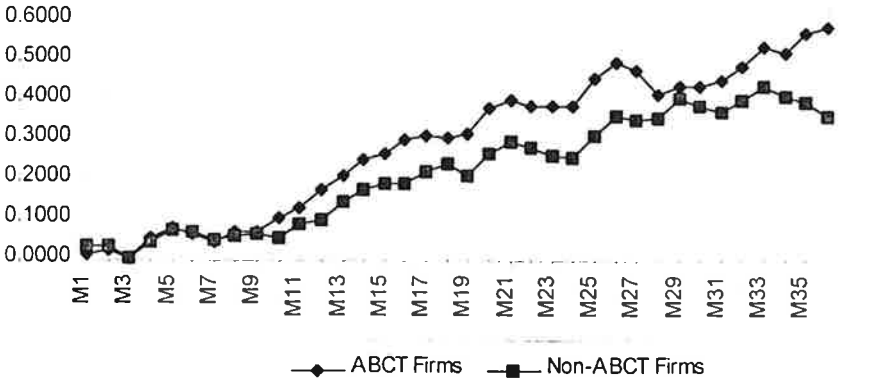
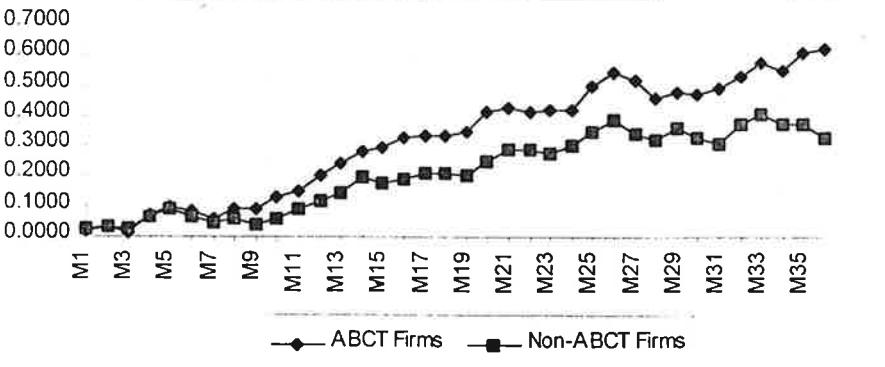


Figure 9.3. Post-Adoption:

Monthly Average Holding Period Returns (AHPR)

ABCT/nonABCT - Net Total Assets



The post-adoption market based results, using the average holding period return method, are remarkably robust across all three data sets. This was also found to be the case irrespective of benchmark or computation method used. In addition to the matched firms comparison, a reference portfolio of firms was used to assess performance. This is documented by the comparison of the post-adoption performance of the ABCT firms with the FTSE all share index. In this case the ABCT firms economically outperformed the FTSE all share index by, on average, 19% in the three year period studied. This result is statistically significant at the 5% level and remarkably robust across all three data sets. A wealth relative of 14%, on average, was also recorded. Figures 9.4., 9.5. and 9.6. depict these results graphically for each data set. They highlight both the magnitude of the difference and its profile over the 36 months. The pattern is surprisingly consistent with the matched firm results. Worth noting is the consistency of the largest positive abnormal returns in the last 12 months of the study period under review.

The results of the widely used, but potentially biased, monthly cumulative average return method are not shown in Table 9.1. However, for the sake of completeness and comparability, they are documented for the three data sets in Chapters 6, 7 and 8 respectively. They confirm the magnitude and significance of the post-adoption superior performance of the ABCT firms, as reported under the average holding period return method in Table 9.1. They also exhibit the same profile in placing the largest positive abnormal returns in the last 12 months of the study period under review.

A review of the pre-adoption performance of the matched firms found that, in the two years prior to the introduction of the ABCTs, the performance of the ABCT firms was not significantly different from their matched counterparts. The small variation in the results, across the three data sets, does not alter this finding. A wealth relative range of 0.95 to 1.05 was not deemed to be economically or statistically significant. This allows one to eliminate the possibility that the market over-reaction/under-reaction phenomena could be an explanation for the superior post-adoption performance of the ABCT firms. Therefore, the superior performance can be more directly attributed to the quality of the information and decision-making characteristics inherent in the ABCTs.

Figure 9.4. Post-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/FTSE - Market Capitalisation

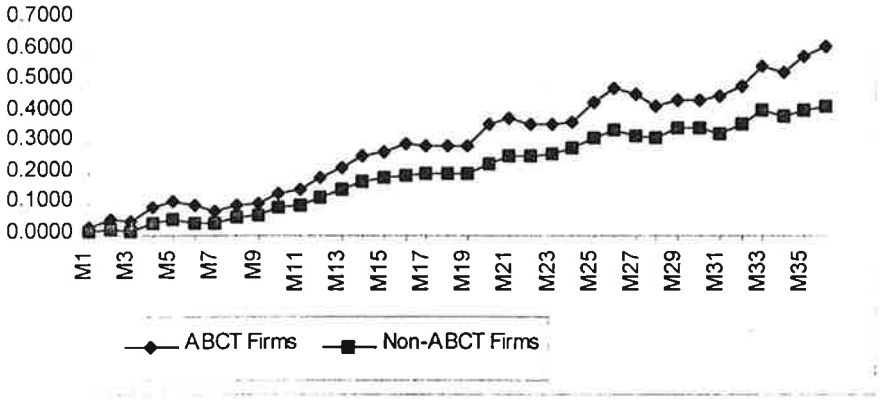


Figure 9.5. Post-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/FTSE - Market-to-Book

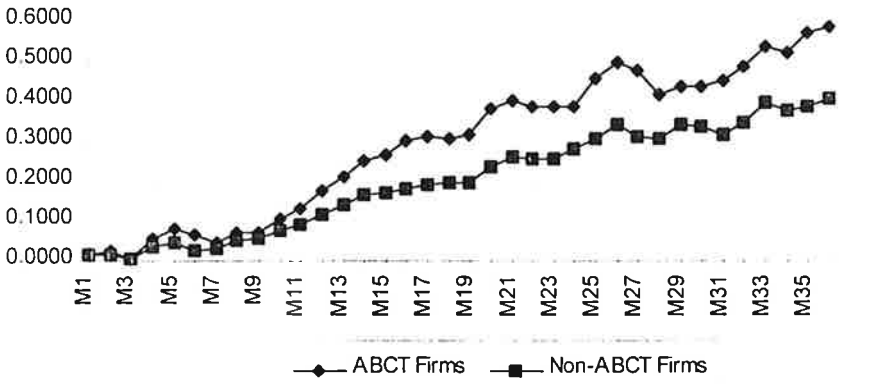
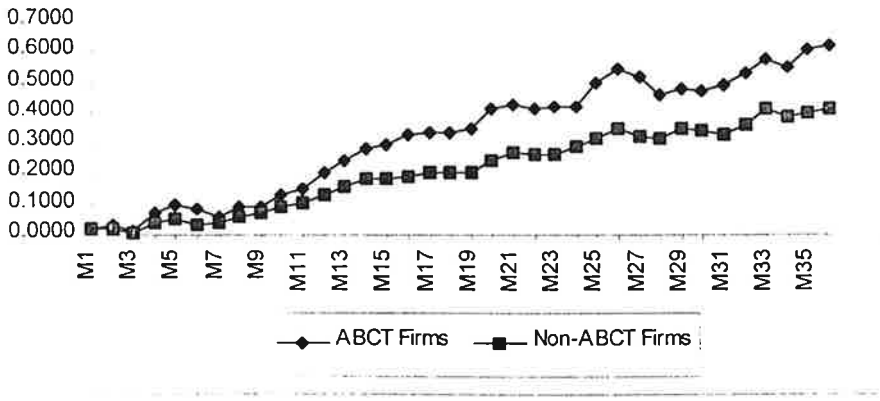


Figure 9.6. Post-Adoption:
Monthly Average Holding Period Returns (AHPR)
ABCT/FTSE - Net Total Assets



A review of the accounting based measures of performance, in Table 9.2., confirms the superior performance of the ABCT firms. This superior performance is statistically significant for the key return on shareholders equity and profit margin ratios. As with the market based results, these accounting based results are remarkably consistent for the three data sets. The focus on profitability, rather than investment turnover, is worth noting as the driving force behind the superior performance of the ABCT firms in all cases. This suggests that the attention-directing and control characteristics of the ABCTs, as set out in Figure 1.3., are the driving force behind the superior performance of the ABCT firms. It is, therefore, reasonable to posit the view that the ABCTs applied from a process perspective, as depicted in Figure 1.2. and in an organic, flexible and task oriented management accounting environment, will give rise to a clear measurable benefit to the shareholder. Of additional interest to the shareholder is the consistency and significance of the high cash quality of the earnings underpinning the return of the ABCT firms *vis-a-vie* the non-ABCT firms.

As regards capital gearing, the ABCT firms report a consistent gearing profile across the three data sets. This was to be expected given the common set of firms used to compile each ABCT data set. The picture is much different when one looks at the non-ABCT firms. There is no obvious explanation for the wide variations reported. It could be suggested, in regard to the market capitalisation data set, that as the balance sheet value of the non-ABCT firms was somewhat lower than their ABCT counterparts, lending institutions would be less favourably disposed. The same general theme could explain the variation in the market-to-book data set. In this case the non-ABCT firms exhibit significantly lower market valuations and balance sheet values. By extension the somewhat lower market valuation of the non-ABCT firms is suggested in the case of the net total assets data set. Whatever the reason, the significantly higher debt structure exhibited by the ABCT firms, whilst not generating any increase in turnover, did not impinge in a negative way on their cost structure. On the contrary, it could be interpreted to mean that the shareholders could rely on others to provide more cost effective sources of finance to generate the superior overall return on their investment. The ability of the ABCT firms to finance their working

capital needs to a significant extent by creditors is a complementary factor in this equation.

Table 9.2. Post-Adoption Empirical Results: Accounting Based Measures of Performance

Description	ABCT Firms Mean	Non-ABCT Firms Mean	Diff.		Prop. of ABCT Firms > non-ABCT Firms		Wealth Relative
ABCT v non-ABCT							
3 Year AR							
Return on S`Holders Equity							
- Market Capitalisation	14.95%	12.62%	2.33%		.6420	**	1.02
- Market-to-Book	16.46%	13.99%	2.47%		.6184	**	1.02
- Net Total Assets	16.52%	15.94%	0.58%		.5775	*	1.01
Operating Profit Margin %							
- Market Capitalisation	11.73%	10.29%	1.44%	*	.5556		1.01
- Market-to-Book	13.63%	11.10%	2.53%	**	.5526		1.02
- Net Total Assets	13.26%	10.93%	2.33%	**	.5915	*	1.02
Pre-Tax Profit Margin %							
- Market Capitalisation	10.26%	9.46%	0.80%		.5802	*	1.01
- Market-to-Book	12.37%	10.21%	2.16%	**	.5395		1.02
- Net Total Assets	12.08%	10.26%	1.82%	*	.6197	**	1.02
Turnover/Fixed Assets							
- Market Capitalisation	2.99	3.57	-0.58		.4444		0.87
- Market-to-Book	3.27	4.43	-1.16		.4211		0.79
- Net Total Assets	3.44	5.32	-1.88		.4769		0.70
Capital Gearing %							
- Market Capitalisation	38.43%	20.95%	17.48%		.6914	**	1.14
- Market-to-Book	36.36%	30.69%	5.67%	**	.6053	**	1.04
- Net Total Assets	37.03%	31.16%	5.87%	**	.6620	**	1.04
Quick Assets Ratio							
- Market Capitalisation	0.9937	0.9414	0.0523		.5185		1.03
- Market-to-Book	0.9605	0.9376	0.0229		.5526		1.01
- Net Total Assets	0.9655	0.9410	0.0245		.5070		1.01
Creditors Ratio (Days)							
- Market Capitalisation	102.58	94.13	8.45	*	.5432		1.09
- Market-to-Book	105.60	81.92	23.68	**	.6711	**	1.29
- Net Total Assets	104.66	85.93	18.73	**	.6761	**	1.22
Cash Earnings per Share							
- Market Capitalisation	44.72	32.06	12.66	**	.5062	**	1.38
- Market-to-Book	47.15	34.39	12.76	**	.6053	**	1.36
- Net Total Assets	47.08	33.34	13.74	**	.6056	**	1.40

*Significant at the 10% level

**Significant at the 5% level

In conclusion, therefore, the findings are that a clear and measurable benefit exists for those firms that decide to adopt the ABCTs. This benefit is measured in both market and accounting based terms. It is based on the reported differences in the performance of the ABCT firms when compared to non-ABCT firms and a market portfolio of firms. It is interpreted to mean that there is a strong causal link between the introduction of the ABCTs and firm performance.

The empirical results are found to be economically and statistically significant. They are remarkably robust. This is based on the consistency, magnitude and pattern of differences reported against the benchmarks used and when measured in a variety of ways. Consequently we reject the null hypothesis H_o as stated, namely: *the adoption of ABCTs does **not** significantly improve a firm's relative performance* and accept the alternative H_a: *the adoption of the ABCTs does **significantly improve** a firm's relative performance.*

This conclusion suggests that the ABCTs contribute in a meaningful way to the overall performance of the firm as reflected in both accounting and market based terms. Given that the conceptual literature suggests that the use of ABC information causes managers to make better decisions, the adoption and implementation of the ABCTs may be the driving force behind the superior performance of the ABCT firms. The evidence in this study is consistent with the view that the impact is likely to be slow at the outset, to take time to mature and, therefore, must be viewed in the long term.

The results suggest that the sophisticated ABCTs, as categorised in this study and framed in the context of a new economic citizenship, have the potential and capability to add significant value beyond their cost to the firms that choose to adopt them. In effect the ABCTs offer a "new technology", a new way of thinking with the potential to offer new insights into how to better manage the organisation. Finally, the process should be seen as "evolutionary" in that it should complement the firms` existing and evolving work practices rather than replace them.

9.3. Contribution/Implications of the Research

The results of this study have implications for both the theoretical development of the concepts and practising managers. In addition, they update the findings of previous surveys in regard to adoption rates and the associated characteristics.

As regards theoretical development, it is believed that this is the first study to provide evidence of a causal link between the introduction of the ABCTs and firm performance. Therefore, it contributes to the theoretical development of the ABC concept and its framework in support of the Cooper and Kaplan (1992) view that "the goal of ABC is to increase profits, not to obtain more accurate product costs". It offers a clear response to the Bromwich and Bhimani (1989) view that "there is no real evidence that ...profitability can be increased if this new technique is used in firms". In addition, it addresses the Innes and Mitchell (1990a) view that "there is no evidence to date that ABC improves corporate profitability".

In subjecting the ABC process to rigorous academic analysis, this study presents a contextual framework as the basis for synthesising the key attributes of the ABCTs. It, therefore, contributes to the "evolutionary" versus "revolutionary" debate in support of the Bromwich and Bhimani (1994) view that "current evidence and experience suggest that those who urged the use of ABC as a revolutionary approach to accounting...have not yet provided a sufficiently strong case or the necessary empirical evidence to convince practitioners".

The implications of this study for practising managers are that the ABCTs can contribute to the improved performance of the firm. Consequently, serious consideration should be given to the adoption of the techniques, in part or in total, as they have the potential to provide quality, meaningful and insightful information for decision-making. This is a fundamental pre-requisite for any organisation operating in a complex, competitive and highly flexible environment. In addition, as the process facilitates the decentering of accounting knowledge and expertise, greater commercial and technological awareness should be created throughout the organisation and be

reflected in improved overall performance as measured in market and/or accounting terms.

Further, practising managers who decide to adopt the techniques in the future should reflect on the experience of previous adopters as reported in this study. These include:

(i) the need to involve all functional aspects of the organisation in both the design and implementation stages;
(ii) the importance of not under-estimating the size and complexity of the task ahead;
(iii) the need to ensure high level management support;
(iv) the critical importance of good software support and,
(v) the value of introducing as a parallel costing system, at least at the outset.

Finally, the study confirms that as the ABCTs are by definition sophisticated, their introduction requires careful planning and involves major change across the organisation as part of the implementation process.

9.4. Limitations of the Study

Although the study controlled for risk, size and industry effects, there are several other factors which may vitiate the improvement of firm performance after a switch from traditional volume based systems to sophisticated ABCTs. These factors may have affected the analysis and as such represent limitations.

1. The matched firm sample sizes of 43, 38 and 34 limits the power of the statistical tests. This is however offset, in part by the robustness tests carried out and the decision to use both market and accounting based measures of performance.

2. Given the complex and all embracing nature of the ABCM process, it is reasonable to suggest that a longer assessment time frame than three years could be used. This is borne out by the pattern of results reported in the last year of the study period. As the adoption of the ABCTs was concentrated in the period 1992 to

1994, it was not possible to extend the review period beyond three years in this study. However the passage of time will allow this issue to be easily addressed by updating the present study on an annual basis to cover a five year period in due course.

3. Given the great variety in the way that firms have implemented the ABC process (Friedman and Lyne, 1995), the in-ability of the research instrument to classify the degree of implementation by the ABCTs firms could be seen as a potential measurement error. This aspect was noted in the hypothesis generation stage and led to the use of the term "techniques" as a compromise. An analysis of the questionnaire responses leads to the conclusion that a different research methodology, namely a longitudinal case study, maybe the best way possible to deal with this concern. It would also add a strong qualitative dimension to the results of this study and augment the high profile anecdotal situations documented to date.

4. Finally as this study could not realistically control for all potential extraneous variables, there is the possibility that the results might be explained by another phenomenon or model of firm performance. In this regard, case study research by Innes and Mitchell (1990b) has shown that substantial organisational restructuring was required as a basis for the introduction of ABC and/or ABCM. Although there is no reason to assume such an occurrence was a defining causal factor in determining the results of this study, the conclusions should be interpreted with the usual care and in the context of the methodology pursued.

9.5. Recommendations for Future Research

Given the limitations noted above, there are a number of recommendations worth noting. These include the question of size, the assessment period and measurement error. In addition, the results of this study give rise to a number of related questions such as the implementation process and the impact the ABC process has on the role of the management accountant.

The question of size can be viewed under two headings, namely sampling size and firm size. In order to address the sampling size question, the obvious avenue would be to replicate this study in a different environment and a larger population such as the USA. It would be comparable in all other respects. As regards firm size, this study in common with previous surveys, based its results on large firms. Therefore, the assertion by Parker and Lettes (1991) that "a scale factor limits the complexity that small companies can handle and may prevent them from using similar systems" is worth investigating. This suggests that the ABC process is only viable in large firms, where the expertise and resources are available to design and implement a complex system. Consequently, the replication of this study with a population of smaller firms and possibly using different performance metrics would be worthwhile.

The assessment period limitation could be overcome by updating the current database on an annual basis to achieve five year returns in the case of all the matched firms. It could also endeavour to address the size limitation by adding new ABCT adopting firms as they became known. This process of information filtering or preliminary analysis, as used by Haka, Gordon and Pinches (1985), would draw on sources such as research studies and journals, ABC specialist software suppliers, professional and academic contacts, and specialist management consultancy firms.

As regards measurement error, the questionnaire instrument could be refined to address this issue with the now known ABCT adopters. This would require a different and more intense involvement than that required for this study from the 47 ABCT firms and maybe difficult to achieve. Consequently, an alternative approach by way of a small number of longitudinal case studies maybe worth considering.

Even though the implementation process touches on both the size and measurement questions, it deserves mention in its own right. This is due to the findings by Friedman and Lyne (1995) that "there is no one best way to implement activity-based techniques, that companies benefit best from a gradual approach to implementation and that the timing of their introduction was important". Cobb, Innes and Mitchell (1992) contribute to this question when they summarise

the implementation problems in terms of "the great deal of resources required, accurate data collection (especially gathering data on cost drivers), coping with the fact that activities cross existing departmental boundaries and areas of responsibility, the fact that other changes were given a higher priority within the organisation and the heavy demands made by ABC design and implementation on the accountants' time". Therefore there is a need to develop a general operational model of how to implement the process and test its resultant impact on firm performance.

Finally, the results of this study have obvious implications for the nature of the management accounting role and the way management information is presented. It contributes to the view that the discipline needs to respond to the challenges posed by the springing up of "pseudo" accountants and the decentering of accounting knowledge and expertise. The question is one of whether the ABC process is a truly innovative set of techniques that is made possible by the advent of cheap computational resources or constitutes a changing perception of cost and the management process. The former has been labelled the progressive technical model of accounting and the latter a historically contingent model. The allied question of whether the ABC approach is an enabler of change in the organisation is also worth considering.

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Appendix A

CASE STUDY CATEGORIES & ABC CONDUCIVE ENVIRONMENTS

	Categories	No. of Cases	Environment & Warning Signs
1	Constituents & customers requests	2	• Competitors prices are low • Customers do not complain about price increases
2	Supporting automation, process changes, or quality enhancement	6	• Increased automation
3	Inappropriate bids on prospective jobs	2	• Results of bids are hard to explain
4	New products & designs	4	
5	Increased industrial competition	5	• Intense competition
6	Existing system seen as inefficient and untimely	9	• Profit margins are hard to explain

Appendix B

PILOT TESTING PROCESS

Covering Letter

College *of* Business

Department
of Accounting
& Finance

Tom Kennedy
Head of Department
College of Business,
University of Limerick,
Limerick, Ireland.
Tel: + 353-61-333644
Fax: + 353-61-338171

7 February 1996

«Executive_Name»
«Company_Name»
«Address_1»
«Address_2»
«Address_3»
«Town»
«County_PostCode»

Re: Activity-Based Costing Survey

Dear Sir/Madam

I am carrying out a research study entitled **'The impact of ABC techniques on firm performance'**. As part of that process I would appreciate your assistance in pilot testing the survey documentation.

The survey documentation consists of a draft letter and questionnaire. I plan to send it to the top publicly quoted firms in the UK. The contents should be self-explanatory and the questions clear and unambiguous.

I would greatly appreciate you completing the enclosed questionnaire and returning it by Friday 16 February. You may use the above postal address or fax number.

In addition I would welcome any suggestions that would improve the presentation or content. Please write as you see fit on the document.

Finally could you add the approximate time it took to complete in order to allow me assess the workload involved in completing the live survey.

My sincere thanks for your input into a very important element of the research process.

Yours faithfully

Tom Kennedy

Appendix C

LIVE MAILING PROCESS

Covering Letter, Final Questionnaire and Pre-Paid Envelope

HENLEY
Management College

FROM A MEMBER OF A COLLEGE PROGRAMME

11 March 1996

«Executive_Name»
«Company_Name»
«Address_1»
«Address_2»
«Town»
«County_PostCode»
«Country»

Re: Activity-Based Costing Survey

Dear Sir/Madam

Given the need to understand more about the role of costing systems in large organisations I am undertaking a research study entitled **"The impact of activity based costing techniques on firm performance"**. This study is part of a doctoral programme at the Henley Management College under the supervision of Professor Roger Mills and Professor John Affleck-Graves.

The results of this study should help clarify the practical real world value of the techniques as well as contributing to the academic testing of the concept. From your perspective I would expect that the outcome of the study would be of interest to your organisation.

In order to undertake this study I need to establish the rate and degree of adoption of activity-based costing techniques amongst the top publicly quoted firms in the UK. The questionnaire is being sent to the Financial Directors in each firm because of their professional experience and the pivotal role they play in the decision making process.

In order to ensure that the results are representative, it is important that a large number of questionnaires are completed. Consequently I have confined the contents to a small number of key questions.

I would greatly appreciate you completing the enclosed questionnaire and returning it by Friday March 22. You may use either the attached prepaid envelope or the fax number printed on the questionnaire.

Alternatively I propose to complete the survey by way of a telephone call in the two week period starting Tuesday March 26. Sometime during that period I will telephone your office for what should be a brief telephone conversation. Should you be unavailable I would appreciate if you could leave a written response with your secretary or nominate a surrogate.

I understand the great demands on your time but your response would be of significant value in studying this issue. In any event I thank you for taking the time to read my correspondence and trust that my research project will be of some interest to you.

Finally you can be assured of **complete confidentiality.** The results of the study will be published in aggregate form only and will be circulated to all respondents. No reference will be made to individual firms.

Yours sincerely

Tom Kennedy
Research Associate
Doctor of Business Administration Programme

Henley Management College, Greenlands, Henley-on-Thames, Oxfordshire RG9 3AU, England
Telephone: 01491 571454 International: +44 1491 571454 Fax: 01491 571635

Activity-Based Costing (ABC) Techniques Questionnaire (Confidential)

The introduction of Activity Based Costing (ABC) techniques has met with mixed success. Some firms have had very successful implementations whilst others have adopted and later abandoned the approach. This questionnaire is the basis of a research study aimed at establishing if the introduction of ABC techniques makes a significant difference to firm performance.

ABC is defined by Raffish and Turney (1991) as "a methodology that measures the cost and performance of activities, resources and cost objects". The cumulative cost of each activity is then traced to products or services that make that activity necessary. By so doing ABC recognises the causal relationship of cost drivers to activities.

Please return the completed questionnaire by using the attached prepaid envelope or fax before Friday March 22 to: *RESEARCH CENTRE, HENLEY MANAGEMENT COLLEGE.* *Fax: 01491-571454*

Firm Name: _____ **Respondent:** _____ *(optional)*

Position in Organisation: _____ ***Please Print the above***

1. Has your firm ever used ABC techniques ?

Yes		If Yes, Answer Questions 2 to 9
No		If No, go to Question 10.

2. When were the ABC techniques introduced and what proportion of your firm's Sales Value, Total Assets and Total Costs were affected by their introduction ? Show multiple introduction dates and data separately, if appropriate.

WHEN		PROPORTION AFFECTED		
Month	Year	% of Sales Value *(approx.)*	% of Total Assets *(approx.)*	% Total Costs *(approx.)*

3. Please complete if your firm has used ABC techniques and abandoned them.

WHEN		PROPORTION AFFECTED		
Month	Year	% of Sales Value *(approx.)*	% of Total Assets *(approx.)*	% Total Costs *(approx.)*

4. Who was involved in the design and implementation of the ABC techniques ? **Tick as appropriate**

Description	**Design**	**Implementation**
Consultants		
In-house accountants		
Production personnel		
Systems personnel		
Marketing personnel		
Any other (please specify)		
_____	_____	_____
_____	_____	_____
_____	_____	_____

cont'd .../

5. For which of the following purposes were the ABC techniques introduced and are they still used for that purpose ?

	Tick as appropriate			
Purpose	**Basis of decision to introduce**		**Current Use**	
	Yes	***No***	***Yes***	***No***
Stock Valuation				
Product Pricing				
Product Output Decisions				
Cost Management and Reduction				
Cost Budgeting				
New Product Design				
Customer Profitability Analysis				
Performance Measurement				
Cost Modelling				
Any other purpose (please specify) _____	_____	_____	_____	_____

6. Have the ABC techniques being used ?

	Tick as appropriate	**Yes**	**No**
As a parallel system with another costing system			
As the main costing system			

7. How would you rate the overall success of the introduction of the ABC techniques in your firm ?

Degree of Success	**Tick as appropriate**
Very successful	
Fairly successful	
Neutral	
Fairly unsuccessful	
Very unsuccessful	

8. Did you experience any unexpected outcomes from the introduction of the ABC techniques?

Yes [ ] No [ ]

If **yes**, please state these outcomes: _____

_____

9. If you wish to add any futher comments about the use of the ABC techniques please do so:

_____

_____

10. Into which of the following categories does your firm fall and why ? (Ignore if answered Yes to Question 1)

Category	**Yes**	**No**	**Why *(optional)***
We have considered using ABC techniques and rejected them.			_____
We are currently considering using ABC techniques.			_____
We have not considered ABC techniques.			_____

Thank you for helping me with this research study. *Tom Kennedy*

BUSINESS REPLY SERVICE
Licence No. R G 2957

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Research Centre
Henley Management College
Greenlands
HENLEY-ON-THAMES
Oxfordshire
RG9 1BR

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