

FINANCIAL PERFORMANCE OF FIRMS WITH EFFECTIVE
TOTAL QUALITY MANAGEMENT (TQM) PROGRAMMES
IN KENYA

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by

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A management research project submitted in partial
fulfilment of the requirement for the Degree of Master of
Business Administration (MBA), Faculty of Commerce,
University of Nairobi.

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DECLARATION

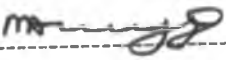
This management research project is my original work and has not been submitted for a degree at the University of Nairobi or any other University.



DATE 10/11/03

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This management research project has been submitted for examination with my approval as University Supervisor.



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DEDICATION

This work is dedicated to my husband Dr Simon M. Onywere and my children Calvin, Eugene and Agnes.

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LIST OF ABBREVIATIONS

CG -	Control Group
EG -	Experimental group
ISO -	International Organisation of standardization
KEBS-	Kenya Bureau of Standards
TQM -	Total Quality Management
ROAE-	Return on Total Assets Employed
ROE -	Return on Equity
SGS-	Society General Surveillance

ABSTRACT

This study explores the hypothesis that implementing effective TQM programmes improves the operating performance of firms. ISO Certification is used as a proxy for the effective implementation of TQM programmes. Means of various performance measures for an experimental group of ISO certified firms are compared against a sample of control firms. The statistical tests provide evidence that firms with effective TQM programmes show significant improvement in performance as compared to the control firms on operating income based measures and sales based measures.

The return on total assets employed for the experimental group improved from 4.79% to 8.06% in the two five-year periods of before and after TQM implementation respectively. For the control group the mean return on total assets employed decreased from 7.80% to 1.23% in the same period. The difference in performance was statistically significant after TQM implementation. Similarly the five-year mean return on equity for the experimental group improved from 9.38% to 18.28% in the period before and after TQM implementation respectively. Over the same period the control firms' return on equity decreased from 19.2% to 10%. The difference in performance was statistically significant.

The mean performance change in sales for the experimental group dropped from 40.61% to 6.62% over the period before and after TQM implementation. That of the control group dropped from 13.12% to (negative) -0.85% over the period before and after TQM implementation respectively. However the difference was statistically insignificant. Similarly, the mean of the percentage change in net income for the experimental group decreased marginally from 16.74% to 11.90% for the period before and after TQM implementation while that of the control group decreased significantly from 38.42% to (negative) -41.68%. However the difference in performance was tested and found to be insignificant.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

1.1.1 Financial Performance

The objective of a company is to create value for its shareholders, which is represented by the market price of the company's common stock. In case of quoted public companies, shareholder wealth is measured by the share price in the financial markets. For a private company, which does not have its shares quoted on a stock market, shareholder wealth maximization remains a valid goal. However, measuring the value of the share in the absence of a valid market is much difficult. In the long run stock prices are driven by profit. The value of a firm is a function of the firm's investment, financing and dividend decisions (Van Horne, 1997).

Performance is the ability to sustain income, stability and growth. It is a measurement of relative investment results. It can be relative to assets, capital and the number of employees.

As performance is very critical for the well being of all business firms its measurement is of great concern to all stakeholders of firms (Koros, 2001). Trade creditors are interested in the liquidity of a firm. Their claims are short-term and the ability of a firm to pay these claims is best judged by means of a thorough analysis of its liquidity. The claims of bondholders on the other hand are long-term. Accordingly they are more interested in the cash flow ability of the firm to service debt in the long run (McMenamin, 1999). The bondholder may evaluate this ability by analysing the capital structure of the firm, the major sources and uses of funds, its profitability over time and projections of future profitability.

Management also employs financial analysis for purposes of internal control. In particular it is concerned with profitability on investment in the various assets of the company and in the efficiency of asset management. In addition to the

suppliers of capital and the firm itself various government regulators may use financial analysis (Van Horne, 1997).

Further by having appropriate standards of governance the long-term performance of a firm is raised and the total shareholder return is enhanced. According to Van Horne (1989) the central concern of governance is to add value to as many organizational stakeholders as is practicable.

Performance of an organization is a function of reputation among other factors. The reputation enjoyed by an organization is built by quality, reliability, delivery and price. Quality is the most important of these competitive weapons. Reputations for poor quality last for a long time and as a result undermine performance of a company.

1.1.2 Measures to enhance firm performance

To enhance their performance, firms pursue various investments and financing decisions. These include: the appropriate assets mix; sources and cost of funds; and strategic capital investment decisions. Financial decisions affect the value of a firm by influencing both the profitability and the riskiness of the firm. The decisions are subject to government constraints as summarised in Figure 1 below.

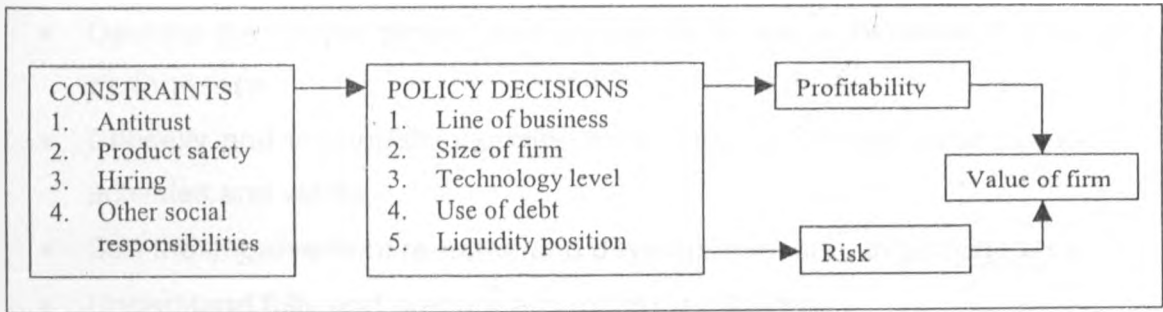


Figure 1: Valuation of a firm (Source: Weston and Brigham, 1981)

In addition to financial decisions quality improvements can also enhance firm performance through customer satisfaction and organizational innovation

1.1.3 Total Quality Management

Total Quality Management (TQM) is a management approach for long-term success through customer satisfaction. It integrates processes within an organisation in order to achieve continuous improvement of quality of goods and services. It is based on the participation of all members of the organisation by continuously improving processes, products, services and the culture they work in (Oaklands, 1989). Basically it consists of a set of management processes, systems, technology and methods to create delighted customers, empowered employees, safer environment, higher revenue and lower costs. According to Oaklands (1989), the reputation enjoyed by an organisation is built on quality, reliability, delivery and price. Quality is the most important of these competitive weapons. Reputations for poor quality lasts for a long time and as a result undermine performance of a company. Moreover as quality improves, costs fall through reduction in failure and detection cost. Improved quality leads to performance benefits from increased output and higher productivity.

Today's business environment is such that managers must strive for competitive advantage to hold on to market share and increase it. TQM helps companies to:

- Focus clearly on the needs of their markets.
- Achieve a top quality performance in all areas.
- Operate the simple procedures necessary for the achievement of quality performance.
- Critically and continually examine all process to remove none productive activities and waste.
- See the improvement required and develop measures of performance.
- Understand fully and prepare a competitive strategy
- Develop the team approach to problem solving

- Develop good procedure and acknowledgement of good work.
- Review continually the process of a never ending improvement strategy

For the most part, TQM relies on a single fundamental principle that should serve as a core mission of any business: Maximize productivity while minimizing costs (Motiska and Shilliff, 1990). TQM has become a frequently used term in discussions concerning quality. The international and national competitive environment is in a process of constant change by the globalisation of markets and the increased interdependence of economic agents. This process of change has brought increased demands on the organisations' competitiveness and the customers have gained a central role in the organisations' focus. TQM is considered to be an important management philosophy, which sustains the organisations in their efforts to satisfy customers (Heizer and Render, 1996).

1.2 STATEMENT OF THE PROBLEM

The issue regarding the relationship between successful TQM implementation and financial performance has attracted a lot of discussion from financial management experts and business media. Does TQM improve firm performance? There exist a large number of examples of failed or badly performing TQM programmes (Hendricks and Singhal, 2000). Such poorly performing programmes negatively affects organisations in their development towards business excellence and ultimately survival in a competitive environment (Heizer and Render, 1996).

Hendricks and Singhal (2000) note that many organizations adopted TQM with inflated expectations and a quick-fix mentality. TQM was expected to have answers to all the problems and a sure bet to reverse poor performance. When TQM did not deliver the hoped for results, it was deemed a failure. Furthermore, contrary to TQM's philosophy, many firms adopted it seeking instant and swift

gratification. Often implementation efforts were measured against short-term financial performance. When short-term improvements did not materialize, many firms got disillusioned with TQM (Stratton, 1993).

The inept defence offered by its proponents has also fuelled the controversy about the value of TQM. Instead of providing hard facts to show that TQM works, many have argued on why TQM's theory of focusing on customer satisfaction, continuous improvement, and employee involvement should lead to success. Gowland, (1988) stated that although you cannot link TQM to financial performance, organizations should still invest in it. Others have argued, again without any data, that if TQM does not improve corporate financial performance then what does (Hendricks and Singhal 2000)? This surely does not help resolve the controversy about TQM. Many organisations in Kenya have implemented TQM (Mbeche and Omutia, 1997), and it will be of interest to study its impact on financial performance of these organisations.

1.3 OBJECTIVE OF THE STUDY

The primary objective of this study was to establish whether there is improved financial performance of Kenyan firms that have effectively adopted TQM programmes.

1.4 IMPORTANCE OF THE STUDY

Enormous capital investments have been made in quality programs, and it is important to document whether TQM is, in fact, an effective strategic tool in enhancing financial performance. Evidence of TQM's association with improvement in financial performance will be of importance to following four major groups:

- (1) the organisations, to justify resource utilisation in adoption of TQM

- (2) the consultants that promotes, recommends adoption and/or provides instruction in the use of TQM;
- (3) the researchers interested in the theoretical and empirical investigation of TQM; and
- (4) educators who share knowledge concerning the use and benefits of TQM.

CHAPTER 2

LITERATURE REVIEW

2.1 THE TQM PHILOSOPHY

Total Quality Management (TQM) is a management tool based on the principles of total customer satisfaction, employee satisfaction, continuous improvement, and long-term partnerships with suppliers and customers (Oaklands, 1989).

Quality is often used to signify excellence of a product or service. This implies meeting customer requirement and has been defined by Juran and Gryna (2002) as "fitness for use". From Juran's definition quality is meeting the customer's requirement. It is the totality of features and characteristics of a product service that bear on its ability to satisfy stated or implied need (ISO, 2002).

Crosby (1979) on the other hand defines quality as a means of conformance to requirements. Conformance is the degree to which a product's design and operating characteristics meet established standards. According to Dale and Duncalf (1985), Crosby's argument is that higher quality reduces cost and raises profits. The only performance indicator is the cost of quality. Further, quality cannot be inspected into the products or services; customer satisfaction must be designed into the whole system. This is seen as the ability to meet customer requirement and satisfaction which is vital not only between organisations but within the same organisation. Oaklands (1989) sees this as an approach used to identify and meet the requirements of both the internal and external customers. These requirements include availability, delivery, reliability, maintainability and cost effectiveness of the organisation's products or services. Reliability reflects the probability of a product malfunctioning or failing within a specified time period. In the final analysis of the market place, the quality of a product depends on how well it fits patterns of consumer preferences (Kathange, 2000). Quality must be achieved in five basic areas: people, equipment, methods, materials and the environment to ensure customer's needs are met (Dale and Duncalf, 1985).

2.1.1 Core concepts of TQM

Customer Focus

A company's continued success requires repeat business, which in turn depends upon the customers. A strong customer base is imperative for the success of a company. TQM is a means to this end since it takes a total systems review and links the various business processes to provide a flexible response to customers (Raju, 1995). Oaklands (1989) underscores the following points required in customer focus of TQM:

- Strive to satisfy and please the customer always because the result of a business is a satisfied customer.
- Listens to the voice of the customer, predict customer behaviour then determine customer quality expectations so as to propose and test process improvement to meet customer expectations.
- Make the customer the real focal point at the head of the business instead of having the support system "around the customer". That is the organisation obtains the customers negotiated needs and then from one point takes all internal measures necessary to ensure that its strategies, structures and staff are working to produce what the customer expects from the service.
- Effectively integrate company process, company employees, who deliver the product and service that is consistent with customer expectations in order to achieve customer satisfaction. This includes forming partnerships with suppliers and involvement of both customers and suppliers in new product development.
- Empower employees by giving them appropriate skills, tools and technology, information including feedback on their performance, understanding customer requirement, authority to decide and to work in the service of their customers' expectation and encouragement from their managers to take initiative and risk.

Continuous improvement

Quality is a never-ending process. The process should cover planning, providing inputs, evaluating output, examining performance and modifying the processes. There are three basic principles of continuous improvement: focusing on the customers, understanding the process and ensuring that all employees are committed to quality. Motiska and Shilliff (1990) identify ten principles that form a foundation for continuous quality improvement. These ten foundations for quality actions are:

- A quality leadership that begins at top management
- Identifying the activities within the organization that affect quality
- Following written procedures as a communication media to direct and control management functions
- Preparing a clear and concise description of the product or service to be acquired or produced
- Justifying the cost, time and effort devoted to evaluating and selecting supplies that must be commensurate with the importance of the goods or services
- Quality audits that determine the adequacy of the compliance with the established policies, procedures, specifications, codes, standards, and contractual agreements
- Quality audits that gather enough reliable data through inspection, observation and inquiry to make a reasonable assessment of the activity being audited
- Possessing timely and accurate information so that systems that are not capable of producing consistent quality can be identified and improved
- Having an effective quality cost program that can help the management team allocate strategic resources for improving quality and reducing costs
- Maintaining exemplary programmes for human resources that can increase productivity, profit and quality.

Effective Leadership

Quality depends on effective leadership. Good leadership means managing a business by following the four stages of: plan-do-check-act in a cyclic way using a creative thinking approach. Effective leadership starts with the chief executive's vision and develops into a strategy for implementation. Top Management must develop the following for effective leadership; clear beliefs and objectives in form of a mission statement, clear and effective strategies and supporting plans, critical success factors and critical processes, appropriate management structure and employee participation through empowerment (Oaklands, 1989).

Zero defects

Zero defects is a journey to achieve excellence; doing it right the first time (Oaklands, 1989).

Teamwork

TQM encourages total participation by uniting and using employee talents company-wide.

Benchmarking

Any organisation, which desires to create improvement, must continually compare its performance on critical criteria against the best in the business. Hendricks and Singhal (1997), Heizer and Render (1996) have identified the following steps for developing benchmarks.

- Determine what to benchmark.
- Form a benchmark team.
- Identify benchmark partners.
- Collect and analyse benchmarking information.
- Take action to match or exceed the benchmark.

2.2 TQM AND FINANCIAL PERFORMANCE

The concept on how effective TQM programs improve operating performance can be broadly classified into three areas: (1) costs of quality, (2) total customer satisfaction, and (3) organizational innovation.

Cost of quality: This concept was developed by Juran (1951). There are two competing theories on how improving the conformance level affects costs. Juran and Gryna (2002) developed the notion of an optimal conformance level by trading off the appraisal and prevention costs with the internal and external failure costs. They argue that the optimal conformance level implies a strictly positive proportion of defectives. On the other hand, Crosby (1979, 1984) prescribe that the optimal conformance level is zero defects. This prescription is based on the belief that producing higher conformance quality products is always less costly than producing low conformance quality products.

Improving conformance quality can also affect revenues. If the performance level of similar products offered by different firms is stable and prices are similar across different firms, a product with a higher conformance level has a better chance of gaining market share than a product with a lower conformance level. If customers perceive improvements in conformance quality, then they may be willing to pay higher prices. This could enable a firm to increase its revenues while maintaining its market share or vice-versa.

Total customer satisfaction: Totally satisfying customer needs and expectations is a key element of any effective TQM program (Juran and Gryna, 2002). Most award givers also reinforce this point as they assign a significant weight to how the award applicant has performed on customer satisfaction. Customer satisfaction includes developing systems to determine customer expectations, establishing communications links and long-term relationships with customers, responding to customer needs in a timely manner, being committed to customers, developing customer satisfaction indicators, and taking actions to improve on

these indicators. Higher customer satisfaction should generally lead to higher customer retention rate, increased market share, and higher profitability.

Organizational innovation: TQM is viewed as a new organizational technology, which enables an organization to utilize its human and other physical assets more productively. Key elements of this technology include training the work force in non-traditional approaches to problem solving, involving employees in decision making, delegating decision making and responsibility further down in the organization, teamwork, inter-functional problem solving effort, and changing the way employees are evaluated. Wruck and Jensen (1994) argue that TQM is an efficiency improving organizational technology because:

- 1) It encourages the use of the scientific method in every-day decision making at all levels of the organization;
- 2) It encourages the creation and utilization of specific knowledge, by transferring decision making rights to those agents who have the specific knowledge, and
- 3) It changes the performance measurement, reward, and punishment systems.

TQM practices and financial performance: In other studies the use of TQM among many Western organizations has been relatively high during the 1990s but diversity exists regarding the actual benefits. A study by the United States General Accounting Office (1991) examined the effect of TQM practices on financial performance based on responses from 22 firms that were finalists or winners in the 1988 and 1989 Baldrige Award Competition. The study measured operating results using measures such as market share, sales per employee, return on sales, and return on total assets employed. The study found that 34 of the 40 observations increased and 6 declined. Responses were also favorable in the areas of customer satisfaction, quality, cost, and employee relations.

A study by Fitzgerald and Erdmann (1992) in the U.S.A. estimated the impact of continuous improvement practices. Based on responses received from more than 280 automotive suppliers, their survey showed that over a two to three year period, respondents reported an average of 17% increase in profits as a result of their continuous improvement efforts.

An internal study by International Business Machines (1993) in the U.S.A., compared the performance of 57 business units that scored 500 or more out of 1000 on the quality award criteria, with other business units that did not. The study found that these 57 units outperformed the other business units in areas of customer satisfaction, employee morale, market share, revenues, and profitability.

A survey by Deloitte & Touche found that the 620 respondents of ISO 9000 registered companies reported annual cost savings ranging from \$25,000 to \$600,000, with an average annual savings of \$179,000.

Easton and Jarrell (1998) examined the impact of TQM practices on financial performance for a sample of 108 firms in the U.S.A., by comparing the actual performance with a benchmark performance measure of how the firm may have performed had they not adopted TQM. The results provide evidence of improved financial performance associated with implementation of TQM programs. The results were stronger for the sub-sample of 44 firms, which they identified as having mature TQM programs.

Hendricks and Singhal (1994) show that the stock market reacts positively to announcements of winning quality awards. Statistically significant mean abnormal returns on the day of the announcements averaged 0.64%. The reaction was stronger for smaller firms and for firms that won awards from independent organizations. The evidence indicates that large firms experience negative stock price performance in the second year before winning quality awards, which is followed by a year of positive performance. Small firms experience a positive stock price performance in the second year before winning quality awards, but no negative performance before winning quality awards.

Hendricks and Singhal (1994) also document a statistically significant decrease in the systematic risk of the firm after the quality award announcement.

Jonas (2003) carried out research project of the relationship between TQM implementation and financial performance within a Swedish context. The results obtained by studying Swedish quality award recipients, indicated that organizations that have implemented TQM perform better than the general mass of organizations, during a period following the award acknowledgement.

Cole and Scott (1994) suggests that quality methods are most likely to be useful for improving financial performance of organizations when:

- Stakeholders are united and support the organizations goals.
- Stakeholders are silent and management adopts the methods.
- The external environment more closely approximates a market with identifiable customers.
- Tasks are clearly defined
- Goals are defined as outcomes rather than processes.
- Technologies are more certain to produce desired results.
- Definitions of organizational performance and success are clear and uncontested.
- Outcomes can be measured.
- Rewards are linked to performance.

Heizer and Render (1996) have proposed two ways in which quality can improve profitability as indicated in Figure 2.

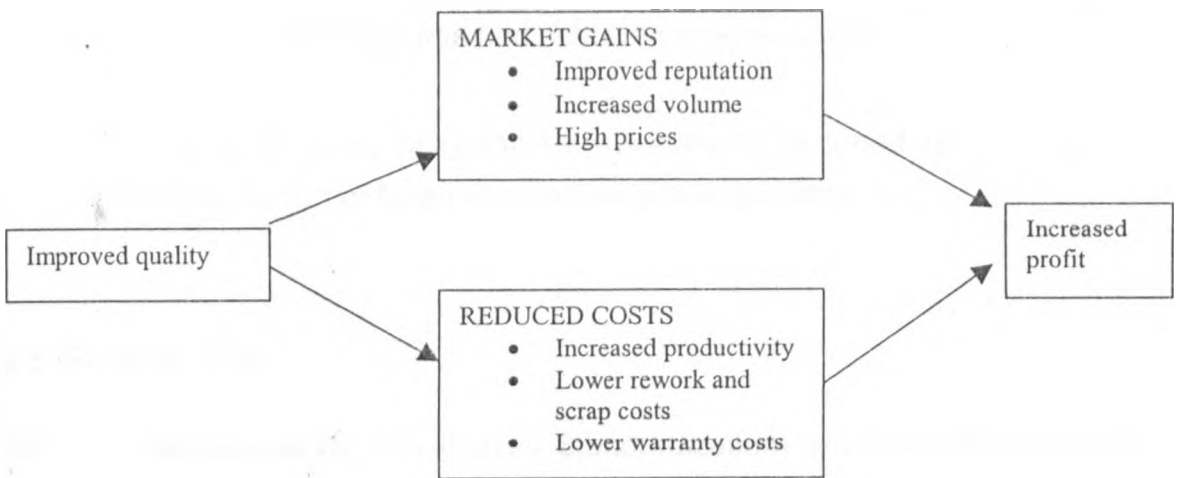


Figure 2: Two-way profitability improvement

Oakland (1989) has proposed things that must be done to avoid total quality disillusionment:

- Avoid overstating the benefits of TQM
- Avoid understating the commitment required when trying to gain acceptance for the quality strategy.
- Emphasizing the long, slow journey to TQM to avoid it being consigned to the scrap heap of discarded magic management ointments of fads.
- Avoid creating the impression that quality is a finite task, that once installed will last forever, with only a minimum maintenance.
- Prevent TQM being used as an instant solution to a particular problem.
- Emphasize that quality improvement requires an on going, never-end commitment to reap the lasting benefits

Much of the criticism on the use of TQM is based on evidence from surveys conducted during the early 1990's in the USA (Hendricks and Singhal, 1997). In their survey they make the following observations:

- In a survey of 500 companies by Arthur D. Little, 36% indicated that TQM was having a significant impact on their ability to compete.

- A survey by A. T. Keamey of 100 British firms indicated that 20% believed that their quality programs had achieved tangible results.
- A study of 30 quality programs by McKinsey & Co. found that two-thirds of them had stalled or fallen short of yielding improvements.

2.3 ISO AND TQM

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (KEBS, 2003; Corbett, *et al*, 2002). It promotes the development of standardization and related activities to facilitate the international exchange of goods and services, and develop intellectual, scientific, technological and economic cooperation. ISO 9000 standards were first introduced in 1987 (Corbett, *et al*, 2002) and are a world-wide compilation of basic quality management and quality assurance elements which have achieved broad general agreement. ISO 9000 standards set the minimum basic rules for quality systems whatever the product or service. Certification demands that all of an organization's processes and elements that affect quality are identified, documented, and functioning effectively according to requirements determined by the organization and ISO 9000. It is a process of internal auditing, management review and the establishment of a quality system with defined procedures, work instructions and forms, all completely documented. It is not a "one-time" exercise but does require the organization to ensure that it continually meets its documented quality requirements.

TQM as a concept integrates various initiatives into a systemic quality improvement process (Larson, 2001). Dick (2000) shows that it is a process that recognizes the need to determine the customers' requirements and to use that knowledge to drive the entire organization to ensure those needs are fully met. Total quality is the goal and continuous improvement is the means to achieve that goal. To put ISO standards in a context, certification is not an end in itself rather it

is an important element in a total quality environment (Corbett, *et al*, 2002). It provides a structure for the quality process, a publicly recognized benchmark, a measurement system and a means to manage the business more effectively.

There must first be an awareness of the importance of quality to the organization, the process required to try to obtain it and the need to continuously improve (Dick, 2000). There must also be recognition of what the costs are in not being a "quality" organization. Most importantly, there must be an emphasis placed on the role of each employee in the process and the recognition of the importance of each employee's contribution. Without this background, then the task of achieving ISO certification is much more difficult.

Dick (2000) lists the following as the specific reasons why a firm ought to consider using the TQM and ISO tools:

- (1) To become more profitable.
- (2) To achieve a competitive position.
- (3) To improve employee involvement
- (4) To increase efficiency
- (5) To improve consistency
- (6) To improved quality of product or service
- (7) Less re-work and waste.

2.4 PERFORMANCE EVALUATION

Analysis and interpretation of various ratios give a better understanding of the financial condition and performance of a firm (Van Horne, 1997). Ratio comparisons can be done in two ways; time-series and cross-sectional analysis. Time-series analysis looks at the financial performance of a firm over time while cross-sectional analysis compares the financial performance of one firm with another at a given point in time (Kathange, 2000). The level and historical trends of these ratios can be used to make inferences about a company's financial

condition, its operations and attractiveness as an investment. In isolation, a financial ratio is a useless piece of information. In context, however, a financial ratio can give a financial analyst an excellent picture of a company's situation and the trends that are developing. The main ratios used are Liquidity, Leverage, Activity and Profitability. They allow the business owner to identify trends in a business and to compare its progress with the performance of others through data published by various sources. The owner may thus determine the business's relative strengths and weaknesses. An overview of some of the categories of ratios is given below.

Leverage Ratios

Leverage Ratios show the extent that debt is used in a company's capital structure. They reflect the company's ability to meet its short-term and long-term debt obligations. They are important for long-term investors. These ratios are debt to total assets, debt to equity and times interest earned. Generally, the higher these ratios, the more risky a creditor will perceive its exposure in a business, making it correspondingly harder to obtain credit. (Altman, 1981)

Liquidity Ratios

Liquidity Ratios measure the firm's ability to fulfil short-term commitment of its liquid assets. Assets are "liquid" if they are either cash or relatively easy to convert into cash. They are relevant to credit analysis and bankers. They include the Current Ratio, Quick Ratio, and Working Capital (Weston and Brigham, 1981; Schall and Haley 1988).

- *Current Ratios:* The Current Ratio is one of the best-known measures of financial strength. It is figured as shown below:

$$\text{Current Ratio} = \text{Total Current Assets} / \text{Total Current Liabilities}$$

The main question this ratio addresses is: "Does a business have enough current assets to meet the payment schedule of its current debts with a margin of safety for possible losses in current assets, such as inventory

shrinkage or collectable accounts?" A generally acceptable current ratio is 2 to 1. But whether or not a specific ratio is satisfactory depends on the nature of the business and the characteristics of its current assets and liabilities. The minimum acceptable current ratio is obviously 1:1, but that relationship is usually playing it too close for comfort.

- **Quick Ratios:** The Quick Ratio is sometimes called the "acid-test" ratio and is one of the best measures of liquidity. It is figured as shown below:

$$\text{Quick Ratio} = \frac{\text{Cash} + \text{Government Securities} + \text{Receivables}}{\text{Total Current Liabilities}}$$

The Quick Ratio is a much more exacting measure than the Current Ratio. By excluding inventories, it concentrates on the really liquid assets, with value that is fairly certain. It helps answer the question: "If all sales revenues should disappear, could a business meet its current obligations with the readily convertible 'quick' funds on hand?"

An acid-test of 1:1 is considered satisfactory unless the majority of your "quick assets" are in accounts receivable, and the pattern of accounts receivable collection lags behind the schedule for paying current liabilities.

- **Working Capital:** Working Capital is more a measure of cash flow than a ratio. The result of this calculation must be a positive number. It is calculated as shown below:

$$\text{Working Capital} = \text{Total Current Assets} - \text{Total Current Liabilities}$$

Bankers look at Net Working Capital over time to determine a company's ability to weather financial crises. Loans are often tied to minimum working capital requirements.

A general observation about these three Liquidity Ratios is that the higher they are the better, especially if a firm is relying to any significant extent on creditor money to finance assets.

Activity Ratios

Activity ratios show the intensity with which the firm uses its assets in generating sales. These ratios indicate if the firm's investments in current and long-term assets are too small or large. They are important to the management of the firm. These ratios are: total assets turnover, fixed asset turnover and stock turnover (Mcmenamin, 1999).

Profitability Ratios

Profitability Ratios measure the success of the firm in earning on sales or investments. Since profit is the ultimate objective of a firm, poor performance indicates a risk failure that if not corrected would result in the firm going out of business. They are important to the investors, creditors and management of the firm (Pandey, 1993). The following are the profitability ratios:

- *Gross Margin Ratio:* This ratio is the percentage of sales left after subtracting the cost of goods sold from net sales. Comparison of business ratios to those of similar businesses will reveal the relative strengths or weaknesses in a business. The Gross Margin Ratio is calculated as follows:

$\text{Gross Margin Ratio} = \text{Gross Profit} / \text{Net Sales}$
--

- *Net Profit Margin Ratio:* This ratio is the percentage of sales left after subtracting the Cost of Goods sold and all expenses, except income taxes. It provides a good opportunity to compare a company's "return on sales" with the performance of other companies in same industry. It is calculated

before income tax because tax rates and tax liabilities vary from company to company for a wide variety of reasons, making comparisons after taxes much more difficult. The Net Profit Margin Ratio is calculated as follows:

$$\text{Net Profit Margin Ratio} = \text{Net Profit Before Tax} / \text{Net Sales}$$

- *Return on Assets Ratio:* This measures how efficiently profits are being generated from the assets employed in the business when compared with the ratios of firms in a similar business. A low ratio in comparison with industry averages indicates an inefficient use of business assets. The Return on Assets Ratio is calculated as follows:

$$\text{Return on Assets} = \text{Net Profit Before Tax} / \text{Total Assets}$$

- *Return on equity (ROE) Ratio:* The ROE is perhaps the most important ratio of all. It is the percentage of return on funds invested in the business by its owners. In short, this ratio tells the owner whether or not all the effort put into the business has been worthwhile. If the ROE is less than the rate of return on an alternative, risk-free investment such as a bank savings account, the owner may be wiser to sell the company, put the money in such a savings instrument, and avoid the daily struggles of small business management. The ROE is calculated as follows:

$$\text{Return on equity} = \text{Net Profit before Tax} / \text{Net Worth}$$

Limitations of Ratios

Although ratio analysis can provide useful information concerning a company's operations and financial condition, it does have inherent problems and limitations that necessitate care and judgement. Weston and Brigham (1981) have identified the following problems:

- Many large firms operate a number of different divisions in quite different industries and in such cases it is difficult to develop a meaningful set of industry averages for comparative purposes.
- Most firms want to be better than average, so merely attaining average performance is not necessarily good. As a target for high-level performance it is preferable to look at the industry leaders' ratios.
- Inflation can distort a firm's balance sheet such that recorded values are often substantially different from two values.
- Firms can employ "window dressing techniques" to make their financial statements look better to credit analysis.
- Different operating and accounting practices can distort comparison.
- A firm may have ratios, which look good, and others, which look "bad" making it difficult to tell whether the company is strong or weak.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

This empirical study investigates the impact of TQM on financial performance of Kenyan firms that have adopted the programme. Experimental research design involving pre- and post-testing of the experimental and control groups is used.

3.2 POPULATION

The population of interest was public limited companies with registered offices in Nairobi. As at 31st December 2002 there were 15027 companies registered with the Registrar of Companies.

3.3 SAMPLE

The researcher used ISO certification as a proxy to effective implementation of TQM. Convenient sampling was used to sample 10 experimental firms from public limited companies with registered office in Nairobi that had won ISO certification for the first time between 1996 and 1998 (see Appendix 1 and Appendix 2). In addition an equal number of non-certified firms for the period 1993-2002 was selected as a control group.

3.4 DATA COLLECTION

This study was facilitated by use of secondary data gathered from the annual financial accounts of the firms under study. A period of ten years between 1991 and 2002 was selected for the study. The data consisted of sales, net profit, current assets, current liabilities, total assets and equity of the firms. The sources of these secondary data were:

- Nairobi Stock Exchange for quoted companies
- Directly from the respective firms
- Kenya Bureau of Standards

3.5 PERIOD OF STUDY

Choosing when to begin measuring the performance and over what time period should the performance be measured are critical issues in linking TQM to financial performance. TQM takes a long time to be fully absorbed and integrated in the normal operating mode of doing things at a firm. Therefore any attempt to establish the relationship between TQM and financial performance must examine performance over a long-time period. Pre- and post-implementation periods of performance over two five-year periods were examined.

3.6 HYPOTHESIS

- H_0 : Implementing TQM does not improve financial performance of a firm
 H_1 : Implementing TQM will improve financial performance of a firm.

3.7 DATA ANALYSIS TECHNIQUE

This study explored the hypotheses that implementing effective TQM programs improves the financial performance of firms. Changes in various performance measures for an experimental group of quality award winners was compared against a sample of control firms.

To test the study hypothesis six performance ratios shown in table 1 were computed for two five-year periods. A *t*-test at 5% level of significance was used

to evaluate the significance of the difference in the means for each ratio of the paired sample across the two periods.

The two-sample t-test yields a statistic t, in which

$$t = | \bar{x}_1 - \bar{x}_2 | \div \sqrt{A * B}$$

Where,

$$A = (n_1 + n_2) \div n_1 n_2 ,$$

and

$$B = [(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2] \div [n_1 + n_2 - 2]$$

X-bar, is the sample mean; n, is the sample size; and s, is the sample standard deviation.

Table 1: Ratios used in calculating financial performance of a firm.

LIQUIDITY RATIOS Current Ratio	Current Assets / Current Liabilities
ASSET MANAGEMENT - Asset Turnover % Change in sales	Sales / Total Assets (Sales in year n - sales in year n-1)*100/sales in year n-1
PROFITABILITY - Return on total assets employed (1) - Return on Equity % Change in net income	Net Income / Total Assets Net Income / Stock. Equity (net income in year n - net income in year n-1)*100/net income in year n-1

3.8 JUSTIFICATION OF RESEARCH DESIGN

The performance of all firms is influenced by industry and economic conditions which may have nothing to do with whether firms have an effective TQM implementation. Benchmarks service the purpose of adjusting a firm's performance for the relevant industry and economic influences.

The student *t*-statistics was used due to small size of the sample. Further, accounting based measures were used due to the fact that the majority of the sample firms are not quoted in the stock exchange.

CHAPTER 4

DATA ANALYSIS AND FINDINGS

4.1 INTRODUCTION

The primary objective of the study was to examine the financial performance of firms with effective TQM programmes in Kenya. ISO certification was used as a proxy to effective implementation TQM programmes. As at March 2003, there were 107 ISO certified companies in Kenya (Appendix 1) out of which 97 companies have there registered offices in Nairobi. For the period 1996-1998, there were 17 ISO certified companies with registered office in Nairobi (Appendix 2).

From the data that was collected various performance ratios were calculated for each firm as shown in Appendix 3, on annual basis for ten years. Further, for each sample group the mean performance ratios were calculated on annual basis (see Appendix 4). The summaries of the means of the performance ratios shown in Table 2 below were then calculated to facilitate for the testing of the hypothesis at 95% confidence level. This was carried out for a paired sample as under:

1. Experimental group verses control group for a period of 5 years before and after
2. Experimental verses control group for ten-year period
3. Experimental group for a period of five years before and after
4. Control group for a period of five years before and after

4.1.1 Characteristics of the firms under study

Due to the limited number of ISO certified public companies with registered office in Nairobi for the period under study, it was not possible to group the companies

into similar industry category and similar asset size. Therefore the firms subjected to the study are from different industry categories and different asset sizes.

Table 2: Summary of ratio mean

Ratio means	Experimental Group	Control group
% Change in sales	21.718	16.254
% Change in net income	13.073	-13.580
Asset turnover (10 yrs)	1.676	0.915
Asset turnover (1 st 5 yrs) before	1.746	1.018
Asset turnover (2 nd 5 yrs) after	1.596	0.812
Return on total assets employed (10 yrs)	0.065	0.045
Return on total assets employed (1 st 5 yrs) before	0.0479	0.0780
Return on total assets employed (2 nd 5 yrs) after	0.0806	0.0123
Return on equity (10 yrs)	0.138	0.046
Return on equity (1 st 5 yrs) before	0.0938	0.1920
Return on equity (2 nd 5 yrs) after	0.1828	-0.0999
Current ratio (10 yrs)	1.389	1.783
Current ratio (1 st 5 yrs) before	1.290	1.707
Current ratio (2 nd 5 yrs) after	1.488	1.858
% Change in sales (1 st 5 yrs) before	40.61	13.12
% Change in sales (2 nd 5 yrs) after	6.62	-0.85
% Change in net income (1 st 5 yrs) before	16.74	38.42
% Change in net income (2 nd 5 yrs) after	11.90	-41.68

4.2 DIFFERENCES IN PERFORMANCE BETWEEN FIRMS WITH EFFECTIVE TQM PROGRAMMES AND THE CONTROL FIRMS

4.2.1 Operating Income Based Measures

Percentage change in net income

The mean percentage change in net income is higher for the experimental group at 13.07% as compared to the control group at (negative) -13.58% over the ten-

year period. Performance of the experimental group is fairly high two years after certification as depicted in Figure 3 below. After TQM implementation the mean percentage change in net income is higher for experimental group at 11.9% as compared to that of the control group at -41.7%. Improvement in net income for the experimental group can be attributed to reduced costs by way of less wastage, increased productivity and increased revenue through high prices and improved reputation resulting in customer royalty.

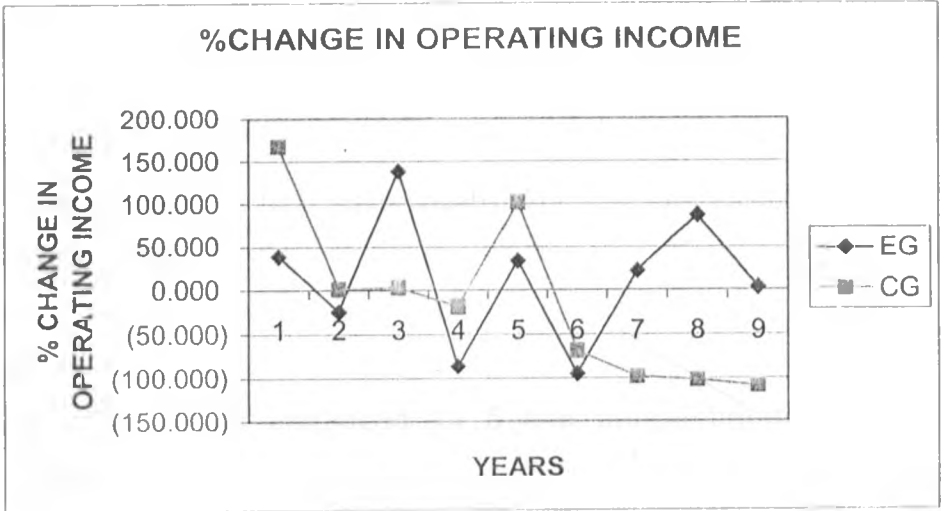


Figure 3: Percentage change in operating income (EG – Experimental group and CG – Control Group)

Return on total assets employed - 10-year period

Appendix 4 reports the mean in the return on total assets employed ratio for the ten-year period on annual basis. The overall mean return on total assets employed is higher at 6.5% for the experimental group as compared to 4.5% for the control group. In Figure 8 the performance of experimental group is superior to that of the control group. In Figure 4, the behaviour of the curve in the first five years for both groups is the same. 1 year after TQM implementation, the experimental group start to outperform the control group.

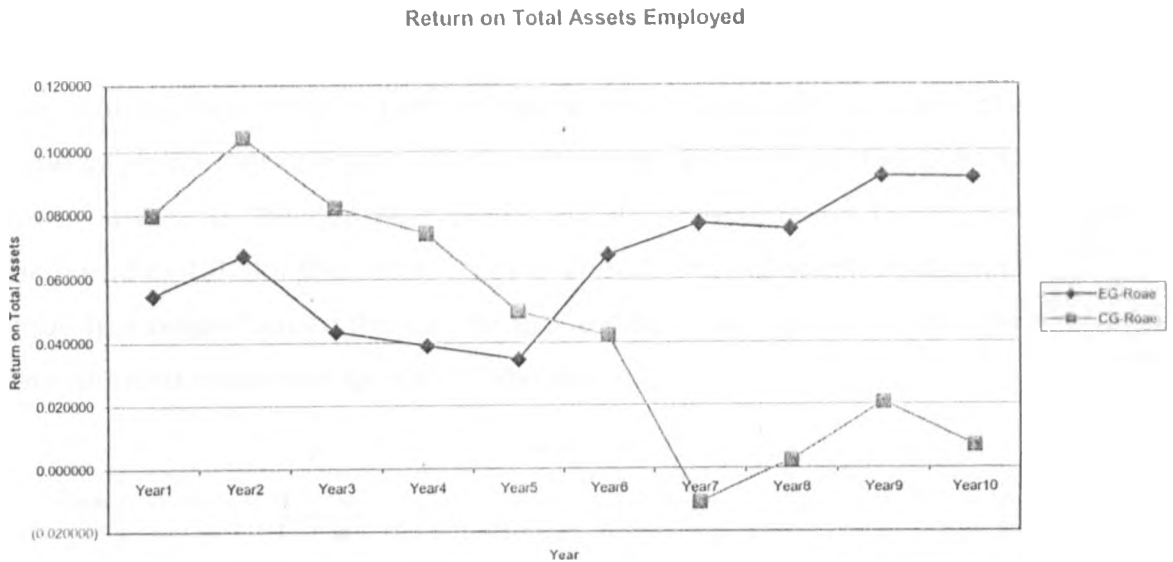


Figure 4: Return on total assets employed (EG – Experimental group and CG – Control Group)

Return on total assets employed for 5-year period before and after TQM implementation

The mean in the return on total assets employed in the period of five years before TQM implementation shows that the control group's performance is superior than that of the experimental .The means are 4.79% and 7.80% respectively. However after TQM implementation performance of the experimental group is superior to that of the control group. The mean return on total assets employed improves to 8.06% for the experimental group while that of the control group decreases to 1.23%. The superior performance can be attributed to the long run benefits if TQM via reduced costs and increased revenue. Reduction in costs results from optimal conformance level with zero defects. Revenue increases as a result of satisfied customers leading to higher customer retention rate and increased market share.

Return on equity for 10-year period

The annual mean in the return on equity ratio for the experimental group shows some improvement one year after certification. This is depicted in Figure 5. The overall mean for the ten-year period for the experimental group is 13.9% as compared to 4.61 for the control group. The results indicate that the experimental group has outperformed the control group due to increased net income resulting from reduced costs and increased revenue.

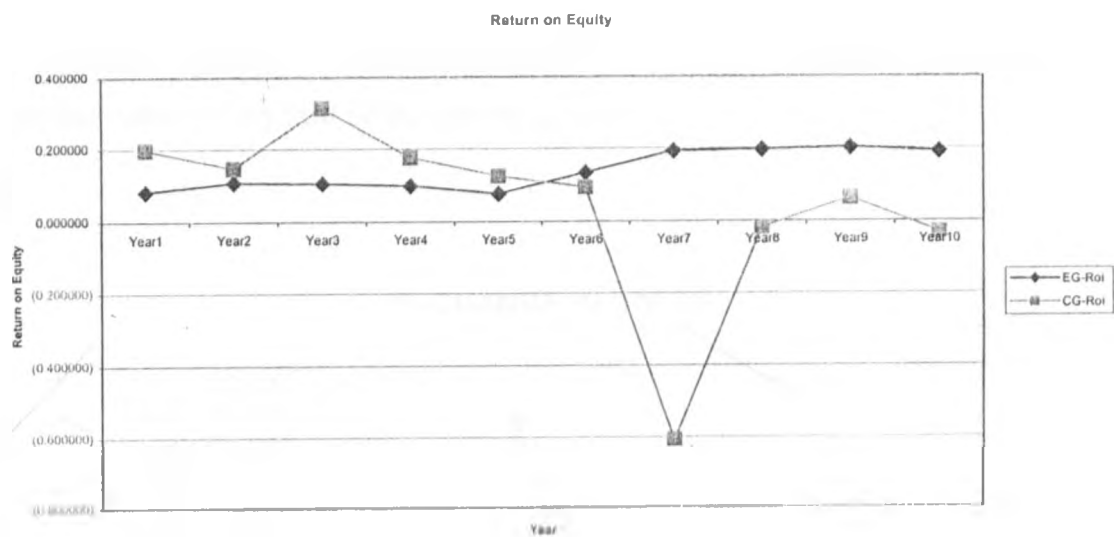


Figure 5: Return on equity (EG – Experimental group and CG – Control Group)

Return on equity for 5-year period before and after TQM implementation

In the period before TQM implementation the control group's performance is superior to that of the experimental group. The return on equity in this period is 9.38% for the experimental group as compared to 19.2% for the control group. However after TQM implementation the experimental group's performance is evidently superior to that of the control group. The mean return on equity for the experimental group is 18.28% while that of the control group is (negative) -10%. This shows that the firms that have effectively implemented TQM have started

harvesting the benefits associated with TQM programmes. The benefits include having zero defects, total customer satisfaction and organizational innovation.

4.2.2. Sales based measures - 10-year period

The mean percentage change in sales is higher for the experimental group at 21.72% as compared to 16.25% over the ten-year period. The percentage change in sales trend is depicted in Figure 6 whereby the performance of the experimental group is slightly higher 3 years immediately after TQM implementation, than that of the control group.

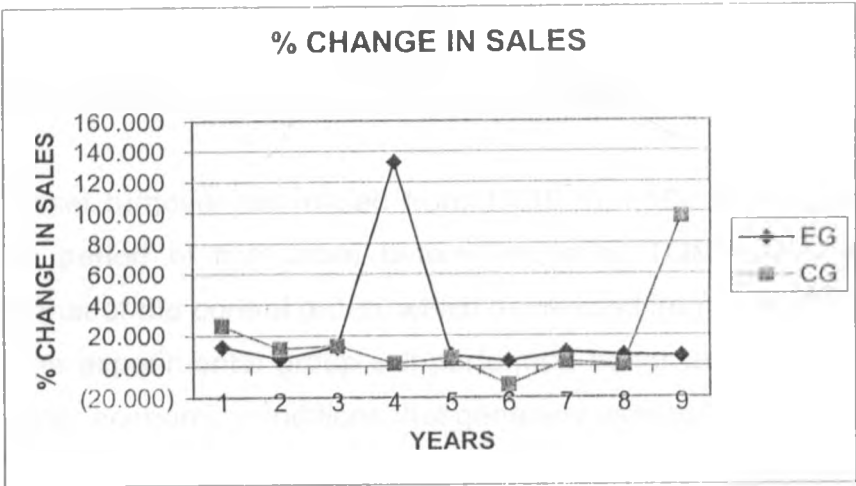


Figure 6: Percentage change in sales (EG – Experimental group and CG – Control Group)

The annual mean of asset turnover ratio for the period of 10 years as shown in Appendix 4 and depicted in Figure 7 is higher for the experimental group than the control group, in all the years. The overall mean in the sales to asset ratio for the experimental group is 1.671, and for the control group is 0.915.

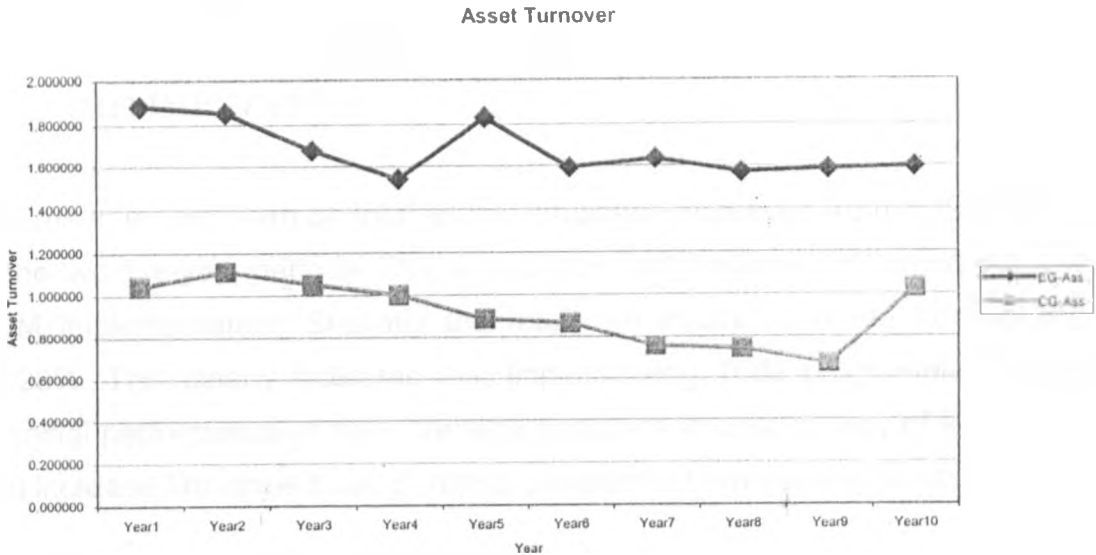


Figure 7: Line graph showing the trend of the asset turnover (EG – Experimental group and CG – Control Group)

Sales based measures - 5-year period before and after

The mean asset turnover decreased from 1.746 to 1.596 for the experimental group in the period of five years before and after TQM implementation as compared to that of the control group, which decreased from 1.018 to 0.812. This shows that the experimental group still performed better than the control group despite the poor economic conditions that generally affected performance.

Generally the firms in the experimental group sustained their performance mainly due to having TQM programmes in place, which enabled the firms to retain their customers in the long run as a result of built-up reputation.

4.3 COMPARRISON OF PERFORMANCE OF FIRMS WITH EFFECTIVE TQM PROGRAMMES IN THE PERIOD AFTER AND BEFORE IMPLIMENTATION

The mean in the return on total assets employed increased from 4.79% to 8.06% in the two five-year periods. This is evidence that the firms performed better after TQM implementation. Similarly the return on equity improved from 9.38% to 18.28%. This clearly indicates that implementing TQM programmes improves financial performance of firms through reduction in cost by way of less wastage and increased revenue through repeat purchases from satisfied customers.

The mean in asset turnover decreased from 1.746 to 1.596 in the two five-year periods. This could suggest that the experimental firms may have made investment in process control and new equipment to implement TQM programmes.

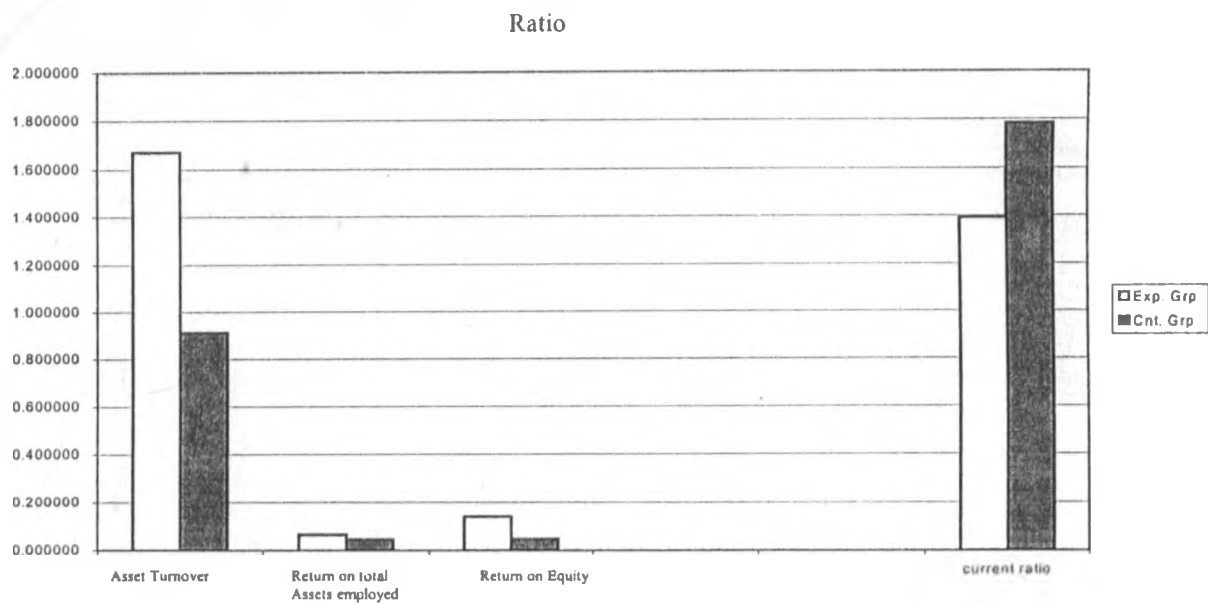


Figure 8: Summary of the compared ratios (*the performance shows that the experimental group (Exp) has higher mean in value than the control group (Cnt.) the difference in performance is statistically significant*)

4.4 RESULTS OF SIGNIFICANCE TESTS

Table 3 contains a summary of the significance tests for the various ratios conducted at 95% confidence level. The conclusions were based on a one-tailed t-test.

There was evidence that firms that have implemented TQM programmes effectively outperformed the control group. The return on total assets employed for the experimental group for example improved from 4.79% to 8.08% for the five-year period before and after TQM implementation. The improvement was statistically significant thus supporting the hypothesis that implementing TQM programmes does improve financial performance of firms. Similarly, the return on equity for the same period showed statistical significant improvement. Asset turnover also showed significant improvement over the period of five years before and after TQM implementation. Although there were differences in percentage change in sales and net income, the difference in performance was not statistically significant.

Table 3: Summary of Hypothesis Testing at 95% confidence level

Ratio means	t-statistic	t-critical One-tail	H ₀
% Change in sales (Exp.Vs Cnt) 9 years	0.311	1.746	Fail to reject
% Change in net income (Exp. Vs Cnt.) 9 years	0.657	1.746	Fail to reject
% Change in sales (1 st 4 yers) before	0.881	1.943	Fail to reject
% Change in sales (2 nd 4 yers) after	1.865	1.943	Fail to reject
% Change in net income (1 st 4 years) before	-0.336	1.943	Fail to reject
% Change in net income (2 nd 4 years) after	0.870	1.943	Fail to reject
Asset turnover (10 years) (Experimental Vs control)	11.963	1.734	Reject
Asset turnover (1 st 5 yrs) before (Experimental Vs control)	9.822	1.859	Reject
Asset turnover (2 nd 5 yrs) after (Experimental Vs control)	12.368	1.859	Reject
Return on total assets employed (10 yrs) (Experimental Vs control)	1.355	1.734	Fail to reject
Return on total assets employed (1 st 5 yrs) before (Experimental Vs control)	-2.857	1.859	Fail to reject
Return on total assets employed (2 nd 5 yrs) after (Experimental Vs control)	6.775	1.859	Reject
Return on equity (10 yrs) (Experimental Vs control)	1.139	1.734	Fail to reject
Return on equity (1 st 5 yrs) before (Experimental Vs control)	-2.933	1.859	Fail to reject
Return on equity (2 nd 5 yrs) after (Experimental Vs control)	2.185	1.859	Reject
Asset turnover Exp. Group (before vs after)	2.436	1.859	Reject
Return on total assets employed exp. group (before vs after)	-4.294	1.859	Fail to reject
Return on equity Exp. group (before vs after)	-6.449	1.859	Fail to reject

CHAPTER 5

CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH RECOMMENDATIONS

5.1 CONCLUSIONS OF THE STUDY

The study explored the hypothesis that implementing effective TQM programs improves the operating performance of firms. The ISO certification is used as a proxy for effective implementation of TQM programs. Overall the results provide strong evidence that firms that have effectively implemented TQM programmes outperform the control group on operating income-based measures.

The mean return on total assets employed for five years after TQM implementation for the experimental group is 8.06% as compared to that of the control group, which is 1.23%. Over the same period, the return on equity for the experimental group was also found to be higher at 18.28% against that of the control group of -10%. These results are statistically significant thus supporting the hypothesis that implementing effective TQM programmes improves operating performance of the firms.

During the period of five years before TQM implementation, there is not much improvement in operating income for the experimental group. For example one year before TQM implementation the percentage change in the operating income is positive at 137% for the experimental group as compared to 3% for the control group. However the positive improvement is statistically insignificant. This suggests that implementing an effective TQM programme may not necessarily result in poor performance during implementation stage. This is important because managers often worry about the direct and indirect costs of implementing TQM programmes. While these costs are real and often high, TQM programmes provide at least earlier benefits, which outweigh the cost of implementation.

The results from 5 years after TQM implementation are highly significant in respect to return on total assets employed and return on equity. This is consistent with the notion that once an effective TQM programme is in place, then firms should experience improvement in performance. It could also be that firms are using ISO certification to send a credible and verifiable signal about quality to the market and improvement in performance is due to favourable reaction by customers.

Weak evidence was observed with firms in the experimental group improving their performance after TQM implementation without comparing with the control group. In particular there was significant improvement in asset turnover after TQM implementation. The mean return on total assets employed for the experimental group improved from 4.79% (before) to 8.063 (after). However, these results were statistically insignificant.

5.2 LIMITATIONS OF THE STUDY

One of the limitations of the study was the size of the sample. Only 17 companies qualified for the study taking into account when the companies were first certified. Out of the 17 companies, only ten provided the information required for the study.

The limitation in the sample size made it difficult to classify the companies according to industry and asset size. Thus the sample may not be representative of Kenyan firms.

The researcher was not given an opportunity to go through the financial accounts of the experimental groups. The information presented for analysis was a summary provided the experimental group firms. Caution must therefore be exercised for there is a limitation in the accuracy associated with such data.

Further, not all the information was given as requested (cost of sales, number of employees etc.). Thus the efficiency ratios could not be worked out.

5.3 FUTURE RESEARCH RECOMMENDATIONS

There are number of avenues for future research. First, other methodologies and measures of performance could be used to estimate the economic impact of implementing effective TQM programs. For example, one could look at the long-term stock price performance of firms with effective TQM programmes, and test whether the results for the stock price performance are consistent with the results on operating performance based on accounting numbers.

Second, future research could examine the characteristics of firms that have implemented effective TQM programs. These characteristics could include variables like size of the firm, how diversified is the firm, managerial and institutional ownership of the firm, capital structure of the firm, the structure of top managers' compensation, and the extent of competition faced by the firm. Such studies could provide guidelines to the board of directors and top managers on how to create an environment where the organization as a whole is more likely to respond to TQM initiatives. A related issue is whether firms adopt TQM only when faced with a crisis situation.

Finally, it would be interesting to study if managers in these firms actually adopted elements of TQM, and if so what is unique about their implementation approach. This could also clarify the role of incentives and organization structure on the adoption of TQM.

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APPENDICES

APPENDIX 1

A LIST OF ISO CERTIFIED COMPANIES IN KENYA AS AT MARCH 2003
BY KENYA BUREAU OF STANDARDS (KEBS), SOCIETY GENERAL
SURVEILLANCE (SGS) KENYA LIMITED & BUREAU VERITAS (*Source: KEBS*)

1. Kenya Breweries Ltd -Tusker Brewery
2. Kenya Breweries Ltd - Kisumu Brewery
3. Kenya Breweries Ltd - Maltings
4. Africa Marine and Gen. Engineering Servic
5. Gilgil Telecommunications Industries Ltd
6. Afromeat (K) Ltd
7. Paging Services Ltd
8. SGS Laboratories
9. GlaxoSmithKline
10. General Motors Kenya Ltd
11. Wanjohi Consulting Engineers
12. Kenya Breweries Ltd - Molo
13. Sanpac Ltd
14. Coastal Bottlers Ltd.
15. ASP Company
16. Zakhem Construction Kenya Ltd
17. Zakhen International Construction Ltd
18. Southern Engineering
19. Steel Africa
20. Interkek Services
21. Panafrican Paper Mills (EA) Ltd
22. Kenya Bixa Ltd
23. Institute of Advanced Technology
24. Carnaud metal box Ltd
25. Total Kenya Ltd
26. Heidelberg East Africa
27. Triad Archetets
28. Firestone EA Ltd
29. Unilever Kenya Ltd
30. Box Clever Kenya Ltd
31. Associated Battery Manufacturers
32. Total Kenya Ltd - Service Station
33. Bags & Balers Manufacturers Limited
34. Kenya Shell Distribution
35. Delmonte
36. Health First International Ltd
37. Iberofrica International Ltd - Nairobi
38. Johnshon Diversey Ltd
39. Kaluworks Ltd Mombasa
40. Tibbet and Britten
41. Nation Newspaper
Division
42. Crown Foods
43. Kenol Kobil
44. Vestergaard
45. Homegrown Kenya
46. Alloy Steel Castings
47. Allpack
48. Ariman Technologies Ltd
49. Bidco Elianto Division
Nakuru
50. Bidco Oil Refineries Ltd
51. Blow Plast Ltd
52. Cargill Kenya Ltd
53. Carton Manufacturers Ltd
54. Cempack Ltd
55. Citi Bank NA Kenya
56. Cook N Lite Ltd
57. Dodhia Packaging Ltd
58. EA Elevators Co. Ltd
59. EA Packaging Industries
Ltd. Mombasa
60. EA Packaging Industries
Ltd. Nairobi
61. S A Spectre Centre
62. Friendship Containers
Man Ltd
63. General Plastics
64. General Printers Ltd
65. Wartsila EA Ltd (1S0
1400)
66. Tetra Park (K) Ltd
67. Samaki Industries Ltd

68. Kenya Litho Ltd
69. Mabati Rolling Mills Ltd
70. Metal Crowns Ltd
71. Mutiport International Ltd
72. Oasis Ltd
73. Panafrican Paper Mills EA Ltd
74. Proctor & Allan (EA) Ltd
75. Roy Transporters Ltd
76. Sadolin Paints EA Ltd
77. Silpack Industries Ltd
78. Slumberland Kenya Ltd
79. Spinners & Spinners Ltd ISO 9000
80. Spinners & Spinners Ltd ISO 1400
81. Taws Ltd
82. Thermopak Ltd
83. Twiga Chemicals
84. Unga Technical Dept
85. Unique Sun Apprels EPZ Ltd
86. Vipul Shah & Company
87. Vitaplast Ltd
88. Wartsila EA Ltd (ISO 9000)
89. Van Leer EA Ltd - Plastic Division
90. Caltex Oil (K) Ltd - Lube Plant
91. Galsheet (K) Ltd
92. DHL International (K) Ltd
93. Kenya Postel Directories
94. Mobil Oil (K) Ltd
95. Mobil Oil (K) Ltd - Lube Plant
96. Caltex Oil (K) Ltd - Distribution
97. Magadi Soda Ltd
98. Kenya Shell Ltd
99. Coates Brothers E A Ltd
100. Atlas Copco Kenya Ltd
101. Standard Bank
102. Kenya Petroleum Refineries
103. Azicon Engineering Ltd
104. Highland Cannery Ltd
105. Van Leer EA Ltd - Steel Division
106. Nation Media Group
107. Nation Carriers Ltd

APPENDIX 2

A LIST OF ISO CERTIFIED COMPANIES IN NAIROBI, KENYA BETWEEN THE PERIOD 1996-1999

1. Alloy Steel Castings - 1996
2. Allpack Industries Ltd - 1999
3. Atlas Copco Kenya Ltd - 1998
4. Azicon Engineering Ltd - 1999
5. Bidco Oil Refineries Ltd - 1999
6. Cempack Ltd - 1999
7. Coates Brothers E A Ltd - 1998
8. Cook N Lite Ltd - 1999
9. DHL International (K) Ltd - 1997
10. Dodhia Packaging Ltd - 1998
11. E A Spectre Ltd - 1997
12. EA Elevators Co. Ltd - 1999
13. Galsheet (K) Ltd - 1997
14. General Motors Kenya Ltd - 1999
15. General Plastics - 1997
16. GlaxoSmithKline Beecham - 1999
17. Highland Canners Ltd - 1999
18. Johnshon Diversey Ltd - 1998
19. Kenya Bixa Ltd - 1999
20. Kenya Litho Ltd - 1999
21. Kenya Petroleum Refineries Ltd - 1999
22. Kenya Shell Ltd - 1998
23. Kulworks Ltd - 1997
24. Magadi Soda Ltd - 1998
25. Mobil Oil (K) Ltd - 1997
26. Nation Carriers Ltd - 1999
27. Nation Media Group - 1999
28. Paging Services Ltd - 1999
29. Prestige Packaging Ltd - 1999
30. Silpack Industries Ltd - 1997
31. Standard Bank - 1998
32. Tetra Park (K) Ltd - 1996
33. Threadsetters Tyre Ltd - 1999
34. Twiga Chemicals - 1999
35. Vitaplast Ltd - 1997
36. Wartsila EA Ltd - 1999

Appendix 3: Calculated financial ratios of the firms under study

(A) – EXPERIMENTAL SAMPLE FIRMS

COMPANY: COATES BROTHERS EAST AFRICA LTD (1998)						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	1.079485	0.0533589	0.0620169	5.4037179	-1.583251149	-56
2001	1.023126	0.1131191	0.15030361	3.1003731	-4.410079941	-25.428784
2000	0.877586	0.1243763	0.17516589	2.7330305	3.403974436	82.151589
1999	1.078156	0.0867428	0.13350016	2.0080873	-8.365078411	-9.1694221
1998	1.086575	0.0881943	0.15069909	1.7606145	-4.857636123	33.204049
1997	1.100569	0.063805	0.11335574	1.6712405	15.32960609	74.409539
1996	0.939508	0.0360171	0.06762027	1.5736627	15.20979552	258.04598
1995	0.892503	0.0110095	0.02025561	1.5072928	-5.474022804	-68.425146
1994	1.012857	0.0374039	0.06547735	1.3999322	5.482820429	77.356322
1993	0.840359	0.0184573	0.03950523	1.2499044	-	-
mean	0.993073	0.0632484	0.09778999	2.2407856	1.637347561	40.68268
1 st 5-year mean	1.028986	0.0931583	0.13433713	3.0011647	-	-
2 nd 5-year mean	0.957159	0.0333386	0.06124284	1.4804065	-	-
COMPANY: TETRA PARK LTD (1996)						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2000	0.867776	0.005338	0.01741541	1.1109933	-14.53615197	-68.029969
1999	1.08335	0.0178148	0.04639433	1.3039546	18.263352	273.81183
1998	0.951215	0.0049487	0.00758359	1.9502606	9.11782034	-47.727993
1997	1.076998	0.0116964	0.01461879	3.1557367	6.616278728	113.11453
1996	1.032946	0.0056121	0.00696136	3.093872	11.25416052	153.90947
1995	0.965436	0.0022983	0.00294681	2.2588104	-1.485232923	-32.437442
1994	1.129664	0.0039213	0.00486788	2.3379807		
1993	0.84232	0.0049879	0.00700783	1.4256902		
1992	0.91246	-0.015673	-0.02321604	1.6572283		
1991	0.854904	0.0076014	0.01213637	1.4322141		
mean	0.971707	0.0048546	0.00967163	1.9726741	4.871704449	65.440071
1 st 5-year mean	1.002457	0.009082	0.0185947	2.1229634		
2 nd 5-year mean	0.940957	0.0006272	0.00074857	1.8223847		

COMPANY: JOHNSON DIVERSY LTD (1998)						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	3.450555	0.2143982	0.27073056	1.0468712	-5.366198293	4.152446
2001	3.792648	0.2141173	0.2844451	1.1103259	4.704684816	93.825799
2000	4.609127	0.1405667	0.21380507	0.9284583	-11.11914103	-54.63144
1999	4.602173	0.2749666	0.39285778	1.0655611	-10.69518717	-23.092257
1998	4.041935	0.2804213	0.37623684	1.2000485	0.645413365	73.202496
1997	5.581064	0.224998	0.33019321	1.1461797	104.7279326	83.311126
1996	3.517524	0.1583751	0.2115475	1.1926747	-1.752042084	95.146262
1995	4.253975	0.0964291	0.11294112	1.7502036	5.263402805	15.432716
1994	4.472551	0.0924521	0.10314491	2.4889847		
1993	4.70132	0.0843908	0.10728515	1.9143332		
mean	4.302287	0.1781115	0.24031872	1.3843641	10.80110813	35.918394
1 st 5-year mean	4.099287	0.224894	0.30761507	1.070253		
2 nd 5-year mean	4.505287	0.131329	0.17302238	1.6984752		

COMPANY: DODHIA PACKAGING LTD						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	1.600668	0.1273496	0.32203091	1.1945554	0.283016914	11.070182
2001	1.518919	0.1091091	0.34298678	0.9146557	4.841339914	121.65501
2000	1.39393	0.0473612	0.24193313	0.7921481	0.240848483	13.142146
1999	1.504825	0.0452989	0.2914657	0.7280625	50.8643349	-699.49434
1998	1.288683	-0.009762	-0.04083097	0.8037469	15.41578947	-92.013462
1997	1.150121	-0.125908	-0.32416123	0.8010076	2.591792657	13.043478
1996	1.163317	-0.115578	-0.22851579	0.7905759	15.46134663	109.09091
1995	1.132768	-0.062147	-0.08854045	0.8323171	0.753768844	-300
1994	1.184524	0.0327381	0.04210397	0.7610619	40.6360424	83.333333
1993	0.887147	0.0188088	0.02396961	0.8921933		
mean	1.28249	0.0067271	0.05824417	0.8510324	14.56536447	-82.241416
1 st 5-year mean	1.461405	0.0638713	0.23151711	0.8866337		
2 nd 5-year mean	1.103575	-0.050417	-0.11502878	0.8154312		

COMPANY: MAGADI SODA LTD (1998)						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	2.077717	0.1050853	0.11586798	2.3802873	20.54908486	10.56439
2001	1.859817	0.1025592	0.11847006	2.1902834	27.33050847	64.197332
2000	1.35292	0.0578552	0.08180041	2.4209753	-5.173279759	149.08064
1999	1.341554	0.0218408	0.03348554	2.2743123	1.945724526	17.442029
1998	1.262117	0.0178364	0.02377261	2.5983946	4.662379421	10.932476
1997	1.158215	0.0154429	0.02349386	1.4010211	7.179781735	-79.541156
1996	1.05997	0.0740396	0.117158	1.3769508	8.880550344	1015.6881
1995	1.024278	0.0069823	0.01114519	1.4088567	8.923705722	24.429224
1994	0.947953	0.0056567	0.01172691	1.2723303	6.686046512	23.033708
1993	0.902887	0.0046719	0.00967391	1.1685978		
mean	1.298743	0.041197	0.05465945	1.849201	8.998277982	137.31408
1 st 5-year mean	1.578825	0.0610354	0.07467932	2.3728506		
2 nd 5-year mean	1.01866	0.0213587	0.03463957	1.3255513		

COMPANY: KALU WORKS LTD (1997)						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2001	0.527845	0.0035276	0.01070656	0.6543997	31.83973907	24.859463
2000	0.670865	0.004734	0.04491413	0.672795	25.50893964	255.61972
1999	0.525427	0.0013086	0.01285331	0.4154137	-25.12922465	-76.305263
1998	0.672071	0.0052888	0.05637313	0.5350792	-5.495537811	-427.58621
1997	0.59414	-0.001349	-0.02532088	0.7188724	-23.59179572	-295.94595
1996	0.826892	0.000732	0.01407781	0.8057899	1147.991938	47.117296
1995	0.071255	0.0005351	0.01018332	0.6005181	33.59928194	-107.79845
1994	0.060404	-0.007771	-0.13553267	0.5003834	5.261500346	32.989691
1993	0.060361	-0.006147	-0.10846472	0.7004607	25.00065612	-3.960396
1992	0.049275	-0.006531	-0.12928827	0.7523602		
mean	0.405853	-0.000567	-0.02494983	0.6356072	134.9983885	-61.223343
1 st 5-year mean	0.59807	0.002702	0.01990525	0.599312		
2 nd 5-year mean	0.213637	-0.003836	-0.06980491	0.6719025		

COMPANY: DHL INTERNATIONAL LTD (1997)						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2001	3.759036	0.1740964	0.39054054	1.2608696	24.8	15.6
2000	3.448276	0.1724138	0.35714286	1.3866667	16.27906977	34.408602
1999	3.52459	0.152459	0.31	1.3870968	10.82474227	15.52795
1998	4.041667	0.1677083	0.33541667	1.5416667	5.149051491	75
1997	4.341176	0.1082353	0.23589744	1.2826087	5.428571429	26.027397
1996	4.605263	0.0960526	0.20857143	1.0487805	18.6440678	30.240856
1995	4.538462	0.0862308	0.20759259	1.1315789	3.50877193	-21.27809
1994	4.596774	0.1148387	0.37473684	0.9302326	4.01459854	8.3713851
1993	4.644068	0.1113559	0.3285	0.95	2.23880597	22.574627
1992	4.701754	0.0940351	0.2552381	0.9444444		
mean	4.220107	0.1277426	0.30036365	1.1863945	10.09863102	22.941414
1 st 5-year mean	3.822949	0.1549826	0.3257995	1.3717817		
2 nd 5-year mean	4.617264	0.1005026	0.27492779	1.0010073		

COMPANY: SILPAK COMPANY LTD (1997)						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2001	1.839736	0.1036146	0.13371017	1.3138565	20.94240838	67.654639
2000	1.553692	0.0631238	0.07926456	1.2672513	20.12578616	108.0429
1999	1.404947	0.0329588	0.046625	1.0094822	-4.790419162	-31.684982
1998	1.459809	0.0477279	0.0853125	1.0511774	0.906344411	6.744868
1997	1.468852	0.0453969	0.0825	1.0602069	53.24074074	42.677824
1996	0.940779	0.0312286	0.0602521	1.1261407	33.33333333	-925.08631
1995	1.462226	-0.007844	-0.00877778	1.0373324	18.42105263	-109.63415
1994	2.578554	0.1700187	0.11564103	1.233513	35.44554455	5.2754435
1993	3.555837	0.3016477	0.12417391	1.0442606	22.27602906	75.57377
1992	3.727437	0.2202166	0.08872727	0.9290499		
mean	1.999187	0.100809	0.08074288	1.1072271	22.21120223	-84.492888
1 st 5-year mean	1.545407	0.0585644	0.08548245	1.1403949		
2 nd 5-year mean	2.452966	0.1430536	0.07600331	1.0740593		

COMPANY: STANDARD CHARTERED BANK

Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	0	0.0357826	0.38762959	1.0701062		-1.6495765
2001	0	0.0413251	0.39918135	1.0792075		3.1264368
2000	0	0.0440506	0.33973758	1.1062993		25.215889
1999	0	0.0406107	0.38412207	1.0800261		9.039548
1998	0	0.0419475	0.39884827	1.0725068		49.577465
1997	0	0.0325608	0.33023256	1.0510124		-7.310705
1996	0	0.0373404	0.41360691	1.0312578		1.7714792
1995	0	0.0415486	0.53079455	1.035854		61.285714
1994	0	0.0271108	0.38440417	1.0332944		60.91954
1993	0	0.0186224	0.24899828	1.0341477		
mean	0	0.0360899	0.38175553	1.0593712		22.441755
1 st 5-year mean	0	0.0407433	0.38190377	1.0816292		
2 nd 5-year mean	0	0.0314366	0.38160729	1.0371133		

COMPANY: ATLAS COPCO Ltd (1998)

Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	0.755993	0.0915796	0.19579501	1.0678643	-10.86956522	22.131148
2001	0.903733	0.0798952	0.19003115	1.0309423	-41.35146621	-62.622549
2000	1.057053	0.1466307	0.52645161	0.9817185	111.6007194	142.31626
1999	0.56938	0.0689708	0.19493488	1.1759134	-5.762711864	-6.1324042
1998	0.808219	0.0982877	0.13324048	1.9031414	6.690777577	334.84848
1997	1.462963	0.0436508	0.06860707	1.7890909	0.362976407	-61.627907
1996	1.497283	0.1168478	0.19196429	2.2048611	28.2887078	138.88889
1995	1.39222	0.0583468	0.09944751	2.0431373	-4.661487236	-20
1994	1.759766	0.0878906	0.14705882	2.0195122	22.08672087	50
1993	2.176991	0.0884956	0.16574586	1.8930818		
mean	1.23836	0.0880596	0.19132767	1.6109263	11.82051906	59.755769
1 st 5-year mean	0.818876	0.0970728	0.24809063	1.231916		
2 nd 5-year mean	1.657845	0.0790463	0.13456471	1.9899366		

(B) CONTROL SAMPLE

COMPANY: BAKPHARM LTD						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	1.077885	0.0111428	0.06639903	2.2192418	-11.51587481	-80.251375
2001	1.160212	0.0537389	0.36009278	1.3239036	-0.872833246	-203.96929
2000	1.495926	-0.066062	-0.54133876	1.3011273	-24.38816862	-457.59346
1999	1.65299	0.0154351	0.09822709	1.4907354	19.05234997	-60.232288
1998	1.590913	0.0444727	0.27390723	1.6710901	44.70880081	106.77233
1997	1.768865	0.0346054	0.18243954	4.4077057	6.93099152	57.727273
1996	1.555233	0.0206273	0.14149427	2.7323753	-5.33604733	-10.871033
1995	2.203005	0.0310333	0.18491697	0.999018	-15.45383632	-21.097496
1994	1.428517	0.0215626	0.25878947	1.0427404	5.074992606	83.839373
1993	1.671988	0.0144248	0.16359558	1.0328291		
mean	1.560553	0.0180981	0.11885232	1.8220767	2.022263843	-65.075107
1 st 5-year mean	1.395585	0.0117456	0.05145748	1.6012196		
2 nd 5-year mean	1.725522	0.0244507	0.18624716	2.0429337		
COMPANY: BIUPCO TEXTILE MILLS LTD						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	1.131099	0.0160004	0.05923332	0.9612979	-16.88789108	-173.13295
2001	1.016408	-0.01634	-0.08609535	1.0154276	29.32227099	-359.91587
2000	1.120397	0.0089618	0.03049853	1.1755968	-7.514581926	-22.820037
1999	1.206531	0.0115645	0.04076308	0.7166863	-19.09679136	-30.113452
1998	1.516991	0.0168324	0.06080615	0.6662291	-1.929446457	-5.8590174
1997	1.330428	0.0153785	0.0687723	0.7143677	-1.804572739	-11.884915
1996	1.591194	0.0204968	0.08381412	0.6300384	34.02610787	-5.2484076
1995	1.210014	0.0220473	0.09654884	0.6300874	6.484030905	-29.189969
1994	1.317467	0.036099	0.15092028	0.54426	-4.657388337	5.060652
1993	1.484132	0.0369041	0.1691839	0.7561997		
mean	1.292466	0.0167945	0.06744452	0.7810191	1.993526429	-70.344884
1 st 5-year mean	1.198285	0.0074038	0.02104115	0.9070475		
2 nd 5-year mean	1.386647	0.0261851	0.11384789	0.6549907		

COMPANY: EAST AFRICA PORTLAND CEMENT LTD						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	0.432502	0.016588	0.01855763	2.4872774	-19.21914358	-83.288043
2001	0.488435	0.0905512	0.10060142	2.2007389	36.05209047	-275.65632
2000	0.361005	-0.051837	-0.05754704	1.9326683	24.22307365	-52.332196
1999	0.389359	-0.145699	-1.06934307	1.5463483	7.900780891	-333.7766
1998	0.375928	0.0649283	0.22117647	1.3100917	24.82798165	317.77778
1997	0.313669	0.0161871	0.06364922	1.0148883	3.80952381	34.328358
1996	0.291565	0.0116279	0.0484104	1.8648649	2.003642987	19.642857
1995	0.361422	0.0122888	0.16568047	1.3920188	2.680798005	-30.864198
1994	1.594433	0.0805169	0.28125	1.3820225	46.21695533	170
1993	1.519391	0.0415512	0.14084507	1.7352941		
mean	0.612771	0.0136704	-0.00867194	1.6866213	14.27730036	-26.018707
1 st 5-year mean	0.409446	-0.005094	-0.15731092	1.8954249		
2 nd 5-year mean	0.816096	0.0324344	0.13996703	1.4778177		

COMPANY: DUNLOP KENYA LTD						
Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2001	0.485714	0.1142857	0.19753086	1.7457627	-1.449275362	700
2000	0.472603	0.0136986	0.01923077	2.3571429	-16.86746988	-75
1999	0.58042	0.0559441	0.07017544	3.0344828	5.063291139	33.333333
1998	0.593985	0.0451128	0.05660377	3.037037	-8.139534884	-33.333333
1997	0.68254	0.0714286	0.08653846	3.5	-4.444444444	-40
1996	0.967742	0.1612903	0.234375	2.7931034	-11.76470588	-21.052632
1995	1.243902	0.2317073	0.33928571	2.6923077	15.90909091	26.666667
1994	1.442623	0.2459016	0.33333333	2.9375	6.024096386	0
1993	1.566038	0.2830189	0.41666667	2.5	33.87096774	50
1992	1.44186	0.2325581	0.38461538	1.8823529		
mean	0.947743	0.1454946	0.21383554	2.6479689	2.022446191	71.179337
1 st 5-year mean	0.563052	0.060094	0.08601586	2.7348851		
2 nd 5-year mean	1.332433	0.2308953	0.34165522	2.5610528		

COMPANY: E. A. CABLES LTD

Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	1.172205	-0.018127	-0.02238806	3.8095238	8.379888268	-137.5
2001	1.091463	0.0487805	0.05405405	7.8064516	-10.27568922	-46.666667
2000	1.105263	0.0831025	0.0974026	5.0769231	7.837837838	36.363636
1999	0.922693	0.0548628	0.07913669	2.4508197	-26.87747036	-65.625
1998	1.204762	0.152381	0.18338109	4.2857143	-3.250478011	0
1997	1.379947	0.1688654	0.19631902	5	0.965250965	-13.513514
1996	1.588957	0.2269939	0.28571429	4.0447761	17.99544419	25.423729
1995	1.493197	0.2006803	0.25106383	4.1525424	12.56410256	-10.606061
1994	1.418182	0.24	0.30414747	3.9310345	11.11111111	-1.4925373
1993	1.415323	0.2701613	0.34895833	3.5614035		
mean	1.279199	0.1427701	0.17777893	4.4119189	2.049999705	-23.735157
1 st 5-year mean	1.099277	0.0642	0.07831727	4.6858865		
2 nd 5-year mean	1.459121	0.2213402	0.27724059	4.1379513		

COMPANY: CROWN BERGER

Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2001	1.0913	0.0128894	0.0195122	1.8987342	-1.263362488	33.333333
2000	1.099359	0.0096154	0.01507538	1.704142	-12.94416244	200
1999	1.286181	0.0032644	0.00500835	1.68125	0.141485856	-86.117538
1998	1.266367	0.0231852	0.03854523	1.4895394	-0.214731965	-51.372637
1997	1.099444	0.0413057	0.07739868	1.4260947	5.896097618	738.49057
1996	0.952251	0.0045183	0.00948376	1.4635543	1.209611656	-82.853445
1995	1.049905	0.0294045	0.08301329	1.3006034	15.75436572	-59.48886
1994	1.232086	0.0985979	0.21163287	1.5759936	13.27670191	-0.9990917
1993	1.16919	0.1070565	0.22504161	1.5864823	40.04991681	63.978723
1992	0.846479	0.0661972	0.15015974	1.5092838		
mean	1.109256	0.0396034	0.08348711	1.5635678	6.878435854	83.885672
1 st 5-year mean	1.16853	0.018052	0.03110797	1.6399521		
2 nd 5-year mean	1.049982	0.0611549	0.13586626	1.4871835		

COMPANY: PRINTING INDUSTRIES LTD

Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	0.31033	0.0027378	0.00601245	1.3618136	-14.98253783	-45.26699
2001	0.373189	0.005114	0.01108898	1.4160975	-9.096406489	-20.155039
2000	0.407638	0.0063598	0.01402479	1.4248239	-13.34189255	11.447084
1999	0.465632	0.0056488	0.01259401	1.5115002	-23.79854248	-74.462217
1998	0.666117	0.0241124	0.04906365	1.3094794	-24.06070898	247.98464
1997	0.814408	0.0064334	0.01380773	1.6979629	-24.95633623	-88.314456
1996	1.425576	0.072319	0.13125589	2.3901045	28.54311707	4.6719098
1995	0.97521	0.0607545	0.14247487	1.8140904	-4.33000077	131.43168
1994	1.140071	0.0293606	0.07166498	2.127101	47.67483908	-21.946565
1993	0.767673	0.0374045	0.09890317	1.9672566		
mean	0.734584	0.0250245	0.05508905	1.702023	-4.260941019	16.15445
1 st 5-year mean	0.444581	0.0087946	0.01855678	1.4047429		
2 nd 5-year mean	1.024588	0.0412544	0.09162133	1.9993031		

COMPANY: KENRUB LTD

Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	0.591914	0.0003877	0.01150628	1.1476068	-5.027996154	-91.2
2001	0.628702	0.0044448	0.14551804	1.2158148	-6.701493325	-42.922374
2000	0.678688	0.007843	0.30501393	1.3386096	21.24760077	-109.43966
1999	0.725122	-0.107632	-5.16703786	3.2690827	-12.46149538	258.02469
1998	0.764373	-0.027741	-0.17499325	2.0767058	-6.238512839	-245.61798
1997	0.679476	0.0158781	0.12835304	1.3855731	23.1122317	-5.720339
1996	0.775727	0.023671	0.15613629	0.9583984	2.443870455	-34.170153
1995	1.06174	0.0504184	1.1472	0.5534477	0.96964023	-50.890411
1994	1.02089	0.0996723	-1.0181311	0.6191994	62.82665505	1068
1993	0.645261	0.0087824	-0.04320774	0.5822592		
mean	0.757189	0.0075725	-0.45096424	1.3146697	8.90783339	82.895976
1 st 5-year mean	0.67776	-0.024539	-0.97599857	1.8095639		
2 nd 5-year mean	0.836619	0.0396844	0.0740701	0.8197755		

COMPANY: KENYA COMMERCIAL BANK

Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2002	0	-0.050222	-0.56977406	0.9985318		-1631.1224
2001	0	0.0030161	0.02402844	1.0733767		-142.24138
2000	0	-0.006328	-0.05765408	1.0577512		-70.160772
1999	0	-0.020662	-0.17588508	1.0840108		-238.09947
1998	0	0.0143439	0.10873974	1.1084656		-56.118472
1997	0	0.0348926	0.26156983	1.1165033		2.64
1996	0	0.0366354	0.30712531	1.0975855		5.3962901
1995	0	0.0409743	0.3694704	1.0747664		41.274568
1994	0	0.0275743	0.36820175	1.0431034		30.86516
1993	0	0.033316	0.4009375	1.0287026		
mean	0	0.0113541	0.10367598	1.0682798		-228.6185
1 st 5-year mean	0	-0.01197	-0.13410901	1.0644273		
2 nd 5-year mean	0	0.0346785	0.34146096	1.0721323		

COMPANY: EXPRESS KENYA LTD

Year	Asset turnover	return on total assets employed	return on equity	current ratio	% change in sales	% change in net income
2001	3.985588	-0.034368	-0.10064935	0.7373737	1034.069401	416.66667
2000	0.367323	-0.006952	-0.01916933	0.7777778	-1.552795031	-53.846154
1999	0.369266	-0.014908	-0.0408805	0.7992767	14.18439716	-262.5
1998	0.327907	0.0093023	0.02247191	0.9325397	-56.61538462	-52.941176
1997	0.753187	0.0196987	0.04709141	0.9342629	16.27906977	-48.484848
1996	0.667064	0.0393795	0.08967391	0.9253731	20.21505376	-52.173913
1995	0.463609	0.0687936	0.19166667	0.9448819	20.15503876	60.465116
1994	0.52439	0.0582656	0.23626374	0.5616114	89.70588235	-17.307692
1993	0.463636	0.1181818	0.41269841	0.9304636	21.42857143	225
1992	0.604317	0.057554	0.16161616	0.7439024		
mean	0.852629	0.0314947	0.1000783	0.8287463	128.6521371	23.875333
1 st 5-year mean	1.160654	-0.005446	-0.01822717	0.8362462		
2 nd 5-year mean	0.544603	0.0684349	0.21838378	0.8212465		

Appendix 4: Annual mean ratios for Experimental Group (EG) and Control Group (CG)

	Asset turnover		return on total assets employed		return on Equity		current ratio		% change in sales		% change in net income	
	EG-Ass	CG-Ass	EG-Roae	CG-Roae	EG-Roe	CG-Roe	EG-Cr	CG-Cr	EG-Cr	CG-Cr	EG-Cr	CG-Cr
Year1	1.884207	1.039642	0.054877	0.079885	0.082199	0.197561	1.221033	1.479948				
Year2	1.855038	1.111842	0.067444	0.104304	0.107491	0.147125	1.332707	1.570641	12.440712	26.359662	38.883090	167.330481
Year3	1.677380	1.050369	0.043424	0.082096	0.104790	0.313859	1.266748	1.569108	4.952701	11.192142	(24.064097)	1.175133
Year4	1.537921	0.998567	0.038989	0.074228	0.098725	0.176792	1.327739	1.865594	12.161746	13.149463	137.992090	3.248811
Year5	1.831275	0.887385	0.034579	0.049743	0.075854	0.124844	1.301027	2.051903	132.867620	1.771705	(85.788122)	(18.081758)
Year6	1.592464	0.865425	0.067482	0.042176	0.134200	0.093311	1.549401	1.828813	6.888840	5.178836	33.642025	101.494501
Year7	1.634663	0.755058	0.077085	(0.010888)	0.192209	(0.606392)	1.461562	1.752830	3.516322	(12.025082)	(94.413365)	(68.193148)
Year8	1.569680	0.740478	0.075252	0.002634	0.195596	(0.017530)	1.372488	1.882251	8.897604	2.745304	21.708480	(97.981960)
Year9	1.585443	0.669769	0.091821	0.020567	0.201313	0.062443	1.405646	2.089087	7.129213	0.706351	86.663630	(102.037309)
Year10	1.595881	1.027854	0.091413	0.007132	0.190644	(0.031406)	1.650352	1.736716	6.605908	97.210321	3.035272	(109.176181)

APPENDIX 5: HYPOTHESIS TESTING AT 95% CONFIDENCE LEVEL

t-Test: Two-Sample Assuming Equal Variances

Asset Turnover (Exp. vs Cnt.) - 10 year period

	Variable 1	Variable 2
Mean	1.676395	0.914639
Variance	0.017021	0.023525
Observations	10	10
Pooled Variance	0.020273	
Hypothesized Mean Difference	0	
df	18	
t Stat	11.96304	
P(T<=t) one-tail	2.65E-10	
t Critical one-tail	1.734063	
P(T<=t) two-tail	5.3E-10	
t Critical two-tail	2.100924	

t-Test: Two-Sample Assuming Equal Variances

Return on Equity (Exp. vs Cnt.) -10 year period

	Variable 1	Variable 2
Mean	0.138302	0.046061
Variance	0.002622	0.062936
Observations	10	10
Pooled Variance	0.032779	
Hypothesized Mean Difference	0	
df	18	
t Stat	1.139236	
P(T<=t) one-tail	0.13477	
t Critical one-tail	1.734063	
P(T<=t) two-tail	0.269539	
t Critical two-tail	2.100924	

t-Test: Two-Sample Assuming Equal Variances

Return on Total Assets (Exp. vs Cnt.) - 10 year period

	Variable 1	Variable 2
Mean	0.064237	0.045188
Variance	0.000427	0.001549
Observations	10	10
Pooled Variance	0.000988	
Hypothesized Mean Difference	0	
df	18	
t Stat	1.354947	
P(T<=t) one-tail	0.096098	
t Critical one-tail	1.734063	
P(T<=t) two-tail	0.192197	
t Critical two-tail	2.100924	

t-Test: Two-Sample Assuming Equal Variances

Current Ratio (Exp. vs Cnt.) - 10 year period

	Variable 1	Variable 2
Mean	1.38887	1.782689
Variance	0.017519	0.041168
Observations	10	10
Pooled Variance	0.029343	
Hypothesized Mean Difference	0	
df	18	
t Stat	-5.14077	
P(T<=t) one-tail	3.43E-05	
t Critical one-tail	1.734063	
P(T<=t) two-tail	6.85E-05	
t Critical two-tail	2.100924	

t-Test: Two-Sample Assuming Equal Variances
% Change in Sales (Exp. Vs Cnt.)

	Variable 1	Variable 2
Mean	21.71785	16.2543
Variance	1746.185	1030.953
Observations	9	9
Pooled Variance	1388.569	
Hypothesized Mean Difference	0	
df	16	
t Stat	0.311027	
P(T<=t) one-tail	0.379898	
t Critical one-tail	1.745884	
P(T<=t) two-tail	0.759796	
t Critical two-tail	2.119905	

t-Test: Two-Sample Assuming Equal Variances
% Change in Net Income (Exp. Vs Cnt.)

	Variable 1	Variable 2
Mean	13.07322	-13.5802
Variance	5623.867	9195.193
Observations	9	9
Pooled Variance	7409.53	
Hypothesized Mean Difference	0	
df	16	
t Stat	0.656846	
P(T<=t) one-tail	0.260308	
t Critical one-tail	1.745884	
P(T<=t) two-tail	0.520617	
t Critical two-tail	2.119905	

t-Test: Two-Sample Assuming Equal Variances
Asset Turnover (Exp. Before vs Cnt. Before)

	Variable 1	Variable 2
Mean	1.757164	1.017561
Variance	0.021411	0.00694
Observations	5	5
Pooled Variance	0.014176	
Hypothesized Mean Difference	0	
df	8	
t Stat	9.821974	
P(T<=t) one-tail	4.85E-06	
t Critical one-tail	1.859548	
P(T<=t) two-tail	9.7E-06	
t Critical two-tail	2.306006	

t-Test: Two-Sample Assuming Equal Variances
Asset Turnover (Exp. After vs. Cnt. After)

	Variable 1	Variable 2
Mean	1.595626	0.811717
Variance	0.000578	0.019508
Observations	5	5
Pooled Variance	0.010043	
Hypothesized Mean Difference	0	
df	8	
t Stat	12.36807	
P(T<=t) one-tail	8.51E-07	
t Critical one-tail	1.859548	
P(T<=t) two-tail	1.7E-06	
t Critical two-tail	2.306006	

t-Test: Two-Sample Assuming Equal Variances
Return on total Assets (Exp. Before vs Cnt. Before)

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	0.047862	0.078051
Variance	0.000177	0.000381
Observations	5	5
Pooled Variance	0.000279	
Hypothesized Mean Difference	0	
df	8	
t Stat	-2.85739	
P(T<=t) one-tail	0.010618	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.021236	
t Critical two-tail	2.306006	

t-Test: Two-Sample Assuming Equal Variances
Return on Equity (Exp. Before vs Cnt. Before)

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	0.093812	0.192036
Variance	0.000197	0.005409
Observations	5	5
Pooled Variance	0.002803	
Hypothesized Mean Difference	0	
df	8	
t Stat	-2.93341	
P(T<=t) one-tail	0.00945	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.018899	
t Critical two-tail	2.306006	

t-Test: Two-Sample Assuming Equal Variances
Return on total Assets (Exp. After vs Cnt. After)

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	0.080611	0.012324
Variance	0.000114	0.000405
Observations	5	5
Pooled Variance	0.000259	
Hypothesized Mean Difference	0	
df	8	
t Stat	6.704698	
P(T<=t) one-tail	7.6E-05	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.000152	
t Critical two-tail	2.306006	

t-Test: Two-Sample Assuming Equal Variances
Return on Equity (Exp. After vs Cnt. After)

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	0.182792	-0.09991
Variance	0.000755	0.082924
Observations	5	5
Pooled Variance	0.041839	
Hypothesized Mean Difference	0	
df	8	
t Stat	2.185318	
P(T<=t) one-tail	0.03018	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.06036	
t Critical two-tail	2.306006	

t-Test: Two-Sample Assuming Equal Variances
Current Ratio (Exp. Before vs Cnt Before)

	Variable 1	Variable 2
Mean	1.289851	1.707439
Variance	0.002167	0.058317
Observations	5	5
Pooled Variance	0.030242	
Hypothesized Mean Difference	0	
df	8	
t Stat	-3.79675	
P(T<=t) one-tail	0.00263	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.005261	
t Critical two-tail	2.306006	

t-Test: Two-Sample Assuming Equal Variances
Current Ratio (Exp. After vs Cnt. After)

	Variable 1	Variable 2
Mean	1.48789	1.85794
Variance	0.012738	0.020153
Observations	5	5
Pooled Variance	0.016446	
Hypothesized Mean Difference	0	
df	8	
t Stat	-4.56253	
P(T<=t) one-tail	0.000922	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.001844	
t Critical two-tail	2.306006	

t-Test: Two-Sample Assuming Equal Variances
% change in Sales (Exp. Vs Cnt.) before

	Variable 1	Variable 2
Mean	40.60569	13.11824
Variance	3795.241	102.5966
Observations	4	4
Pooled Variance	1948.919	
Hypothesized Mean Difference	0	
df	6	
t Stat	0.880547	
P(T<=t) one-tail	0.20622	
t Critical one-tail	1.943181	
P(T<=t) two-tail	0.412441	
t Critical two-tail	2.446914	

t-Test: Two-Sample Assuming Equal Variances
% Change in Sales (Exp vs Cnt.) after

	Variable 1	Variable 2
Mean	6.607995	-0.84865
Variance	5.050432	58.85925
Observations	4	4
Pooled Variance	31.95484	
Hypothesized Mean Difference	0	
df	6	
t Stat	1.865477	
P(T<=t) one-tail	0.055687	
t Critical one-tail	1.943181	
P(T<=t) two-tail	0.111375	
t Critical two-tail	2.446914	

t-Test: Two-Sample Assuming Equal Variances**% Change in Net Income (Exp vs Cnt.) before**

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	16.75574	38.41817
Variance	9123.125	7478.184
Observations	4	4
Fooled Variance	8300.655	
Hypothesized Mean Difference	0	
df	6	
t Stat	-0.33625	
P(T<=t) one-tail	0.374064	
t Critical one-tail	1.943181	
P(T<=t) two-tail	0.748128	
t Critical two-tail	2.446914	

t-Test: Two-Sample Assuming Equal Variances**% Change in Net Income (Exp. Vs Cnt.) after**

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	11.90019	-41.6795
Variance	5820.351	9338.267
Observations	4	4
Pooled Variance	7579.309	
Hypothesized Mean Difference	0	
df	6	
t Stat	0.870363	
P(T<=t) one-tail	0.208779	
t Critical one-tail	1.943181	
P(T<=t) two-tail	0.417559	
t Critical two-tail	2.446914	
