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CAPITAL BUDGETING PRACTICES OF MAJOR BAHRAINI COMPANIES AND THEIR BRITISH COUNTERPARTS

A COMPARATIVE APPROACH

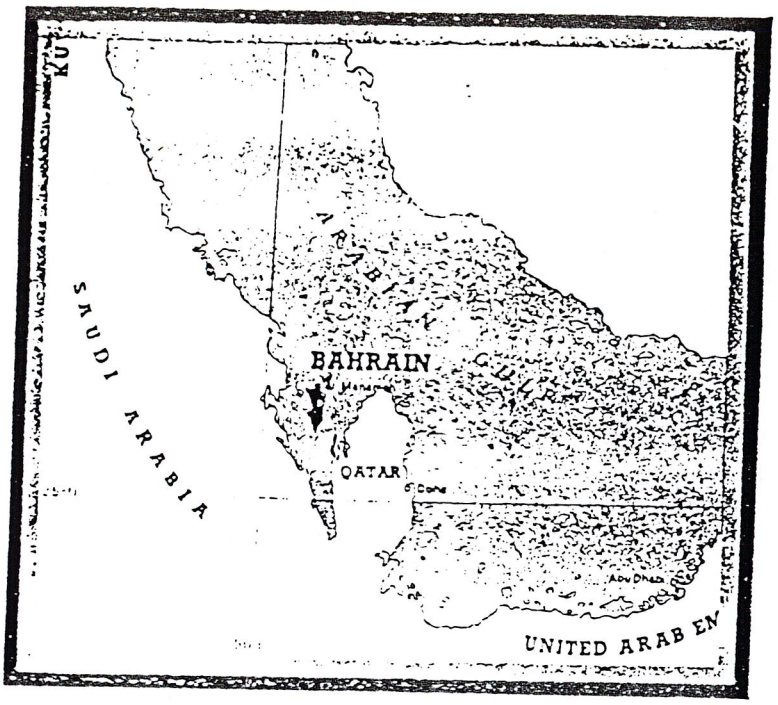
A thesis submitted for the Degree of Philosophy

By

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Brunel University/ Henley Management College

February/ 1998



State of Bahrain

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MAIN FEATURES

Capital	:Manama
Area	:669 Sq.Km.
Population	:508,000 (91 Census)
Currency	: Bah. Dinar =1000fils
Exchange Rate	:$=0.379
GDP	:BD. 1900.2m. (1995)
Oil Prod.	:42000/bd

Acknowledgment

This study has been made possible only with the co-operation of many individuals and organisations. I wish to express my gratitude to the University of Bahrain for the scholarship and support provided throughout the duration of this project. I also wish to acknowledge the guidance and encouragement given by various persons in preparing this dissertation. My special thanks and appreciation go to Professor Roger W. Mills and Professor Arthur H. Money, my dissertation advisors, who have provided invaluable guidance from the inception of the project until the completion of the dissertation. They spent a great amount of valuable time and effort in editing and revising the draft versions of this dissertation. Their untiring efforts, encouragement, suggestions and criticisms were essential in the completion of this research.

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While much of the credit for the strengths of this dissertation goes to those people who made its completion possible, the blame for any weaknesses is strictly mine.

Abstract

The main objective of this thesis is to investigate and identify the capital budgeting practices of large successful Bahraini industrial companies in the public sector in order that over time, their good practices may be disseminated more widely to other companies in the country. The significance of this research stems from the fact that Bahrain is a small country with a limited amount of economic resources of which oil is the most important and is depletable; thus, the utilization of these resources, in an efficient manner becomes a pressing necessity. Another factor contributing to the value of this research and the prime motive for undertaking this commitment is the lack of empirical studies on the capital budgeting practices of Bahraini companies.

This study attempts to compare the capital budgeting practices of Bahraini companies with those of a group of British companies carefully selected for this purpose. The objectives of this comparison are two-fold: firstly, from an academic perspective, to examine the theory of capital budgeting in the two completely different environments of a developed country (UK) and a developing country (Bahrain) thereby contributing to the body of literature and knowledge in this area. This comparison should identify the similarities and dissimilarities in the practices of the two groups and the areas where improvements can be achieved. Secondly, from a practical viewpoint, the research provides some conclusions and recommendations which could help managers, as well as those responsible for making decisions, to improve their practices and procedures in accomplishing the goal of better utilisation of the economic resources at their disposal.

Five Bahraini companies are included in this study representing major industries in the country. The Bahraini companies in this study are considered to be quasi public and produce a significant portion of the country's GNP. These companies were established with the mission of accelerating economic growth, diversifying the source of income, and providing job opportunities for the people of Bahrain. On the other hand, the British sample consisted of thirty-six companies identified as having the same characteristics as those of the Bahraini companies.

A questionnaire was used to collect primary data as to the specific nature of the capital budgeting practices of the British companies. To gain more insight into the capital budgeting practices of Bahraini companies, structured interviews were arranged with Bahraini managers and other officials in these companies using the same questionnaire.

The major findings of the study include: (1) Both the Bahraini and the British companies were found to follow a relatively structured approach to their capital investment decisions (systematically, well defined steps or activities); (2) The two groups of companies exhibit a great similarity in certain key areas of their capital budgeting system. These areas include: existence of a formal screening body, evaluation techniques, preparation of a long-term capital budget, existence of at least one capital budgeting staff and risk analysis; (3) However, dissimilarities were observed in other areas. These areas include: the systematic search for investment opportunities, post-audits of capital investment projects, application of management science techniques and expenditure control . These similarities and dissimilarities are reflected in the capital budgeting sophistication index for Bahraini companies and their British counterparts specifically developed for this study. The British companies appeared to be relatively more sophisticated than the Bahraini companies, as indicated by the sophistication score.

Implications of the study for the theory of capital budgeting and for various individuals responsible for capital investment decisions, as well as recommendations of the study and direction for future research, have been highlighted.

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A List of Abbreviations:

- ALBA: Aluminium Bahrain
- AP: Administration Procedures
- APT: Arbitrage Pricing Theory
- ARR: Accounting Rate of Return
- BANACO: Bahrain National Oil Company
- BANAGAS: Bahrain National Gas Co.
- BFML.: Bahrain Flour Mills Co.
- CAPM: Capital Asset Pricing Model
- CE: Certainty Equivalent
- CPM: Critical Path Method
- DCBS: Degree of Sophistication of Capital Budgeting System
- DCF: Discounted Cash Flow
- EIU: The Economic Intelligence Unit
- EVT: Evaluation Techniques
- EXP: Expenditure Control
- FCBS: Full Time Capital Budgeting Staff
- GCC: Gulf Co-operation Council
- GDP: Gross Domestic Product
- GNP: Gross National Product
- GPIC: Gulf Petrochemical Industries Co.
- HRDS: Human Resource Development Support Programme
- IRR: Internal Rate of Return
- LRC: Long-Range Capital Budget
- MEED: Middle East Economic Digest
- MST: Management Science Techniques
- MWU: Mann Whitney U Test
- NPV: Net Present Value
- OPT: Operation Research Techniques

- PA: Post-Audits
- PB: Payback Period
- PERT: Project Evaluation and Review Technique
- PI: Productivity Index
- RA: Risk Analysis
- SER: Systematic Search for Investment Projects
- SMIs: Small and Medium-Sized Industries
- SP: Selection Process
- SSR Screening and Reviewing
- TCBS: Trends in Capital Budgeting System
- WACC: Weighted Average Cost of Capital

PART ONE

BACKGROUND

CHAPTER ONE

INTRODUCTION

1.1 Introduction:

The purpose of this chapter is to provide a foundation for the rest of the thesis. It provides a discussion of the research problem and addresses the motivation behind the undertaking of this inquiry. It also delineates the study's purpose, its scope, the research data, the methodology utilised, its significance , its limitations and its organisation.

1.2 Research Problem:

The problem of this research stems from the lack of attention to the study of capital budgeting investment practices followed by major Bahraini industrial companies, despite the growing importance of the industrial sector in the National Economy. The continuing decline in the country's oil resources, together with the sharp decline in oil prices over the past decade, have contributed to the growing importance of the Bahraini industrial sector and to the increase in capital expenditures. Figures published by the Ministry of Finance and National Economy reflect those trends (Table 1.1). Recently, the Finance and National Economy Minister announced that BD 250m had been earmarked in 1997 for spending through industrial companies held by the Government (GDN,1996). The Government intends to inject more investment into the economy aiming at broadening the industrial base, diversifying the sources of income, and providing job opportunities for the people. The Government plans to spend BD 380m (£590m) on capital projects annually for the next three years (The Economic Intelligence Unit, EIU, 1997).

Against this background, it would appear that national capital expenditure plays a vital role in the development of the Bahraini economy. Despite the advanced stage that

capital budgeting has reached in developed countries, its application to developing countries, which normally experience shortages in their economic resources - has been limited. In fact the lack of research in this area is the prime motive behind undertaking this commitment (see Habra, 1994).

Table 1.1 : Summary of Government Oil and Non-Oil Revenue & Capital Expenditure

Million BD

Period	Oil Revenue	Non-Oil Revenue	Capital Expenditure
1990	306.7	164.6	112.5
1991	306.3	167.9	100.5
1992	289.0	185.2	113.7
1993	247.3	195.4	113.0
1994	285.1	203.9	127.7
1995	325.1	212.4	135.7

Source: Ministry of Finance & National Economy- National Accounts, 1995

1.3 Purpose of the Study:

In the light of the above major characteristics of the Bahraini economy and the economic role of the industrial sector, this study is designed to evaluate capital budgeting practices followed by Bahraini companies against those followed by a sample of British companies carefully selected for this purpose.

The five companies , Alba, Banagas, Banoco, Gpic, and Bflm were selected because of their strategic importance, their major contribution to Bahrain's Gross National Product (GNP) in general and the leading role they play in the industrial sector in particular. Government-owned enterprises were chosen for this study because these enterprises have been used as an important economic 'tool' for economic development

in Bahrain. The use of public enterprises as a "tool" for economic development is supported by Hanson (1965) who states that:

> "*Whatever the ultimate perspective may be, the country anxious to develop economically has no alternative but to use state enterprise on a considerable scale, at the very least in order to get things done...*"(p.23).

The managers of these Government enterprises are expected to employ the most appropriate techniques and procedures in all managerial processes, particularly in projects requiring capital investment. Appropriate procedures to plan investment projects should help to ensure efficient utilisation of available economic resources.

An overview of the Bahrain economic environment within which this research is undertaken is a prerequisite for understanding the current nature of the capital investment process and the factors that influence this process. Bahrain, being a small developing country with a limited amount of economic resources, is keen to use these available resources in the most efficient manner. No information is available regarding how efficiently these resources, allocated for the economic development of the country, have been managed and utilised. The Minister of Development and Industry* was reported in 1994 to have made the following statement on the role of managers in state and private enterprises:

> *"Government as well as private enterprises need to be run and managed by managers who are more professional and are more aware of the Government economic policy so that these enterprises can play a significant role in the development of the economy".*

The implication of this statement is that managers of these enterprises were expected to improve their performance and productivity. By application of formal capital

* Following the new cabinet formation in July, 1995, it is now called the Ministry of Oil and Industry.

budgeting techniques and procedures, managers can improve the performance of their companies.

The capital budgeting practices followed by Bahraini companies and those followed by British companies can be best described through the use of a capital budgeting system. The proposed system is largely based on the works of King (1975); Pike (1982); Mukherjee (1987) and Northcott (1992). The components included in the system are: preparation of a long-term capital budget, systematic search for investment opportunities, screening and reviewing of capital projects proposals, evaluation techniques, risk analysis, expenditure control, existence of capital budgeting staff, management science techniques, and post-audits.

Each component of the proposed system will be investigated for both Bahraini and British companies in order to identify similarities and dissimilarities among those companies and to identify the main factors underlying these commonalties and differences. In order to meet this goal, the following specific objectives are set:

1. To identify capital budgeting procedures which are workable in the Bahraini culture and economy so that, over time, knowledge of these procedures can be widely disseminated throughout Bahraini enterprises.
2. To determine the extent to which discounted cash flow (DCF) techniques are used in the evaluation of capital investment projects among selected Bahraini companies and the motivation for the usage of these techniques.
3. To investigate the capital budgeting practices for a comparable sample of British companies carefully selected for this purpose.
4. To conduct a comparison of capital budgeting practices followed by Bahraini companies and their British counterparts, and to evaluate their degree of compliance with the capital budgeting model adopted in this study.

To guide this research process, a number of hypotheses were formulated. These hypotheses are based on the capital budgeting practices as cited in literature. This study will use the nine elements of capital budgeting practices as identified by Kim (1982) and appear in Chapter Five. These nine elements of capital budgeting practices are divided into three areas, (1) administrative aspects before project approval, (2) selection process, and (3) administrative aspects after project approval. Therefore, the main hypothesis of the study revolves around these three areas.

Given the different levels of economic development, different levels of technological advances, managerial competencies, and different cultural environments, one would expect that capital budgeting practices of large Bahraini companies are likely to differ from those adopted by their British counterparts.

The following general hypothesis can be stated in accordance with this line of argument:

"Capital Budgeting Practices adopted by large Bahraini Industrial Companies differ from those adopted by their British Counterparts".

This hypothesis is sub-divided into nine sub-hypotheses, each dealing with one element of capital budgeting practices. These sub-hypotheses are spelt out in **Chapter Five.**

1.4 Scope of the Study:

This study covers five major Bahraini industrial companies which are not publicly traded and in which the Government of Bahrain owns a major proportion of the shares. The British companies included in this study are selected from the *Financial Times* 1000, 1993 to match their Bahraini counterparts in terms of industrial sector, asset size, turnover and capital intensity. This research is designed to seek information

on the administrative as well as the financial aspects of capital budgeting practices pertaining to companies included in the study and their degree of compliance with what is prescribed in the financial literature. Other aspects of the capital budgeting process are beyond the scope of this thesis.

1.5 Research Data:

The data used in this study was mainly obtained from the following sources:

1. Responses to study questionnaires from British companies.
2. Personal interview with Bahraini officials responsible for the capital investment process, utilising the same questionnaire as above.
3. Annual reports of the companies.
4. Companies' documents made available to the researcher.
5. Government publications.
6. Published and unpublished materials: books, articles, conference papers, etc.

1.6 Methodology:

In order to achieve the study's objectives, a variety of analytical techniques are utilised, each highlighting a different aspect of the problem. After reviewing the relevant literature, the main elements of capital budgeting practices have been identified. These elements are: preparation of a long-term capital budget, systematic search for investment opportunities, screening and reviewing of capital projects proposals, evaluation techniques, risk analysis, expenditure control, existence of capital budgeting staff, management science techniques, and post-audits.

Information on these elements was sought from British companies and their Bahraini counterparts. The aim of this section is to summarize the analytical methods used in

this inquiry (Figure 1 depicts the methodological approach followed throughout this study).

1.6.1 Questionnaires

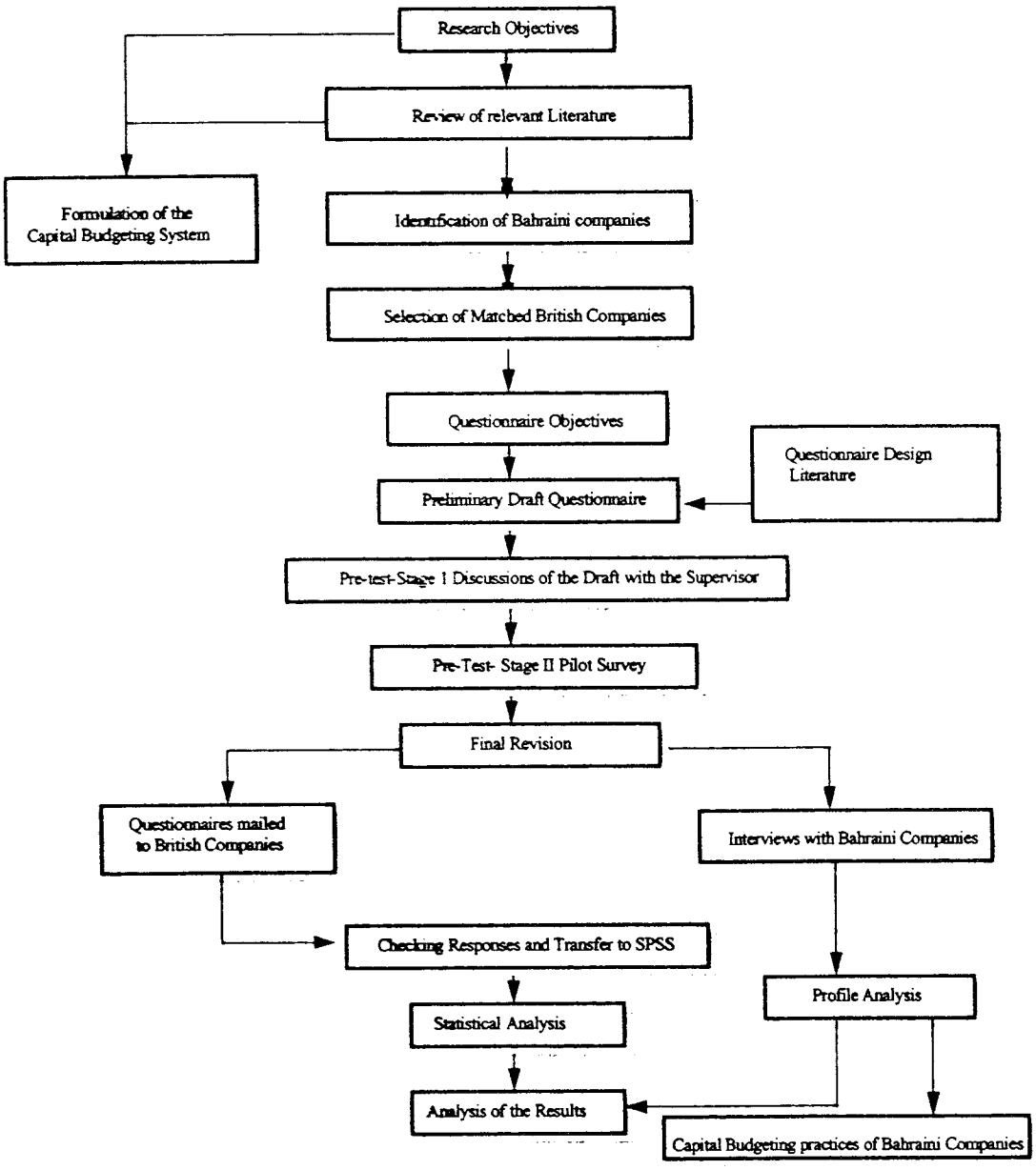
Questionnaires were used to obtain original data as to the specific nature of the capital budgeting practices of the British companies under review. In order to convince managers to offer some of their precious time to respond to the study questionnaire, the questionnaire was designed as closed questions (questions in which the responses are limited to stated alternatives). The questions focused on areas which had been identified in the literature. Sixty-seven medium- and small- sized British companies in three different sectors were selected to receive the questionnaires. Chi-square analysis, Coefficient of concordance (W) and the Mann-Whitney U (MWU) test were the statistical tools used to test for the similarities and dissimilarities between the two groups of British companies- small and medium- in the area under investigation.

1.6.2 Interviews

To gain more insight into the capital budgeting practices of Bahraini companies, structured interviews were arranged with Bahraini managers and other officials in these companies using the same questionnaire. However, during the interviews, managers were willing to go beyond the requirements of the questions. The interviews were conducted by myself, using Arabic, except in some cases where English was used. Each meeting averaged about three hours, with the first 20 minutes being used to explain the academic nature of the study, its importance and the confidential treatment of the responses. With the exception of one case, managers seemed quite willing to discuss their situations openly. This was more than anticipated, given my experience with Bahraini managers.

Figure 1.1 is a flow chart depicting the methodological approach followed throughout this study.

Figure 1.1 : An Overview of the Methodological Approach



1.7 Significance of the Study:

The significance of this study stems from its comparative nature, since it investigates capital investment practices in two different environments, that of a developing country (Bahrain)* and that of a developed country (UK). As such, it is expected to enrich the understanding of both the business and academic communities on the subject of capital budgeting, as well as the factors that may influence capital investment practices.

This study is expected to achieve the following contributions:

1. This study represents the first comprehensive attempt to investigate the capital budgeting practices of major Bahraini companies. These companies were established with the aim of accelerating economic growth and providing employment for Bahraini Nationals.

2. The timing of the study is highly significant as it comes at a time of major structural changes in the Bahraini economy. The Government is currently embarking on an ambitious privatisation programme in which investment decisions play a pivotal role.

3. Developments in the international oil market over the past decade have led to a significant erosion in the oil revenues of oil exporting countries. As oil revenues represent more than 60% of Bahrain's GDP, the country has begun to look for ways and means to diversify its economy away from heavy dependence on oil. Among these means has been the emphasis on the development of industries, with particular emphasis on manufacturing industries. The objective is to ensure that the manufacturing sector becomes a major growth factor in Bahrain's economy- a move that puts more emphasis on proper investment decisions.

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* Bahrain has been classified as a developing country by several international agencies (Organization for Economic Co-operation and Development (OECD)- Development Assistance Committee- DAC, 1994)

4. The State of Bahrain is a small country with a population of just over half a million people and an annual GDP of approximately £ 3.5 billion (1994 figure). Whilst oil is a major source of Government revenue, Bahrain is less dependent on oil than the other Gulf States. However, it is a diminishing and finite resource and even with the most optimistic forecasts would have run out by the time the population reaches the million mark. The need to create industrial employment has, therefore, long been recognized. The limited resources of the country have caused the officials responsible for formulating the country's economic policy to put more emphasis on the proper allocation of these resources, as proper investment decisions can play a significant role in achieving this goal. This study is expected to shed some light on the current capital budgeting practices followed by major Bahraini industrial companies for the purpose of providing some recommendations to improve those practices.

5. The study employs a comparative methodology according to which the capital budgeting practices followed by Bahraini companies are compared with the capital budgeting practices followed by a selected sample of British companies. Due to the different state of economic, cultural and managerial developments in both countries, the study can be viewed as a means of transmitting managerial culture and experience from the developed country (UK) to the developing country (Bahrain).

6. This study devotes part of its attention to the review of capital budgeting practices for a number of small and medium-sized UK companies. Therefore, it attempts to fill the gap created due to the limited amount of literature on the practices of these companies.

7. The study represents an attempt to employ a leading methodology which has been used in capital budgeting studies in the US- known as the Kim methodology or the

Kim index- for the purpose of computing the degree of the capital budgeting sophistication index for the sample companies.

8. The study is expected to add more to the existing body of knowledge on capital budgeting in general and to its application in the developing economies in particular. In addition, it is considered as a point of departure into pursuing more comparative researches across international boundaries in order to fully examine the impact of environmental and cultural factors delineating the capital investment process.

1.8 Limitations of the Study:

1. The sample of Bahraini companies is limited to the five largest industrial companies. These companies' share of the country's total industrial output exceeds 80 per cent (Ministry of Finance & National Economy, National Account, 1995). However, these companies represent the Bahraini population of major Government owned- industrial enterprises.

2. The British sample is limited to those small and medium-sized companies whose characteristics are similar to those of their Bahraini counterparts.

Limitations 1 and 2 restrict the generalization of the study findings only to those companies with similar characteristics to the ones included in this research.

Moreover, it can be argued that Bahrain does not represent a typical developing economy when considering its resources and size. Therefore, generalization of the results may be inappropriate. A broader sample, perhaps by investigating some other developing countries, may be required to generalize the results more correctly.

3. The study employs questionnaire and interview methodologies to collect the necessary information, and as such it suffers from the shortcomings pertaining to these methods. Interviews have the inherent problem of interviewer bias. Survey

questionnaires normally suffer from the following limitations: forced-choice problems, response errors arising from unclear definitions and unwillingness to provide honest answers and lack of representative responses. Under forced-choice procedures, the response to one item can be influenced by responses to another item. This results in a violation of the independence assumptions necessary for statistical tests.

4. Although the same questionnaire was mailed to both Bahraini and British companies, the researcher conducted a series of in-depth interviews with the officials in Bahraini companies. Those interviews allowed the researcher to gain more insights into the capital budgeting practices of these companies. However, the study comparisons were made on the basis of the responses to the study questionnaire as reported by the two groups.

5. Due to the small size of the Bahraini sample, no formal statistical testing was performed to test the study hypotheses related to the comparison between Bahraini companies and their British counterparts regarding their capital budgeting practices. However, chi-square tests were performed for testing the similarities and dissimilarities of the companies in the British sample with regard to size and industry affiliation.

1.9 Organisation of the Study:

The study consists of four parts. Part one is background and consists of chapter one and chapter two. Chapter one is the introduction to the study. Chapter two covers the economic environment and industrial development in Bahrain. Part two is the literature review, and consists of chapters three and four, both of which are designed to cover the relevant literature in the area of capital budgeting. Part three is the methodology and analysis and includes chapters five, six, and seven. The fourth part consists of

chapter eight, which provides a summary and conclusions of the study. Below is an outline of each of these chapters.

Chapter Two: The Economic Environment and Industrial Development in Bahrain-this chapter provides an overview of the economic environment in Bahrain with the main focus on industrial development and the government's ambitious programme to diversify the economy away from heavy dependence on oil.

Chapter Three: Capital Budgeting Theory- this chapter provides an overview of capital investment decisions. It presents a review of prior literature that has attempted to describe the capital budgeting process, a review of existing models of capital budgeting, a review of the basic elements of capital budgeting practices, a review of some studies which attempt to study the relationship between organisational performance and the sophistication of capital budgeting practices, and the gap between theory and practice.

Chapter Four: Capital Budgeting Practices- this chapter provides a review of empirical studies on capital budgeting practices in the UK and the USA. A review of capital budgeting practices for some developing countries as well as capital budgeting practices of non-profit-making organisations are provided.

Chapter Five: Research Methodology-this chapter describes the Bahraini sample, and reviews the relevant literature on the criteria used in capital budgeting practices to guide the selection of a matched sample of British companies. The development of research objectives and hypotheses briefly stated in chapter one are clearly spelt out in this chapter. The capital budgeting practices identified in the literature are all integrated into a conceptual capital budgeting system that is used as a basis for formulating the study hypotheses.

An overview of various data collection methods and their advantages and disadvantages are also highlighted. In addition this chapter describes the survey method used to collect information from British companies, development of the questionnaire and the breakdown of the study sample.

Chapter Six: Analysis and Results - Phase I: The Case of British Companies- this chapter presents the responses of British companies to the study questionnaire. The chi-square test was used to test for similarity or dissimilarity between the two groups of British companies regarding their capital budgeting practices in light of the study objectives stated in chapter one. Kendall's coefficient of concordance (W) was used to test the similarity of perception of the two groups of companies with respect to the relative importance of the components of the capital budgeting system. The weights assigned to capital budgeting components as established by this study, along with the responses of British companies to the use or non-use of certain investment practices, were used to measure the degree of sophistication of capital budgeting practices for each company.

Chapter Seven: Analysis and Results-Phase II: The Case of Bahraini Companies- this phase of the analysis is comprised of two parts. Part one presents the results of the analysis of the responses of Bahraini companies to the study questionnaire following the same approach as in phase one. This part also includes a description of the capital budgeting practices of the Bahraini companies. Part 2 of this chapter presents a comparison between British and Bahraini companies with respect to the elements of the capital budgeting practices identified in chapter five.

Chapter Eight: Summary and Conclusions- this chapter summarises the various findings of the study, provides an outline of the research process, presents the study

conclusions, assesses the conformity of the capital budgeting practices of the Bahraini and the British companies to the theory of capital budgeting, highlights the implications of the study for the capital budgeting theory and for both researchers and practitioners, provides some managerial guidelines to improve the investment process of the Bahraini companies included this survey, offers some direction for future research and finally spells out the practical and academic contributions of the study.

CHAPTER TWO

THE ECONOMIC ENVIRONMENT AND INDUSTRIAL DEVELOPMENT IN BAHRAIN

2.1 Introduction:

Chandler and Holzer (1984) describe the characteristics and problems of developing countries as follows:

> *"Developing countries vary greatly in geographical size, population, access to natural resources, and degree of economic, social, and political development... are predominantly agrarian; the major part of their population lives in rural areas... an unbalanced distribution of income and wealth..." (p. 453-454)*

Most of these countries have been continuously striving to improve their general economic condition through the formulation and execution of development programmes. The main objective of these programmes is essentially to achieve a higher growth of per capita real national income or output which will subsequently improve living conditions.

Bahrain, a developing country, exhibits many of the characteristics mentioned by Chandler and Holzer (1984). Since achieving independence from Great Britain in 1971, the Government of Bahrain has formulated a strategy involving consecutive development programmes to improve conditions.

Industrial development has long been recognised as a key factor in the economic progress of developing countries (Todaro,1994). This fact is reinforced by the continued efforts of governments in many developing countries to modernise their industrial sectors. This has been the thrust of the Government in the State of Bahrain which has been dependent on oil revenues for many decades. The continued downward pressures on oil prices has led the Government of Bahrain to diversify its economy away from the oil sector towards the industrial sector.

To form an alternative source of revenue from industrial development, industrial projects are expected to have the objective of commercial profitability as well as strategic objectives. Such objectives are essential to attract investments into industry and the country has been encouraging this for some time.

This chapter, which is concerned with the economic environment and the industrial development in Bahrain, consists of the following three sections:

Section 2.2 presents an overview of economic development and the factors important for achieving economic development are highlighted.

Section 2.3 presents an insight into the economic environment in Bahrain prior to the industrialisation era. This section illustrates the nature of Bahrain's economy prior to the discovery of oil in 1932 and the main sources of the country's revenues during that period.

Section 2.4 presents an overview of the economic structure, industrial policy objectives and development strategy adopted by the Government of Bahrain to diversify its economy away from heavy dependence on oil.

This chapter ends with a brief summary outlining a future outlook for industrialisation in the State of Bahrain.

2.2 An Overview of Economic Development:

> *"Economic development is concerned with the efficient allocation of existing productive scarce resources and with their sustained growth over time"* (Todaro, 1994, p. 8).

In strictly economic terms, economic development as defined by Todaro refers to the capacity of a national economy to generate and sustain an annual increase in its gross national product (GNP) at rates of 5 per cent to 7 per cent (Todaro, 1994).

According to Hanson (1965, p. 24):

> *"Economic development implies successive additions to a country's store of capital equipment and this must be large enough to effect an increase, not merely in total national income, but in national income per capita. Otherwise, the forward movement of the economy will do no more than prevent it from slipping backward"*

John Gullick (1981, p. 146) further emphasises that:

> *"If the economic development program is to succeed there must be a continuing steady expansion of the national economy as a whole. The condition of the poor cannot be improved by mere redistribution of resources at the expense of the better off.....To achieve growth there must be a high level of capital investment in new resources"*

The industrial sector is perceived as the main source of development because, in the past, it achieved higher rates of growth than any other sector, (Gueciouer, 1984). Agriculture has not been able to cope with mounting unemployment resulting from population explosion and economic inefficiency. For developing countries and oil producing countries in particular, there is an extra motivation for industrialisation. Given the exhaustibility of oil and the quasi-non-existence of any agricultural potential, the exportation of goods and services appears to be the only future source of foreign exchange earnings. These goods and services can only be provided by industry (Gueciouer, 1984). The role of industrialisation in enhancing the economic development is supported by Todaro (1994, p.14) who states that:

> *"Economic development in the past has also been typically seen in terms of the planned alteration of the structure of production and employment so that agriculture's share of both declines and that of the manufacturing and service industries increases. Development strategies have therefore usually focused on rapid industrialisation, often at the expense of agriculture"*

Capital expenditure is a major factor in enhancing economic development and, as such, plays a decisive role in determining the rate of growth of an economy. According to Lamfalussy (1981), economic growth involves two propositions: first, investment generates income and is therefore-via effective demand-one of the main determinants of the degree of utilisation of existing resources. Secondly, net investment is an addition to capital and thus increases the productive capacity of the economy.

Lamfalussy has illustrated the impacts of capital expenditure on the country's economic growth by using a numerical example. If the country's capital expenditure is to be maintained at its present level-according to Lamfalussy's argument- we may expect a steady growth of output capacity of three per cent per year. Such an increase may require an increase of one per cent in the labour force, with the remaining two per cent being accounted for by the growth in productivity.

Thus, a certain degree of interdependency exists between capital expenditure, output capacity and productivity. Such interdependence has far reaching implications for the nature and scope of economic development.

The increased productivity alone does not guarantee a rise in the productivity of a nation's economy, because productivity is a function of technological progress which is a major input requirement for economic development. The rate of economic growth is said to be a function of the type of technology used and the degree of usage of each relevant technology. Many studies have established the indispensability of technology to economic growth. Previous research in the United States and other industrialised countries has indicated that "*fifty per cent of economic growth has been attributed to some technological change*" (Contractor and Sagafi-Nejad, 1981, p.115).

Technological progress contributes to economic growth by increasing usable natural resources through new discoveries, discovering new uses for existing resources, improving the productivity of existing resources and discovering new production methods. The concept of technology goes beyond these to include scientific research methods and techniques and their application in the real world environment to attain specific desired objectives. Capital budgeting tools and practices,such as project appraisal techniques, risk analysis, and use of operation research methods which are the concern of this thesis among others, are considered part of the technology that can be transferred from developed to developing countries. The former can provide the latter with the means to improve their economic resources and enable them to use these resources in the most efficient manner in order to accelerate their economic progress.

Realising that a direct relationship exists between scientific research and economic development and that new and relevant technologies offer substantial benefits to their economies, most developing countries are gradually transferring the relevant technologies into their economic systems. Numerous studies have been undertaken to investigate the problems and extent of technology transfer to the developing countries (Contractor and Sagafi-Nejad, 1981). The findings of these studies indicate that managerial techniques and methods play an important role in the economic development of both developed and developing nations, Jaggi, (1973), Briston (1978), Enthoven (1980) and Alhashim (1984).

However, the process of transferring this technology has been rather slow. The environment prevailing in most of the developing countries has not been very receptive

to accepting changes in accounting methods and techniques developed in the West. Many entrepreneurs and managers are not fully aware of the value of accounting and of the information it may provide as an instrument of financial and management control. Financial statements are unnecessarily delayed, incomplete and consequently, of little use. Entrepreneurs and managers frequently lack proper understanding of the value of sound management accounting techniques for efficient decision-making (Enthoven, 1980). The prevalence of this problem has been confirmed by previous studies of such countries as Ghana (Anyane-Ntow, 1982), and the Sudan (Mirghani, 1979).

2.3 Bahrain Economy - Pre Industrialisation Era:

Bahrain is an independent state consisting of an archipelago of about 33 small islands. It is situated halfway down the Arabian Gulf, 24 kilometres from the eastern coast of Saudi Arabia and a little further from the western coast of Qatar. It has a total area of approximately 690 square kilometres. The population was estimated at 508,037 according to the 1991 census, with an average annual growth of 4.7 per cent since 1978, (Bahrain Statistical Abstract, 1992). Demographically, the Bahraini population is young with almost half still under twenty. Approximately 67 per cent of the population are Bahrainis, the rest are expatriates.

Prior to the discovery of oil in 1932, Bahrain was one of the richest countries in the northern Gulf, with an economy that was heavily dependent on the pearling industry. Its pearls were considered to be the best in the region and pearling employed nearly half the male working population (EIU, 1997). Pearling represented more than 90 per

cent of the total export and was the major source for hard currency (Al Khalifa , 1995).

Government revenue from the pearling industry was, to a large extent, based on the nominal taxes and fees imposed on each pearling ship and on the indirect taxes imposed in the form of custom duties on their export (Al-Shamlan, 1993). Therefore, the Bahraini economy depended on the pearling industry prior to its oil discovery in 1932. The economy also depended on other activities such as agriculture, trading, fishing, and traditional ship-building. In effect, Bahrain was an important agricultural and trading centre.

Prior to the economic recession of the 1920's and the discovery of oil in Bahrain in 1932, Bahrain had a strong influence on pearl trading in the Arabian Gulf, but in the 1930's the effects of world economic recession took its toll on the Bahraini economy. As a result the demand for the natural pearls which Bahrain has been producing over the years, fell approximately by 40 per cent. The fall was mainly due to the impact of the world economic recession in the 1920's and the competition from Japanese cultured pearls. The result was a big loss in a main source for obtaining hard currency (Bahrain Monetary Agency, 1987).

The discovery of oil in 1932 led to Bahrain becoming the first state on the Arab side of the Gulf to exploit its oil resources. The revenue generated from oil production eliminated the adverse effects which had resulted from the decline of the pearling industry (Bahrain Monetary Agency, 1987). The timing of the discovery of oil could not have been better. New job opportunities were created in the emerging oil industry. Therefore, the year 1932 could be considered as transitional year for the

Bahraini economy. This turning point resulted in a change in the socio-economic structure of the society. This new industry attracted employees from the various traditional sectors. Oil provided the country with stable revenues which enabled it to carry out further social projects such as hospitals, schools and development of electricity and water networks. The island's first small oil refinery was set up and started production in 1935. It marked a major turning point in the country's development. The pearling industry, previously the mainstream of the economy, gradually declined for the reasons given earlier.

The timely rise of the oil industry represented not only a source of regular employment for the pearl workers, but also provided a stable economy whose oil revenues enabled the Government of Bahrain to introduce and develop the social welfare services, and economic infra-structure well in advance of the neighbouring states.

2.4 Bahrain Economy-Industrialisation era:

Whilst oil is a major source of Government revenue, Bahrain is less dependent on oil than other Gulf States. However, it is a diminishing and finite resource and even with the most optimistic forecast would have run out by the time the population reaches the million mark. The need to create industrial employment has, therefore, long been recognised.

It was realised by the Government that a policy framework and strategy for industrial development needed to be developed and implemented to generate wealth and employment in order to sustain living standards and to secure the interests of future generations (UNIDO, 1986). Bahrain's early industrial diversification in the 1960s, away from oil production into petroleum refining, petrochemicals, aluminium and

downstream industries has proven particularly successful, both in terms of providing valuable employment opportunities for young Bahrainis and accelerating economic growth.

Industrial activities in Bahrain are characterised by the presence of two major industrial sectors. The first is the basic industries sector in which the Government owns a major interest. It represents the aluminium, petrochemical, gas and ship repair industries. Such industries depend upon gas and rely on foreign markets for marketing their products. The second is the small and medium-sized industries sector which is comprised of aluminium industries, paper products, timber manufacturing, food industries and other smaller manufacturing activities.

2.4.1 Economic Policy:

In 1982, Bahrain launched its first four-year economic and social development plan (1982-86) which in 1984 was spread over six years because of expected shortfalls in public revenue (Bahrain Centre for Studies & Research, 1986). The overall aim of the plan was to forge greater co-operation between various sectors of the economy so as to optimise the use of available human, economic and financial resources. Although the plan was not published subsequently official statements consistently made known that the main objective was creating additional jobs for Bahrainis in a setting of economic growth.

Bahrain's industrial policy and development strategy as stated by Government officials can be summarised as follows:

- Diversification of the economy away from heavy dependence on oil, through development of industries, with particular emphasis on the manufacturing sector becoming a major growth factor in Bahrain's economy.

- Consolidation of the development gains achieved in offshore banking and other service sectors and maintaining the momentum for their future growth.

- Further development of the infrastructure facilities, such as airport, sea port, modern serviced industrial estates and telecommunications.

- Creation of job opportunities for the growing national population.

- Increasing the role of the private sector. Industrialists and entrepreneurs, will have to be encouraged to accelerate the development of small and medium scale industries capable of producing competitive products to substitute the existing high level of imports and to export at least to neighbouring countries.

To achieve the above objectives the Government has pursued the following:

1. **Selective privatisation of state owned industries.** The State of Bahrain has recently commenced progressive withdrawal from direct investment in certain projects and after careful nurturing, many industries are now ready to be exposed to the full rigours of the market place. Plans to privatise include the proposed sale of Government shares in Bahrain Aluminium Extrusion Co. (Balexco). A share offering is planned for 1998 with full privatisation to follow thereafter. Gulf Air is another candidate for privatisation with 49 per cent of its shares earmarked for sale. Based in Bahrain, it is owned jointly by Abu Dhabi, Qatar, Bahrain and Oman.

2. **Encouragement of foreign investment.** With economic growth in 1998 forecast at two per cent, constrained by the recent Gulf War and the resultant retrenchments in the financial sector and weakening of domestic demand, the Government is determined to breathe new life into its diversification drive and boost inward investment. As a result, wholly foreign owned enterprises have been allowed to be established. The major

incentives available to foreign investors are summarised as follows, (Ernst & Young,1992):

- no personal or corporate taxation;
- no restriction on repatriation of capital, profits and royalties;
- an established offshore banking centre;
- a well-educated and competitive labour force;
- a highly developed infrastructure with good transport and communication systems;
- foreign ownership of a company in certain cases;
- duty-free access to the markets of the six GCC states in certain cases;
- government-subsidised fuel, water and electricity;
- industrial sites provided at nominal rents;

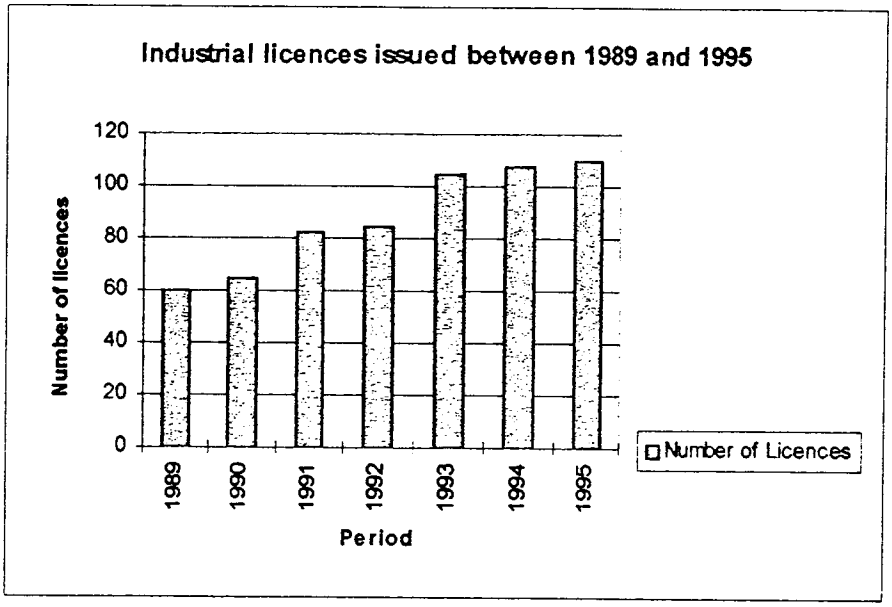
3. **Reducing bureaucracy in all Government private sector interactions.** This has already been achieved in the field of registration and licencing procedures. Recent statistics (Ministry of Finance, 1995) show that there is an 83 per cent increase in the licences issued between 1989 and 1995 (Figure 2.1). A liberal policy in granting industrial licences has the main purpose of expanding the industrial base and subsequently of encouraging more enterprises to undertake capital investment projects. New industrial projects implemented in the past two years total 150. These projects have generated 5,850 new jobs.

2.4.2 Bahrain Economic Structure:

Oil remains the major source of Government revenue. However, an increasing contribution is now coming from the manufacturing and service sectors of the economy, as a result of the diversification policies launched in the 1970s. The transition of Bahrain's economy from its dependency on the primary production of oil can be broadly gauged by comparing the components of Gross Domestic Product (GDP) in 1985 with those in 1994 (Bahrain Statistical Abstract, 1995). In 1985, crude

oil accounted for 28.2 per cent of GDP at current market price , manufacturing for 10.1 per cent (of which about half was due to oil refining and aluminium) and Services for 60.2 per cent of which banking and insurance accounted for 17.1 per cent.

Figure 2.1: Industrial Licences issued by Ministry of Petroleum & Industry



By 1994, crude oil and gas production contributed about 15.7 per cent of GDP, whereas the manufacturing sector share of total GDP was 17.6 per cent (Table 2.1). The tertiary sector's share had declined in importance from 75.1 per cent in 1993 to 74.0 per cent in 1994, with banking and insurance contributing as much as 14.6 to GDP. The other principal contributor to the tertiary sector was public administration which accounted for 19.5 per cent of GDP in 1994.

Table 2.2 shows that the volume contribution of manufactured goods had risen from 138.8 to 321.6 million dinar between 1985 and 1994 (about 132 per cent).

A similar structured transformation can be seen from the data for foreign trade and services (Table 2.3). This Table shows that, since 1985, the importance of oil exports has steadily declined while that of non-oil exports and services has increased.

Table 2.1: Bahrain Gross Domestic Product (At Current Market Prices) (Per cent Distribution)

Sector	1985	1990	1991	1992	1993	1994
A. Primary Sector	29.4	21.9	18.7	17.8	17.9	16.6
1. Agriculture and Fishing	1.2	1.0	0.9	1.0	1.1	1.0
2. Mining (Crude Oil)	28.2	20.9	17.8	16.8	16.8	15.7
B. Secondary Sector	12.0	18.6	18.3	16.9	16.5	19.3
1. Manufacturing	10.1	16.7	16.6	15.1	14.7	17.6
2. Electricity & Water	1.9	1.9	1.7	1.8	1.8	1.7
C. Tertiary Sector	77.3	69.5	71.3	74.6	75.1	74.0
1. Construction	9.7	6.2	5.8	6.1	6.0	6.0
2. Transport & Communication	12.1	9.3	12.1	11.4	11.4	11.8
3. Trade & Services	8.7	9.8	10.6	12.1	11.3	11.4
4. Banking & Insurance	17.1	12.9	11.9	13.9	15.6	14.6
5. Real Estate	6.7	5.2	5.3	5.5	5.5	5.5
6. Public Administration	18.5	20.9	20.8	20.7	20.3	19.5
7. Other Services	4.5	5.2	4.8	4.9	5.0	5.2
D. Less Imputed Service Charge	(18.7)	(10.1)	(8.4)	(9.3)	(9.5)	(9.9)
Total	100	100	100	100	100	100

Table 2.2: Gross Domestic Product By Type of Economic Activity (BD Million- At Current Market Price)

Sector	1985	1990	1991	1992	1993	1994
A. Primary Sector						
1. Agriculture and Fishing	16.4	14.3	14.7	16.6	18.4	17.2
2. Mining (Crude Oil)	387.4	314.1	283.4	280.6	294.5	287.1
B. Secondary Sector	164.3	280.6	293.1	281.5	287.9	3518
1. Manufacturing	138.8	251.9	265.5	251.6	257.3	321.6
2. Electricity & Water	25.5	28.7	27.6	29.9	30.6	30.2
C. Tertiary Sector	1,061.2	1,049.5	1,136.7	1,242.5	1,212.8	1,350.4
1. Construction	133.7	94.1	91.7	101.1	104.7	109.9
2. Transport & Communication	165.9	140.2	192.8	189.8	198.7	216.4
3. Trade & Services	119.5	147.9	168.6	201.1	197.4	208.4
4. Banking & Insurance	234.0	194.6	190.3	232.0	273.6	266.1
5. Real Estate	92.7	78.2	84.9	91.46	95.7	100.1
6. Public Administration	253.7	315.6	331.5	344.6	254.5	356.0
7. Other Services	62.0	78.9	76.9	82.5	88.2	94.4
D. Less Imputed Service Charge	(256.4)	(152.3)	(133.2)	(154.3)	(165.9)	(181.2)
Total	1,373.1	1,506.3	1,594.8	1,666.8	1,747.6	1,826.2

Table 2.3: Foreign Trade in Goods and Services

	1985	1990	1991	1992	1993	1994
(1) Oil						
Oil exports	959.6	1,105.0	1,024.7	979.3	917.1	836.6
Oil imports	(544.8)	(672.0)	(645.9)	(568.5)	(515.3)	448.1
(2) Non-Oil						
Non-oil exports	129.6	309.0	296.2	323.3	469.9	525.3
Non-oil imports	(623.3)	(723.6)	(901.4)	(1,034.4)	(922.9)	966.2
(3) Services						
Receipts	15.3	86.9	98.0	175.7	180.3	195.6
Payments	(8.2)	(53.9)	(56.4)	(105.9)	(95.7)	(105.4)

2.4.3 Highlights of Recent Economic Initiatives:

Much of Bahrain's industrial development progress during this period has been due to direct Government investment, often with other Gulf States as equity shareholders, as in the case of Alba, Gpic and Asry. The Government is now looking increasingly to the private sector to implement such projects in the future, taking advantage of Bahrain's strategic location and its proximity to Saudi Arabia, especially after the opening of the 27 km- long King Fahad Causeway.

The recent achievements, particularly in developing small and medium- sized industries, has much to do with initiatives proposed by the Ministry of Oil and Industry and the Ministry of Finance and National Economy.

These initiatives are:

A. <u>The establishment of the Bahrain Development Bank in early 1992</u>

The bank was established to provide financial support to new and existing small and medium sized companies. Its shareholders include the Government of Bahrain, commercial banks and some private sector representations.

The bank's principal products include:

(I) Project Finance
(ii) Fixed Assets Loans
(iii) Working Capital/ Bridging Finance
(iv) Small Business Support
(v) Equity Investment
(vi) Management Consultancy

The Ministry of Oil and Industry co-operates fully with the Bahrain Development Bank in encouraging development of industry in Bahrain.

B. The introduction of an incentive programme by the Ministry of Finance and National Economy to encourage employment of Bahraini workers in the manufacturing industry

The programme launched in early 1993, is entitled "Human Resource Development Support Programme" (Ministry of Finance & National Economy, 1995). It is designed to offer financial support to new and existing industries in addition to encouraging an increase in the employment content of Bahrainis in the industrial workforce.

The primary objectives of the Human Resource Development Support (HRDS) Programme can be summarised as follows:

- Increase the participation rate of the national manpower in industrial activities.
- Attract new industries with emphasis on new pioneering activities.
- Enhance the competitiveness of small and medium-sized industries (SMIs) in regional and international markets.

- Encourage exports of SMIs.

The HRDS Programme employs financial incentives as a means of achieving its objectives. The programme targets two types of industries on account of their different needs and requirements. The first consists of existing industries while the second encompasses new industries. The latter, in turn, is segmented into three categories: pioneering, downstream and horizontal expansion industries.

Horizontal expansion Industries are those that plan to produce already existing products using the same technological know-how while downstream industries consist of aluminium-based and petrochemical industries. Pioneering industries, on the other hand, are defined as new activities that do not duplicate existing activities nor are they aluminium or petrochemicals based.

The Programme is designed to treat the group of existing industries and horizontal expansion industries alike in terms of qualification conditions and incentives packages. On the other hand, new pioneering industries and downstream industries are treated differently from the former group.

The Human Resources Development Support (HRDS) Programme is administered by the Ministry of Finance and National Economy in association with the Ministry of Oil and Industry.

2.4.4 Financing New Giant Projects:

Bahrain is preparing to embark on more than $1,000 million worth of infrastructure and industrial projects. These include the construction of a new port and industrial zone, the modernisation of the Sitra refinery and the establishment of a new fertiliser

plant (Table 2.4). However, with depressed oil prices biting into Government revenues, the challenge facing the government will be to secure the financing for these ambitious projects.

The Projects:

Refinery Modernisation: One of the most long-standing candidates for spending is the refinery at Sitra operated by Bahrain Petroleum Company* (Bapco) on behalf of its shareholders-the Bahrain National Oil Company (Banoco) (60 per cent) and the US Caltex (40 per cent). Plans to modernise the refinery, originally estimated to cost about $800 million, have been under consideration for the last decade. The modernisation programme is likely to be divided into two or three phases, with the main thrust geared towards the production of unleaded petrol. The refinery needs to be prepared for the time when world-wide demand changes to unleaded petrol, even though it is currently discovering new markets for its products in South Asia. "*As the developing countries in the region introduce stricter environmental measures, we will need to change our product to meet the requirements of the market*" says the Banoco General Manager of Marketing, Adel Al-Moayyed (Meed, 1994, p. 4).

A project administrator has been appointed to oversee the first phase of the modernisation programme and Bapco expects to approach contractors by the end of the year. Phase one, estimated to cost $200 million-$300 million, will involve building a new single crude unit to replace the four original crude units built before the Second World War. By having one unit, Bapco aims to increase efficiency and reduce

* The Government of Bahrain assumed full control of Bapco from 1st of April, 1997.

maintenance costs. Petrol production will also be upgraded and in-house technical experts are considering the different options available to achieve this.

The modernisation scheme has risen and faltered half a dozen times since its conception, but this time Caltex believes it will go ahead and hopes that the first phase will be completed by 1997. " *The government is well aware that it must spend money on the refinery and has indicated that financing will not be a problem,*" says a Caltex representative. As Bahrain's first industrial enterprise and an employer of about 2,200 nationals, the refinery is regarded as extremely important to the local economy.

Port and Industrial Area: The $200 million-$340 million scheme to build a new port and industrial area at Hidd will be a strategic element in Bahrain's plan to attract shipping and foreign investment into the region. It will be able to accommodate much larger ships than the current facilities at Mina Sulman, handling twice as many containers at 400,000 a year and the adjacent industrial area will provide much needed sites on the waterfront. However, the selection of a consultant to design the complex has been held up as the Government decides how to approach the project. Prequalifying documents included proposals for a turnkey contract as well as for a build-own operator-transfer (BOOT) option, but the project is now expected to proceed in phased packages. Twenty one consultants are understood to have been prequalified for the job, and were expecting to receive invitations to bid by early October 1996. However, further delays seem probable before a consultant is selected due to the large number of bids expected.

Urea Plant: The Gulf Petrochemical Industries Corporation's (Gpic) plans to build a urea plant does not come as a surprise, having been under discussion for several years.

Gpic's shareholders, the Government of Bahrain, Saudi Basic Industries Corporation (Sabic) and Kuwait's Petrochemical Industries Company (Kpic), have approved the project, but are now waiting while the Kuwait's Gulf investment Corporation draws up various financing proposals. A technical consultant should be selected once a financing route has been chosen. Gpic sees construction of the plant as a strategic move into the downstream petrochemical industries. By using ammonia already produced at their plant in Sitra as feedstock, Gpic hopes to take advantage of the current high demand for urea, both in the domestic and export market.

Coke Calcining Plant: Having recently expanded its aluminium smelter to a capacity of 460,000 tonnes a year, Aluminium Bahrain (Alba) is already proposing a further $250 million project to build a coke calcining plant at its marine terminal. Alba currently relies on imported coke which is used as a feedback in the smelting process, but would prefer to have greater control over the quality of the coke it uses.

Full approval for the project has yet to be given by Alba's shareholders, the Government of Bahrain with 77 per cent, the Public Investment Fund of Saudi Arabia with 20 per cent and Germany's Berton Investments with three per cent. The primary aluminium industry is always considered a safe investment, but some local industries argue that the Government would be wiser to support other sectors at this stage.

Sitra Power Station: The Works, Power & Water Ministry plans to upgrade the 20 year-old boilers and turbines to match the life of the neighbouring 10-year-old desalination plant, which should be in operation until 2007. Total installed power generation capacity is 984 MW, but demand came to 900 MW last summer. The Government does have access to 250 MW from Alba's new 800-MW unit, but this

$18.6 million refurbishment programme is still vital if supply is to meet the estimated five per cent annual increase in demand.

Extension to the Airport: An $18 million extension to Bahrain International airport is currently underway. Tender documents were submitted in early 1995. The work is divided into four phases and split into three separate packages: an extension of the existing terminal building; construction of three aprons in the terminal, cargo and DHL areas; and an extension to the existing apron. The consultant is the UK's Scott Wilson (Meed, 1995). The aim of the expansion is to further promote the airport as a regional hub for both passenger and cargo traffic.

Table 2.4: Bahrain: Infrastructure and Industrial Projects, 1994*

Project	Cost ($ million)	Client	Gov. Stake	Project Status
Modernisation of Sitra refinery	200-300	Bapco	60	In-house team appointed; Contractors are likely to be approached in early 1995 (1)
Construction of port and industrial area in Hidd	212-345	Finance Ministry/Development & industry Ministry (2)	100	Consultant prequalified; project details to be finalised (3)
Construction of urea plant	200	Gpic	33	Kuwait's Kpic drawing up financing proposals. Shareholders have approved project. Technical consultant to be selected by 1995 (4)
Construction of coke-calcining plant	250	Alba	77	Awaiting shareholders approval (5)
Modification of Sitra power plant	18.6	Works, Power & Water Ministry	100	Ewbank Preece appointed consultant; awaiting budget approval (6)
Extension to airport	18	Development & Industry Ministry	100	Consultant appointment expected in October, tender documents expected by early 1995 (7)

Source: Middle East Economic Digest, Meed, July 14, 1994, p.6)

(1) Negotiations are still going on.
(2) Ministry of Petroleum and Industry.
(3) International consultants bidding for the design and supervision have been asked to extend the validity of their bids.
(4) The local AA Nass Contracting has been awarded a contract for work on the project. Japan's Mitsubishi Heavy Industries (MHI) signed the $ 136 million lump sum turnkey contract for the construction of a 1,700 tonne-a-day urea plant based on process technology developed by Italy's Snamprgetti.
(5) Still not finalised.
(6) The project is at an advanced stage, with bids for the consultancy under evaluation
(7) Phase 1 is underway.

Chapter Summary:

The discovery of oil in the early 1930's marked the beginning of several development initiatives by the State of Bahrain in the social, economic and industrial fields, which in turn resulted in the achievement of a better standard of living for the people of Bahrain. It was also the beginning of a shift in the occupation of the people from fishing, agriculture and pearl diving to modern industry.

To achieve its long-term economic goals, the Government of Bahrain has embarked on an ambitious industrialisation programme. The programme began with oil exploitation activities which were followed by the establishment of oil refining. These steps were followed by the establishment of gas liquification facilities as well as aluminium and petrochemicals plants. This, in turn, has led to investment in a number of down-stream industrial activities with further diversification into light manufacturing and food processing.

The building of such an industrial infrastructure relying upon the wealth of natural endowment of oil has resulted in the generation of tremendous and positive yields to the national economy. In addition to the increase in the national income, the companies in the petroleum industry sector have contributed to the creation of a qualified managerial workforce, which has been able to accommodate thousands of workers, thus providing an honourable means of livelihood for the citizens of Bahrain.

It was realised from the outset that oil supplies were limited. Therefore, a need for developing a more diversified economic base was identified. The adoption of a deliberate policy of diversification into hydrocarbon-linked industries and the efficient

use of all oil associated products was attempted and investments in industrial projects were therefore encouraged. As a result, industrial projects began to be set up from the late 1960's and the industrial sector was further developed and took different forms. The major investor at this stage was the Government, which attracted some foreign investors in a joint venture to set up the Bahrain Aluminium Smelter, which was the most important project after the oil refinery.

Industrial expansion, diversification and modernisation is a continuously ongoing process in Bahrain. These activities in turn create a multiplier effect and generate numerous opportunities for further industrial investment. It is estimated that every manufacturing job created results in the creation of four additional jobs in marketing, trading, advertising and services.

The successful creation of the expanded aluminium smelter and the successful marketing of Alba's products and its downstream industry's products in the world market are a shining example of what can be achieved.

The future strategy for industry in Bahrain must aim at maximising the use of available resources of oil, gas and aluminium, coupled with the infrastructure resources of power, transport and telecommunications. In addition, the support of the financial and banking community will be essential in implementing future projects.

However, it is the manpower resource which will play an increasingly important role in industrial development at both entrepreneurial and employee levesl.

PART TWO

LITERATURE REVIEW

CHAPTER THREE

LITERATURE REVIEW

CAPITAL BUDGETING THEORY

3.1 Introduction:

Due to its comparative nature, a complete review of the literature on capital budgeting for this study would require the coverage of previous capital budgeting both in Bahrain and the UK. However, the limited number of capital budgeting studies conducted on the Gulf region in general and on the State of Bahrain in particular, makes it inevitable that more emphasis will be placed on previous capital budgeting studies in the UK and other Western countries. This can be complemented by the review of capital budgeting as it stands in the financial literature. This review will help in identifying key dimensions of the capital budgeting system helpful in the development of the study framework. It is expected that such an approach would be an appropriate option for the following reasons:

1. The literature on capital budgeting studies in Western countries is comprehensive, which allows the researcher to review those studies that are related to the different areas covered in this present study.

2. The economic theory approach to measuring an investment's performance is to assess its contribution to the wealth of the investor (or the owners of the firm undertaking the investment). That is, the decision-maker must be able to ascertain whether the value of future benefits from the investment justifies the outlay (and future costs) required to invest. This basic decision criterion is the same for all investments and all organisations and can be applied to the study of capital investment decisions in different economic environments.

3. Most of the research undertaken in developing countries regarding investment-decision making, has employed models prescribed in the financial literature and

developed in the West. This is apparent from studies of Abdul Rahman (1980), and Samidi (1989), in Malaysia and Al-Deehani (1990), in Kuwait.

4. Rapid globlisation of the world market represents fertile ground for exchanging knowledge and transferring technology from developed countries to developing countries. Developing countries are eager to import not only machines, equipment and hardware, but also techniques, methods procedures and know-how.

5. Since the early 1960s, capital budgeting has received a great deal of attention by both academic and business communities. The literature documenting research into capital budgeting practices reveals a predominant approach to discovering capital budgeting practices used by firms. As a result, the researcher finds it an appropriate path to use the documented literature on capital budgeting as a foundation for developing the study framework. This is essential where the empirical evidence on the topic is almost non-existent.

3.2 Capital Budgeting Theory- Background:

Capital budgeting is one of the areas of managerial economics that has been receiving ever increasing attention. For the past four decades or so, the literature of accounting, finance and economics, among others, has dealt extensively with the subject of capital budgeting. In brief, capital budgeting refers to, "*the entire process of planning expenditures whose returns are expected to extend beyond one year*" (Brigham & Pappas, 1976, p. 283)". For Bromwich (1976) capital budgeting addresses three issues: the specific investment projects the firm should accept, the total amount of capital expenditure the firm should assume and the planning for financing the portfolio of projects under consideration.

Various authors have stressed the importance of capital budgeting. According to Christy (1966, p.1),

> *" the influence of capital budgeting decisions is widely felt, both in the firms that make them and in the economy as a whole. On the company itself, capital investment imposes a heavy burden of depreciation, interest, and overheads ; the correctness of investment decisions exerts a crucial - and often decisive- impact on a firm's survival and growth. For the economy as a whole, the proper planning and allocation of capital investment are indispensable to an efficient utilization of other resources ; ill-conceived or poorly placed investment reduces the productivity of labor and materials and sets a lower ceiling on the economy's potential output."*

Johnson (1976) argues that capital budgeting investment decisions have been and will continue to be fertile ground for researchers. On the other hand, capital budgeting is viewed as a perenial, multidisciplinary function involving different departments within the organisation. This fact is reinforced by Weston and Brigham (1979, p283-284) who state that:

> *"A number of factors combine to make capital budgeting perhaps the most important decision with which financial management is involved. Further , all departments of a firm - production , marketing , and so on - are vitally affected by the capital budgeting decisions , so all executives , no matter what their primary responsibility, must be aware of how capital budgeting decisions are made."*

Merrett and Sykes (1963, p. 12) note that in Britain, "*concern over our inadequate rate of growth has reached significant economic proportions*". According to Merrett and Sykes, the poor British economic growth was due less to "*an inadequate amount of investment" than to "the quality of the investment which was at fault".*

Regarding the importance of capital investment analysis and selection techniques, Miller (1988) quotes Alfred (1964), who stated:

> *"It leads to a marked change in the emphasis of investment policy which I believe can significantly affect the rate of growth of individual companies and of the economy as a whole".*

In recognition of this role, Northcott (1992) emphasized the idea that improved capital investment decision-making has been, and continues to be viewed not only as an important issue for individual organisations, but as a potential driver for economic growth.

Given the importance of capital budgeting decisions as indicated in the above paragraphs, the objective of this chapter therefore, is to review the literature on capital budgeting and to provide an insight into this process as viewed by some authors who investigated this process within the organisational context.

3.3 Definition of Capital Investment:

> *"Capital investment can be viewed as a sub-set of capital budgeting, which is concerned with the selection of long-term investments and planning for their financing"* (Northcott, 1992, p.1).

Several definitions of capital investment have been proposed by authors. However Northcott (1992) outlines the main characteristics of capital investment as follows:

1. The investment generally requires a substantial financial outlay.

2. The return generated from the investment occurs over a number of years in the future.

3. Usually risk and uncertainty are associated with the future returns of the investments.

4. Capital investments involve expenditures on the purchase or expansion of equipment or production facilities, or other outlays which directly impact the organisation's ability to meet its strategic and operating objectives.

Taking these broader issues into account, Northcott defines capital investment as that which requires (1992, p.2):

"the making, communication and acceptance of decisions about investment in long-term, risky capital assets. These decisions take place within social organizational context and impact upon the strategic and operating position of the organization, and also upon those people who constitute the organization."

3.4 Critical Issues Surrounding Capital Budgeting Investment Decisions:

The whole process of capital budgeting is about making decisions which lead to investment in a capital project. Normally, decision making is a process that is characterized by two properties: the uncertainty surrounding the outcome, and the cognitive limitations of the decision- maker which inhibit the searching activity for optimal solution (Harrison, 1975). These two concepts can be summarized as follows:

3.4.1 Problem of Uncertainty:

Certainty implies a state of awareness on the part of the decision-maker that seldom exists. Uncertainty is almost as incomplete as complete certainty. The decision- maker has incomplete information. This is defined as the situation where the decision- maker knows at the decision time the opportunities under current consideration. He or she does not know precisely, but expects new opportunities to become available between the decision time and the horizon of his decision. Incomplete information refers to the situation commonly encountered in practice. Several authors attempted to classify investment decisions that business organisations face based on the degree of environmental uncertainty surrounding these decisions. Among the earliest and best known of these is the distinction between programmed and non-programmed decisions that was put forward in 1960 by Herbert Simon (1960). The distinction that he proposed was based on the idea that a great many business decisions are straightforward, repetitive and routine, with the result that the organisation is able to develop a defined and formalised procedure for handling them. The non-programmed

decisions are those that are characterized by Simon as being "*...novel, unstructured and consequential. There is no ideal method for handling the problem because it has not arisen before, or because its precise nature and structure are elusive or complex, or because it is so important that it deserves a custom-tailored treatment*" (Simon, 1960, p. 5-6). These two types of decisions- according to Simon- should be seen in terms of a continuum, with highly programmable decisions at one end of that continuum and highly unprogrammable decisions at the other end. In between these two polar extremes are " *decisions of all shades of gray... the terms programmed and non-programmed are simply labels for the black and white of the range*" (Simon, 1960, p.7). Along a similar line, Harrison (1975, p. 13), reduced investment decisions into two categories involving the matched pairs of: (1) routine and non-routine, (2) recurring and non-recurring and (3) certainty and uncertainty. Category 1 includes the routine, recurring decisions that are handled with a high degree of certainty. Categories 1 and 2 comprise the non-routine, non-recurring decisions characterized by considerable uncertainty as to the outcome.

The types of investment decisions outlined above have far-reaching implications for classifying capital budgeting investment proposals according to previous categories, so that different acceptance criteria can be applied to different categories of investment. Runyon (1983), identified four types of classification in his study of capital investment making in small US firms. These are: (1) replacement of existing assets, (2) expansion of existing operations, (3) strategic expenditure to develop new types of production, technologies or product line, or responding to some change in the operating environment and (4) non-financial motivated expenditure or legislatively required expenditures.

However, the classification of capital investment type is judgemental. This has important implications when we consider that the financial analysis undertaken on a capital investment proposal could be dictated by the category to which the project is initially allotted.

3.4.2 Concept of Satisfying Behaviour:

By definition, satisfying consists of adopting a course of action that is good enough in view of the intended goal or the current level of aspiration; that is, a satisfactory rather than an optimal solution. The main sources of difference between satisfying and maximizing behaviour are the internal and external constraints which limit the global rationality and consequently, the behaviour and process of choice for the latter (McGuire, 1964). The central proposition of the satisfying concept is that "*decision makers strive to attain satisfactory solutions to problems*" (Harrison, 1975, p.70).

According to March and Simon (1958), the basic difference between optimal and satisfying solutions is that in the former, decision makers are assumed to have all the alternatives against which to apply the decision criteria, while in satisfactory situations the choices are made by applying the criteria to minimally satisfactory alternatives, the alternatives good enough to meet the objective.

In the words of March and Simon (1958, p.140-141)

> *"Most human decision-making, whether individual or organisational, is concerned with the discovery and selection of satisfactory alternatives; only in exceptional cases is it concerned with the discovery and selection of optimal alternatives".*

The process of arriving at a satisfying choice is bounded by several limits within which the decision maker must search for an alternative solution whose outcome will meet his objective. This state of affairs has been labelled "*bounded rationality*" by Simon, and its rationale provides the primary argument in the case of satisfying behaviour.

Furthermore, Simon has advanced a formal principle of bounded rationality as follows (1957, p. 198):

> *"The capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behavior in the real world- or even for a reasonable approximation of such objective rationality".*

The cognitive limitations of the decision-maker suggests why a satisfactory solution in hand is more realistic than a fruitless quest for an optimal solution. Many businessmen are likely to substitute the principles of satisfactory profits for those of profit maximization.

3.5 Strategic Nature of Capital Budgeting Investment Decisions:

Several authors refer to "strategic investment decision-making" when discussing capital investment decisions (see for example Chandler, 1962; Grossman and Lindhe, 1984; Butler et. al., 1991). In order to understand the strategic nature of this relationship, it is important to identify the characteristics of "strategic decisions". These characteristics- according to Wilson and Chua (1988, p. 140)- are that they:

1. are concerned with the scope of an organization's activity and hence with the definition of the organization's boundaries.
2. match the organization's activities with its environmental opportunities.
3. match an organization's activity with its resources.
4. have major resource implications.
5. are influenced by the values and expectations of those who determine the organization's strategy.
6. affect the organization's long-term direction.
7. are complex in nature.

Capital budgeting investment decisions are regarded as strategic decisions because they are long-term and require major resource allocations which will affect the future direction and activities of the organisation (Northcott, 1992). Northcott argues that capital investment can be viewed as part of the strategic decision-making activity of an

organisation. He goes on to say that capital investment cannot be viewed as an isolated, independent activity but instead must be responsive to the firm's technology, goals and environment.

Several other authors in administrative disciplines described capital budgeting as one important aspect of strategic planning (Mintzberg et. al., 1976; Witte, 1972; Downs, 1967; Soelberg, 1967 and Ackerman, 1970). They have argued that one commonality among strategic decisions in general and capital budgeting decisions in particular, is that they are composed of at least three phases: (1) problem identification, or the realization that a problem or opportunity is confronting the organisation which may require a major capital expenditure, (2) alternative development, or the generation of alternative capital projects to solve the identified problem or take advantage of the opportunity and; (3) selection, or the choice of one capital project for implementation in response to the problem or opportunity.

The decisions to make capital investment have several implications for the competitive position of the enterprise in the environment in which it operates and therefore, are classified as strategic decisions. For example, a decision to expand plant capacity in a manufacturing concern will increase output and will have an impact on its share of the market. Such a decision is not recurrent and can only be motivated by a desire to achieve certain enterprise objectives in the context of environmental opportunities and threats. Along this line of argument Grossman and Lindhe (1984) have insisted that *"capital budgeting decisions should be made in the context of the long-term strategy of an organization"* (1984, P. 105). For Chandler (1962) the capital budgeting process as noted by Pike (1983b, p.201), *"is the main vehicle by which strategy can be made operational."*

Considering the strategic nature of capital budgeting investment decisions, Mintzberg (1994, p. 126) has identified three possible relationships between capital budgeting and strategic planning. These relationships can be described as follows:

1. The new or existing strategies influence the proposed capital budgeting projects. The proponents of this view argue that capital budgeting projects take their cues from intended strategies. March et al (1988, p. 4) have stated that " *there is an assumption that investment projects can somehow be subordinated to proper definition of strategy*". A common theme in the arguments of the proponents of this view is that programmes included in the capital budgeting are assumed to be proposed in the light of strategies explicitly formulated by senior management in the corporation.

This relationship, as described in the above paragraphs, is assumed to work informally. Projects' sponsors are likely to take the intentions of top management implicitly into account when they propose capital budgeting projects, as long as those intentions are conveyed to the sponsors of capital budgeting projects. This view is reinforced by Yavitz and Newman (1982) , quoted by Mintzberg, 1994, p.128.

> *"Triggered by need related to existing activities, few capital expenditure proposals deviate very much from the status quo. Some of these bottom-up proposals are for necessary projects- replacement of a faltering elevator, for instance. Others propose better ways to perform present activities, such as computer control of accounts receivable. Still others must deal with natural expansion- say, a West Coast sales branch or acquisition of an additional coal mine by a utility company. If the business-unit wishes to pursue its existing strategy, such proposals are quite appropriate"* (1982, p.189).

2. The proposed capital budgeting projects influence the strategy pursued. Such influence can be achieved in two ways: First, the proposed projects are going to be implemented in a given strategic context and as such, they tend to reinforce the actual strategy. Second, a capital budgeting project may break an established pattern and thereby create a precedent that changes corporate strategy. New projects, not quite

consistent with existing strategies, may create a precedent that leads to new patterns. For example, a new capital project may be introduced by one of the leading corporate officials. The top management may approve the project simply to keep the leading officials happy without realizing that this project may take the corporation to new strategic frontiers.

As a general practice, the organisation makes capital budgeting decisions on an ad hoc basis-project by project. During this process, patterns form to become strategies that are likely to have long term implications for the company.

Another aspect of the influence of capital budgeting on corporate strategy is that it offers senior management the possibility of screening proposals for their strategic effects or implications for the company.

3. Both relationships may exist independently when some projects are influenced by existing strategies and other capital projects may break established patterns and lead to the formation of new strategies.

3.6 Development of Quantitative Appraisal Methods:

Decisions are not made in a vacuum but rather with some objective in mind. The current state of the theory of corporate finance operates on the assumption that management's goal is to maximize the wealth of its stockholders. The main objective of the investment or capital budgeting decision, as seen by this theory, is to acquire real assets which are worth more than they cost. Thus its primary concern is revolving around the optimal choice of capital projects. The fundamental notion is that, in order to undertake a certain project, returns must be a positive function of the degree of risk incorporated. The theory of finance has strived to accomplish this task through the development of various quantitative evaluation techniques.

One area of concern of this thesis is the application of formal capital budgeting appraisal techniques by companies participating in this study. Academic literature appears to have heavily concentrated on developing and refining these techniques to make them more robust and reliable (Northcott, 1992). According to Bromwich (1976), the search for project appraisal has accelerated since the Second World War stimulated by four main phenomena. These are: firstly, rapid economic growth combined with secondly, rapid technological advances which together have both increased the number of investment opportunities and the funds required for investment. Thirdly, the developments achieved in the area of forecasting, econometrics and budgetary control, have made possible the projection and measurement of costs and benefits generated from capital investment proposals. These three factors, further combined with increasing decentralization and the complexity of organisations, require the provision of rules for investment decisions for lower echelon managers.

Four major methods or techniques have been extensively discussed in the financial literature and are currently practiced by many corporations. These methods are used to rank projects and to decide whether or not they should be accepted for inclusion in the capital budget. These techniques can be classified into two main groups.

1. **Sophisticated Capital Budgeting Techniques:** The term refers to those techniques that consider both the risk-adjusted discounted cash flows (DCF) expected from a project. The net present value, internal rate of return, and profitability index are three widely used techniques (Haka et. al. 1985).

The net present value (NPV) analysis method compares the present value of future cashflows from a capital investment with the immediate outlays required. That is, all future cashflows from a capital investment are discounted back to their present value

and compared with the immediate cost of entering into the investment. A project is considered acceptable when its NPV is positive.

The NPV can be expressed as follows:

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1+k)^t} \quad \text{.....(3.1)}$$

Here
NPV = Net present Value (equivalent to market value)
CF_t = Expected value of after tax cash flow in period t
t = Time period (in years)
n = Planning horizon
K = Opportunity cost of capital (or "hurdle rate")

The internal rate of return (IRR) is defined as the discount rate which equates the present value of a project's expected cash inflows to the present value of the project's expected costs. In other words, the IRR is the rate at which the NPV of a project equals zero. A project is considered acceptable when the IRR is greater than the company's opportunity cost of capital.

The profitability index (PI) measure uses exactly the same discounted cashflow information used in the NPV method. However, instead of finding the difference between initial outlay and the present value of future cashflows, the PI finds the ratio of these two values. The profitability index (PI) is a more useful measure of project acceptability than NPV in cases where the firm does not have sufficient funds to invest in any available project which has a positive NPV. Therefore, where funds are scarce, a higher PI project would be preferred as it returns more per scarce pound than a project with a lower PI.

Capital budgeting theoreticians have shown a preference for DCF techniques and especially the net present value (NPV) capital budgeting methodology (see for example Brealy and Myers (1991). This is based on the argument that non-DCF techniques do

not consider the time value of money or the so called "opportunity cost of money". As a DCF technique, IRR is considered to be inferior to NPV. According to Brealy and Myers (1991), the IRR has four pitfalls:

1. The IRR decision criterion reverses whenever the firm is evaluating a borrowing opportunity (initial cash flows are positive followed by cash outflows).

2. There may be multiple IRRs when the signs of the cash flows change.

3. The IRR can give an incorrect ranking when considering mutually exclusive projects.

4. It is difficult to determine the IRR criterion rate whenever opportunity costs change over time.

Several remedies have been suggested for dealing with these pitfalls and it is beyond the scope of this chapter to discuss them. However, a detailed discussion of these remedies can be found in Evans and Forbes (1993).

2. **Unsophisticated Capital Budgeting Techniques:** This term refers to the techniques which do not consider present value or do not incorporate risk in a systematic manner. Two commonly used methods are the payback period and the accounting rate of return. These methods are also referred to as naive methods (Haka et. al, 1985).

The payback period, which was the first formal method used to evaluate capital budgeting projects, is defined as the expected number of years required to recover the original investment from a project by cumulating the forecasted cashflows.

The accounting rate of return (ARR)-sometimes known as the return on capital employed which looks at a project's contribution to net income rather than its cash flows, is the second oldest evaluation technique. In its most commonly used form, the ARR is measured as the ratio of the project's average annual expected net income to

its average investment. A capital budgeting project would be feasible if its ARR is greater than the company target.

3.6.1 Cost of Capital and Dealing with Risk:

An integral part of using discounted cash flow analysis to assess capital investment opportunity is the determination of cost of capital or a required rate of return. The cost of capital to a firm is the minimum return which suppliers of the capital require. Thus it is a price which the firm has to pay for obtaining capital. The concept of cost of capital, or more appropriately the required rate of return, is of utmost significance in financial decision-making. It is a criterion for funds allocation and selection of investment projects. Thus, it is an important determinant of the firm's mix of business and scale of operation.

Also, risk is considered an important determinant of an appropriate required rate of return. Alternative approaches to considering the risky projects and determination of the correct cost of capital or required rate of return have been suggested by many scholars as useful decision tools for capital investment analysis.

3.6.1.1 Approaches to Determining the Cost of Capital:

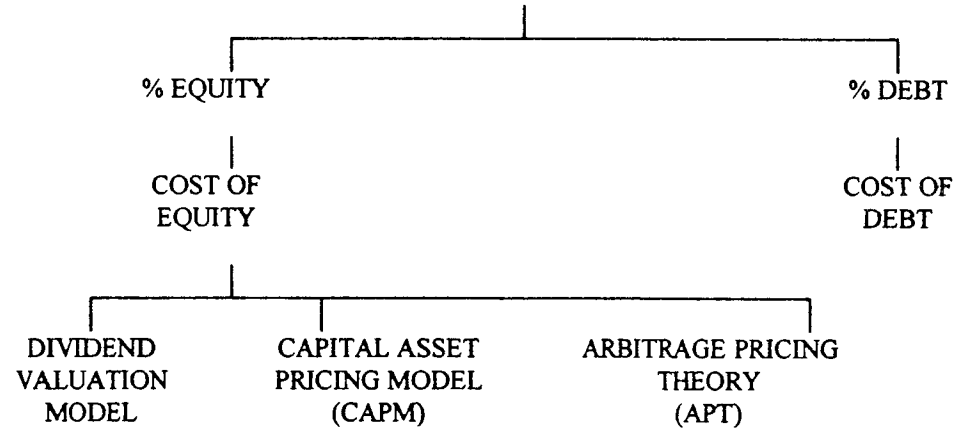
In developing the firm's overall cost of capital, it is important to identify and determine the cost of each component and then combine the component costs to form the weighted average cost of capital.

The procedure required to calculate the cost of capital is highlighted in Figure 3.1:

3.6.1.1.1 Cost of Equity:

Figure 3.1 shows that there are three ways available to calculate the cost of equity, Dividend Valuation Model, CAPM and the Arbitrage Pricing Theory (APT).

Figure 3.1: WEIGHTED AVERAGE COST OF CAPITAL (WACC)



Source Mills, 1994, P.111

3.6.1.1.1.1 Dividend -Valuation Model:

The dividend-valuation model, as reflected in equation (3.2), is the basis for computing the cost of equity (Gordon, 1968)

$$\text{Cost of Equity} = \frac{\text{(Dividend Yield + Capital Gains)}}{Po}$$

$$= \frac{DIV + g}{Po} \quad \text{.....(3.2)}$$

Where DIV is the expected dividend per share, Po is the current price of the company's share, and g is the expected capital gain. The growth term (g) used in this model implies the growth in future dividends. It is the market's expectation about dividend growth. It is extremely difficult in practice to estimate the rate of growth in dividends. This difficulty arises because companies do not follow a constant dividend policy. Also, companies do not increase dividends as their earnings increase. Dividends

grow at a slower rate than the earnings. Higher retention of earnings may lead to higher profits and increased share price (for more details on the subject see Mills, 1994).

3.6.1.1.1.2 Capital Asset Pricing Model: CAPM

Capital market theory assumes that investors adjust for differences in risk between securities or real investments by changing the rate at which they discount expected cash flows. The greater the perceived riskiness of an investment, the higher its discount rate, or cost of capital. This cost of capital is the investor's opportunity cost, and therefore, is the "hurdle" which the rate of return must clear before an investment becomes an acceptable alternative. Modern portfolio theory has provided an approach for determining a project's required rate of return or cost of capital which does take risk into account. The most common way of dealing with risk and return in capital investment is the CAPM (Capital Asset Pricing Model, Sharpe, 1964). The CAPM assumes that investors expect a minimum return which will compensate them for any risk inherent in an investment's future cash flows. According to the CAPM theory, investors determine their required return by adding a risk premium to the interest rate of a virtually risk free security, such as a Government bond. This risk premium is a function of the riskiness of a broad stock market index adjusted for the sensitivity of the particular firm's return (price appreciation and dividends) to movements in the market. This relative sensitivity or volatility is commonly represented by the individual stock's beta coefficient. If its beta is greater than one, a stock is more volatile and therefore riskier than the market, while a beta of zero would simply imply a risk free security.

The CAPM is extremely popular, largely because it provides a simple relationship between risk and return and uses variables that are easy to obtain. However, a number of financial theorists recognized the serious shortcoming of the CAPM method and have proposed a different approach to deal with this problem (Reimann, 1990 and Gordon, 1986).

3.6.1.1.1.3 Arbitrage Pricing Theory (APT):

The first model to mount a serious challenge to CAPM incorporates several macro-economic variables which are thought to influence the riskiness of investment. The APT originally proposed by Ross (1976), splits the contributions to the risk premium into the following four factors: inflation, industrial production, risk premium (between high and low quality bonds) and the slope of term structure of interest rates. Its key advantage over the CAPM is that APT recognises the fact that the returns of different firms and industries tend to differ in their sensitivities to some fundamental economic factors. Still, the APT does not specify which factors are relevant to the model. Thus, the specification of the model must be determined empirically.

3.6.1.1.2 Cost of Debt

The second major component required in calculating the cost of capital is the cost of debt. Debt includes all interest bearing borrowings. The cost of debt is the yield which lenders expect from their investment. In most cases, it is approximately equal to the annual contractual rate of interest. However, yield may be different from the contractual rate when the debenture/bond is issued/redeemed at a price other than the par value. Also, in case of an outstanding debenture/bond, the yield will depend upon its market price.

Unlike dividend payments to holders of equity, interest payments are tax-deductible. Therefore, the after-tax cost of debt is the relevant rate of return to be calculated for use in determining the cost of capital.

Businesses usually have more than one source of debt financing, in which case the overall cost of debt can be calculated by taking the weighted average of the individual instruments based upon market values; that is by multiplying the yield to maturity of each instrument by the percentage of the total market value of the portfolio that each instrument represents and summing the products.

3.6.1.1.3 Weighted Average Cost of Capital (WACC):

The weighted aggregate of component cost (of debt and equity) is known as the weighted average cost of capital (WACC), with the weights being the proportions of debt and equity in the capital structure. The WACC can be computed by either using book-or market value weights. Theoretically, market-value weights are preferred because market values reflect the current expectations of the investors.

There are, however, two problems with using the WACC as a cost of capital or required rate of return for all capital investment projects. The WACC reflects the current cost of a pool of funds used for financing the current investments of the organisation with their current level of risk. If a capital investment project is outside the normal activity or business area, then it may have a different risk profile to that of normal investments. In this case, the WACC is no longer an appropriate discount rate as it does not adequately take account of the different risk of the capital investment being assessed.

The second problem arises where the capital investment project is too large to affect the financing structure. The WACC approach assumes that the relative weighting of

the capital sources remains the same after a new capital investment is financed. If, for example, a substantial loan had to be raised to finance a capital investment, this assumption may no longer hold true and the WACC will change.

Although the WACC approach offers a simple approach to determining the required rate of return or discount rate, it has clear weaknesses. It is often unrealistic to assume that all capital investment projects have the same risk and that this riskiness corresponds to the organisation's "normal" investment. Therefore, as it takes no account of risk, the use of WACC is not a theoretically correct approach to determining the required rate of return.

According to Brigham (1975), academic literature suggests that risk adjusted hurdle rates should be used to screen projects so that firms could use more than one hurdle rate to reflect the risk involved in a project. Brigham also states that while academia agrees that a firm's hurdle rate should be based on its cost of capital, controversy exists over the measurement of the cost of capital.

Keane (1978) examined the appropriateness of the cost of capital for use in capital budgeting decisions. He attempted to show that a firm's overall cost of capital is inappropriate in any of the various forms of capital budgeting decisions. Furthermore, he states that the cost of capital is equally inappropriate as a financial decision tool. Keane argues that investment discount rates cannot be affected by the firm's financial policy (even by those that affect the value of the firm), and that minimizing the cost of capital is not a valid corporate objective. He alleges that the firm cannot affect its cost of capital in a conventional sense by reducing the discount rate for any of its investment, and that the firm's financial policies affect and should be evaluated by their effect upon the expected cashflow streams. Using the cost of capital as a decision tool lacks operational significance because a firm cannot minimize what it cannot control.

3.6.1.2 Adjusting for Project Risk Through the Adjustment of Project Cash Flows:

Several authors have emphasized the importance of adjusting project cash flows instead of adjusting discount rates to account for risky projects, (Van Horne, 1995 and Reimann, 1990). According to Reimann (1990), cash flow adjustments are made to reflect the relative uncertainty of those cash flows. Deficiencies associated with the discount rate adjustment process have prompted many authors to emphasize the adjustment of cash flows. Reimann (1990) has cited several reasons for abandoning the use of risk adjusted rates to account for project risk. These reasons include:.

1. The methods used to compute the risk adjusted rates (CAPM) or (APT) are not appropriate for a typical corporate portfolio of projects since corporate management can affect market risk by its choice of project mix.
2. Risk premium, a major component of the rate of return, is automatically compounded over time resulting in a bias against long-term investment.
3. Any variations in hurdle rates of return tend to be quite modest in practice relative to variations in rates of return and cash flows.
4. The use of different hurdle rates in the same company presents major implementation difficulties.

Reimann (1990) concluded that careful projection of cash flow patterns will have a far greater impact on accurate valuation than trying to fine tune the hurdle rates to be used in discounting those cash flows. Moreover, it appears to be more sensible and practical to combine the analysis of the expected risk with cash flow projection than to attempt a separate risk adjustment of the discount rate. Reimann states that careful projection of cash flows is more appealing to practitioners, since this approach focuses their

$$NPV = \sum_{t=0}^{n} \frac{X_t CF_t}{(1+R_f)^t} \quad \text{.....(3.3)}$$

CF_t = Expected net cash flow in period t

X_t = Certainty coefficient for period t

R_f = Risk free rate

t = Time

n = Project life

The NPV decision rule remains unchanged; i.e. a project should be accepted if the NPV is positive.

Although the process of converting risky cash flows to certain cash flows is somewhat subjective, the technique is theoretically sound. The fact that the degree of risk adjustment can be decided by the management each time, is viewed as a positive aspect of the use of certainty equivalents, (Gitman, 1986). However, despite its advantages, the use of the certainty-equivalents method raises implementation problems which may lead the decision maker to subjectively increase the discount rate for a risky project instead of specifying certainty equivalents for each year.

Before concluding this section, it is worth pointing out that the main difficulty associated with evaluating risky investments lies in obtaining cash-flow estimates from people, not in the mathematical manipulation of the data, (Van Horne, 1995). According to Van Horne, Managers are likely to bias their estimates of future cash flows so that the accuracy of the final results is questionable. Van Horne goes on to say that every effort must be made to provide an environment conducive to the unbiased forecasting of project cash flows.

3.6.1.3 Use of Management Science Techniques to Assess Risky Capital Investments:

There are alternative approaches to assessing risky capital investments. The most sophisticated of which come primarily from the operation- research (OR) literature. Examples of these techniques include probability theory, simulation, sensitivity analysis and game theory. These tools are complex and difficult to interpret. However, where the use of a risk-adjusted discount rate or certainty equivalent approach does not adequately capture the riskiness or uncertainty inherent in a capital investment proposal, these OR techniques represent additional decision-support tools for the decision- maker (Northcott, 1992).

The contribution of management science techniques to capital investment decision-making continues to receive attention in theoretical literature. OR-type models are refined and adapted to allow improved application to real-world decisions. For example, recent work has considered improvements to the application of sensitivity analysis (Darvish and Eckstein,1988), multi-criteria decision-making (Venugopal and Narendran,1990), and the use of mathematical models in considering uncertainty, (Levary, 1988 and Kira and Kusy, 1990). Pike and Sharp (1989) have noted the strong increase in the uptake of OR techniques from 1975 to 1986. They also propose that, while the rate of increase is likely to slow, the use of almost all OR techniques in capital investment decision-making is set to continue increasing. So, it seems that advances in theoretical applications of OR methods to capital investment proposals are continuing to be made and it appears likely that future developments in these sophisticated methods, will have a significant impact on future capital investment decision-making.

While refinement of these techniques will impact the way in which the outputs of financial capital investment analysis can be made more accurate and useful, such theoretical refinements do not always solve the problems in practice, where information, time and understanding of complex mathematics may be in short supply (Northcott, 1992).

3.7 Post- Audits:

The academic literature on investment decision-making is overwhelming, but post-auditing has been relatively neglected (Kennedy & Mills, 1992). Post-auditing practice had been treated as part of a broader survey into aspects of capital budgeting investment appraisal, (Scapens & Sale, 1981; Pike, 1982,1988a ; and Neale & Holmes, 1990).

The post-audit of capital expenditure projects must be distinguished from the expenditure control audit. The post audit is not directly concerned with excessive costs of implementation and as such, does not deal with control of expenditure outlays (Istvan, 1961). According to Istvan, post-audit, is made to accomplish the following: (1) to verify the actual performance results, (2) to compare these results with those expected in the proposal, and (3) to implement necessary action regarding any differences between the two. The formal post-auditing system is advocated in theory, (Gordon and Pinches ,1984; Pinches, 1982; Neale & Holmes, 1988 and Mills & Kennedy,1988,1990,1993) and, over the years, firms have become increasingly attentive to the post-auditing process, (Cook and Rizzuto,1989 ; Gordon & Myers, 1991; Klammer & Walker, 1984; Myres et. al., 1991; Gordon and Smith, 1992; Smith, 1993 and Kennedy and Mills ,1993). More recently, post-completion audits have been strongly advocated at both the strategic and the technical levels, (Adler et. al., 1992;

Hendricks et al., 1992; Kennedy and Mills (1993, 1992) ; Neal, 1991 and Gadella, (1992).

In 1990, CIMA published Management Accounting Guide 9: Post-Completion audit of Capital Expenditure Projects. According to this guide, the definition of post-completion audit is (Mills and Kennedy, 1990, p. 2):

> *" An objective and independent appraisal of all phases of the capital expenditure process as it relates to a particular project. It includes consideration of the appraisal process leading to the project's acceptance or rejection. For accepted projects, it also includes a review of the project's commissioning and implementation phases. The objective of post-completion auditing is to feed information into the company's decision-making system to improve future company performance from either current or prospective projects".*

According to the guide , the benefits of post-audits include:

"1. improve the quality of decision-making
2. encourage greater realism in project appraisal
3. provide a means of improving control mechanisms
4. enable the speedy modification of underperforming/overperforming projects
5. increase the frequency of project termination for "bad projects"
6. highlight reasons for successful projects which may be important in achieving greater benefits from future projects".

The foregoing benefits are counteracted by a number of problems which have been reported in the literature, (Brealy & Myers,1991 ; Mills & Kennedy, 1993 ; Neal and Holmes, 1988 ; Gordon & Pinches, 1984, and Gordon and Schick, 1990).

Pike and Neale (1992) identified some difficulties associated with post-auditing. These include:

1. **The disentanglement problem:** Separating out the relevant costs and benefits specific to a new project from other company activities appears to be a difficult problem where facilities are shared and the new project requires an increase in shared overheads.

2. **Unique projects:** Without any prospect of repeating a project in the future, there appears little to be gained by post-auditing, since the lessons learned may not be applicable to any future activity

3. **Biased selection:** There is a biased selection mechanism due to the fact that many companies carry out post-auditing of only accepted and underperforming projects.

4. **Prohibitive cost:** Introduction of post-audits may involve modification of the present management information system in order to generate flows of suitable data. To post-audit every project may be very resource-intensive and firms tend to carry out post-auditing on a selective basis.

5. **Lack of co-operation:** Project sponsors are unlikely to be fully co-operative if the post-audit is conducted in too inquisitorial a fashion.

6. **Increased risk aversion:** The threat of post-audit is likely to make the project sponsor more risk averse and inclined to advance only "safe" projects while suppressing potentially worthwhile projects.

7. **Environmental changes:** Some projects can be adversely affected by dramatic changes in environmental conditions. This can make the post-audit a complex affair as the review team is required to alter the basis or scope of post-audit, so as to fit adverse circumstances encountered.

3.8 Capital Budgeting Practices and Corporate Performance:

A number of studies have examined the relationship between capital budgeting practices and organisational performance. Christy (1966) found no significant relationship between earnings per share trends and specific capital budgeting practices. Similarly, Klammer (1973) was unable to show a consistent relationship between the operating rate of return and capital budgeting practices.

Kim investigated the capital budgeting practices of the machinery industry and their impact on overall profitability (1975). Kim states (p. 2)

> *"This study challenges the notion that there is no significant relationship between the degree of sophistication of the capital budgeting system a firm uses and its profitability. This study takes the position that there is a significant relationship between these variables".*

In another study, Kim (1982) argues that Christy (1966) and Klammer (1972) were unable to produce a significant relationship because they applied too narrowly the definition of a capital budgeting system in terms of evaluation techniques or use of inappropriate measures of profitability. According to Kim, capital budgeting investment decisions must be more comprehensively defined than methods of ranking projects. Kim assumes that the capital budgeting system incorporates nine factors. These factors are: preparation of a long-range capital budget, systematic search for alternatives to investment projects, existence of a formal screening and reviewing body, project evaluation techniques, use of management science techniques, formal risk analysis, employment of full-time capital budgeting staff, expenditure control and post-audits. One important finding of his study was the establishment of a significant

positive relationship between performance and capital budgeting practices. While Kim recognises the impact of several other factors, such as marketing, product development, executive recruitment, labour relations and raw material costs on the overall performance of the firm, he nevertheless argues that firms with more sophisticated capital budgeting systems tend to achieve better performance than firms with a less sophisticated system.

Following a similar line of investigation, Pike (1984) examined the association between the capital budgeting system and the corporate performance of 144 large UK companies. Pike found a negative association between the level of capital budgeting sophistication and corporate performance. Pike (1984) concludes that while the finding of this study shows a negative relationship, this is no indication that application of sophisticated investment techniques has an adverse effect on corporate performance. Pike recommends that shedding more light on the optimal design and operation of the capital budgeting system for a given corporate content will be one of the most significant contributions that capital budgeting theory can provide to organisational effectiveness.

Haka et al., (1985, p.651) examined the relationship between capital budgeting selection techniques and firm performance and stated:

> *"We conclude that the adoption of sophisticated capital budgeting selection techniques will not, per se, result in superior firm performance. It is possible that the adoption of sophisticated selection techniques is one of many policies the firm pursues in the face of economic stress and this, in combination with other policies, may help to bring about economic recovery for the firm".*

Pike (1989) examined the changes in selected capital budgeting practices over eleven years in 100 large UK corporations and whether these changes improved investment decision-making. One of the findings showed a significant relationship between the

application of sophisticated capital investment methods and capital budgeting effectiveness as perceived by senior managers. Pike concluded that the positive association is attributed to the rapid growth in end-user computing and the availability of relatively inexpensive computer investment software applications which may lead to better capital budgeting decisions.

3.9 Phases of the Capital Budgeting Investment Process- Developed Models:

Capital budgeting can be viewed as a process that requires several stages to be performed at different phases. According to this view, a capital investment decision is regarded as an incremental activity, involving many individuals throughout the organisational hierarchy over an extended period of time. While formal approval of top management is needed , the actual decisions are in fact taken much earlier at a lower level, by a process that is still not clearly understood (Butler et al., 1991) . Most models of capital budgeting view the investment decision-making as a rational resource allocation process although in reality, it may be somewhat less organised and rational than assumed (Butler et al., 1991).

Within a capital budgeting context, various authorities have attempted to describe this process. In the remainder of this chapter we will review those models as prescribed by the authors in North America and the UK.

3.9.1 North America:

Bower (1970) was one of the earlier researchers on capital budgeting investment decisions. According to Bower, resource allocation should be viewed as a process of multiple phases. These phases are: the definition, the process by which the basic technical and characteristics of a proposed project are determined; impetus, the force

that moves a project toward funding and authorisation; and the context, the set of organisational forces that influence the processes of definition and impetus.

Ackerman (1970) followed the same structure as Bower's study. He applied Bower's model to two types of companies; integrated and diversified. Ackerman found that the resource allocation process is influenced and guided by product-market strategy (definition), measures of organisational performance (impetus), and availability of funds and political power in the organisation (authorisation).

Mintzberg et. al. (1976) have developed a model of a decision-making process that comprises three phases and seven routines. These are: (1) the identification phase, which includes the decision recognition routine and the diagnosis routine, (2) the development phase, which includes the search routine and the design routine, and (3) the selection phase which includes the screen routine , evaluation-choice routine and the authorisation routine.

Pinches (1982) modified Mintzberg's (1976) three phase model, and applied it to capital budgeting. Pinches (1982) proposed a four-stage model (Figure 3.2) . These stages are:

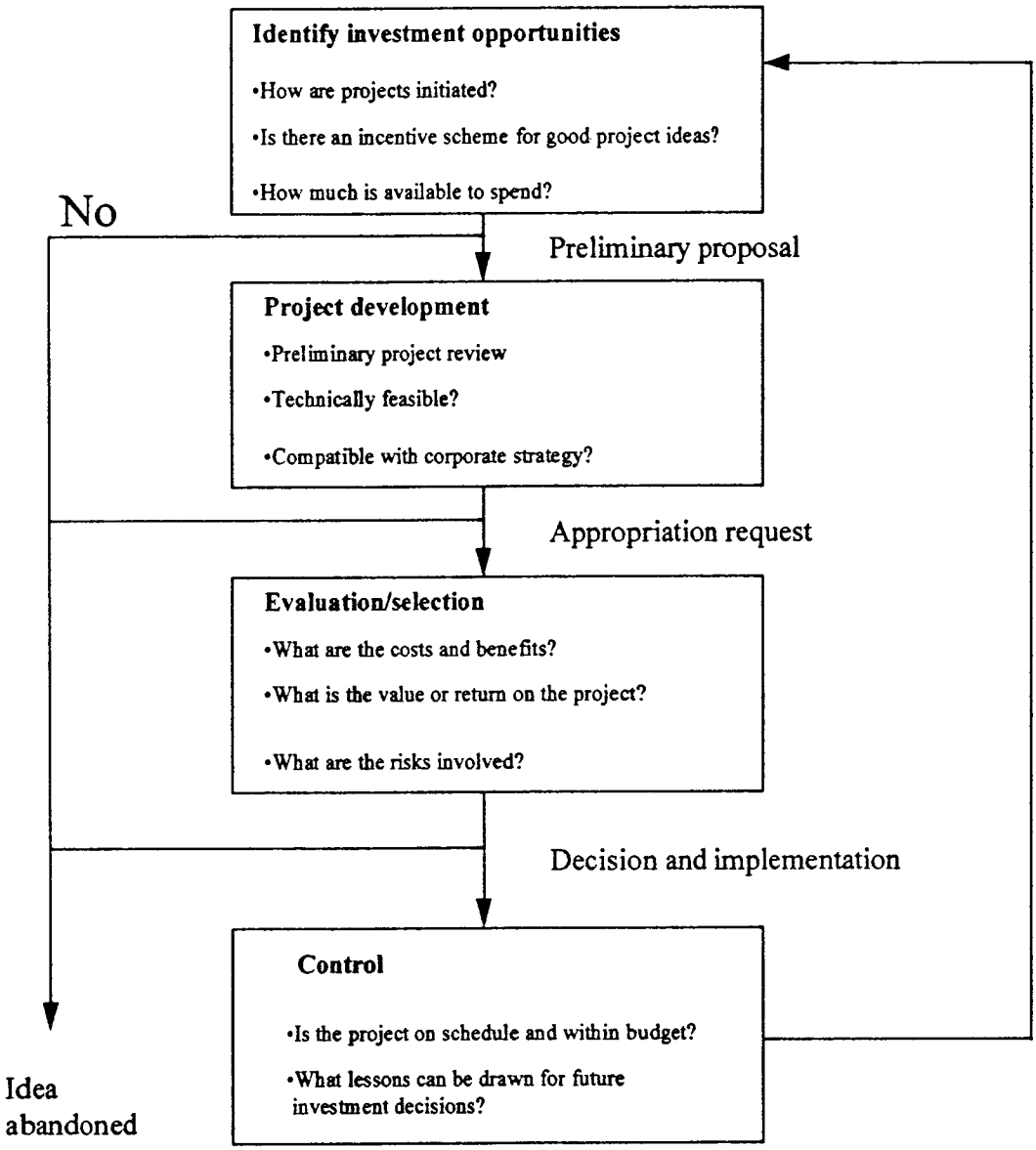
1. Identification of investment opportunities.
2. Development of an initial idea into a firm proposal.
3. Selection of projects.
4. Control of projects, including post-audits.

Kim (1982) considers capital budgeting as a process comprising nine elements. These nine elements are (Kim, 1982, p.187)

"1.The preparation of a long-range capital budget (LRC)
2. A systematic search for alternatives to investment projects (SER)
3. The existence of a formal reviewing and screening body (SCR)
4. The use of capital budgeting evaluation techniques (EVT)
5. The use of management science techniques (MST)
6. Formal risk analysis (RA)
7. The employment of full-time capital budgeting staff (FCBS)
8. Expenditure control (EXP)
9. Post- audits. (PA)"

Along a similar line, Mukherjee (1987) views capital budgeting as a process that requires several tasks to be performed at different phases: identification, development, selection and post-audit. In the first phase, ideas and suggestions for possible investment opportunities for enterprise resources are identified. In the second phase, ideas and suggestions are screened, and those with the greatest income potential are developed into complete and detailed investment plans. In the third phase, investment plans are compared, and those that appear to be in the best interest of the enterprise are selected. In the final phase, investment performance is monitored for any significant variations from expectations, to determine if goals are being met.

Figure 3.2: The Capital Investment Process



Source: Butler et al. (1991, p. 52)

3.9.2 UK Literature:

King's study (1975) on the decision-making process is the most cited one in the UK literature. King, based on two case studies of large capital investment decisions in a major British company, divides the decision-making process into six phases: Triggering, Screening, Definition, Evaluation, Transmission, and Decision (Figure 3.3) Recognition of a potential investment is the starting point of the investment process. King called this stage the triggering phase of the capital investment process, and noted that although much capital investment theory assumes that potential capital investment projects exist and simply need to be discovered, *"in practice each opportunity for investment must be identified and exploited"*(p.73). However, as King indicates, the triggering phase is usually marked by the occurrence of some form of stimulus from sources external to the organisation. King argues that responsible management will usually deny the initial recognition of an opportunity for capital investment until the need becomes pressing (until a trigger is provided).

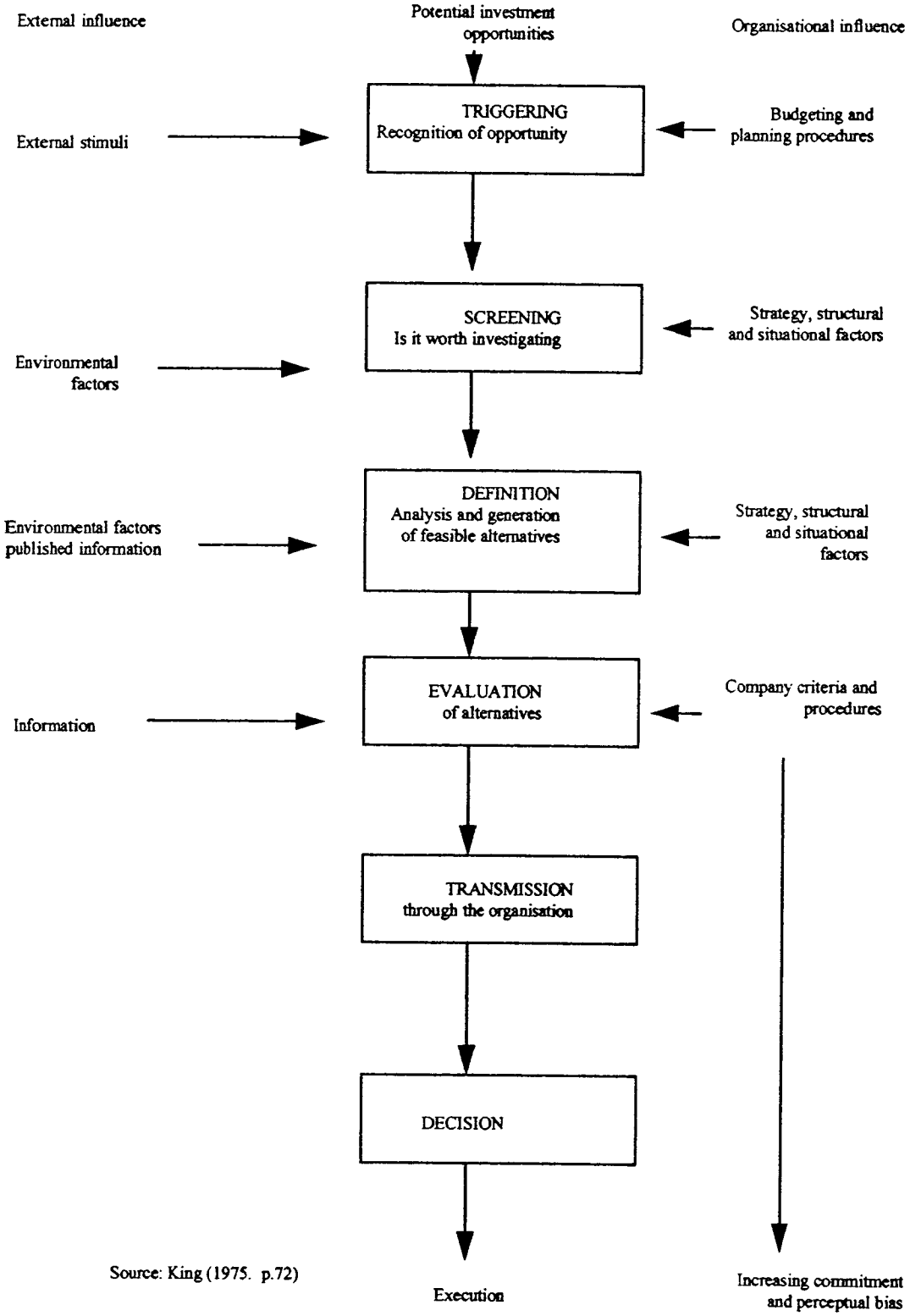
An accepted scientific approach to decision-making is to undertake all available investment opportunities, provided that all the necessary financing and human resources are available. It is regarded as being neither feasible nor desirable to conduct a full-scale evaluation of opportunities at this stage. However, proposals should be screened to ascertain whether they are compatible with corporate strategy; the resources required are available; the ideas are technically feasible; and the expected returns are adequate for the risks involved. King argues that it is during this phase (screening) that the project initiator develops personal commitment to a capital investment idea.

The generation of capital investment ideas leaves an organisation with just that- ideas. Turning these ideas into operational formulations of spending requirements, implementation practicalities and quantifiable future benefits is the difficult activity known as "project definition". It is common to find-at this phase- that proposals are gaining management commitment as more personnel become involved in data collection (Aharoni, 1966). Risk, uncertainty and change are the most important issues that need to be addressed at this phase of the investment process.

Once defined , it is suggested that proposals should undergo a detailed evaluation that requires an assembly of economic data in terms of cash inflows and outflows and the application of specified investment criteria to produce the optimum capital mix.

Financial analysis is an important part of the capital investment decision-making process, and is used to prepare projections of expected expenditures and financial benefits, by applying common project evaluation techniques suggested in the theory of finance. Whichever techniques are used, the emphasis of this phase of the investment process is on assessing those aspects of the proposals which can be quantified in monetary terms. In order for financial analysis to have some purpose, the decision-maker must be able to relate the analysis results to some predetermined "bench-marks" or acceptance criteria using the DCF techniques. The treatment of definition and evaluation as two separate phases, although in practice they are hardly recognised, serves to emphasize the difference between the choice of the form of a capital investment project and the evaluation of that form against company acceptance criteria.

Figure 3.3: Capital Budgeting Process
King's Model (1975)



Following the evaluation phase, proposals are communicated through the various levels of the organisation's hierarchy for approval. King calls it the transmission stage. Informal transmission during the earlier stages will obviously occur and will provide a main source of criteria and assumptions for screening and definition. Formal transmission requires the consolidation of the evaluation phase into a coherent case which can be comprehended by top management which usually lacks specific knowledge of the business environment.

The transmission stage covers more than the transfer of information among organisation divisions and management layers. For the company management, the formal communication of project to division represents the final stage in their commitment to it. The divisional management commitment to a project ends at the time of presenting the project to the division. Consequently, the divisional manager will commit himself to the project before it is transmitted to the corporate team. Knowing that his decision will place his reputation for good judgement on the line, the divisional manager should be very careful in calculating the cost and benefits to himself of sponsoring a project. This is a very important stage for the successful funding of the project. King describes it as political, and that the worth of the project must be argued and sponsors found.

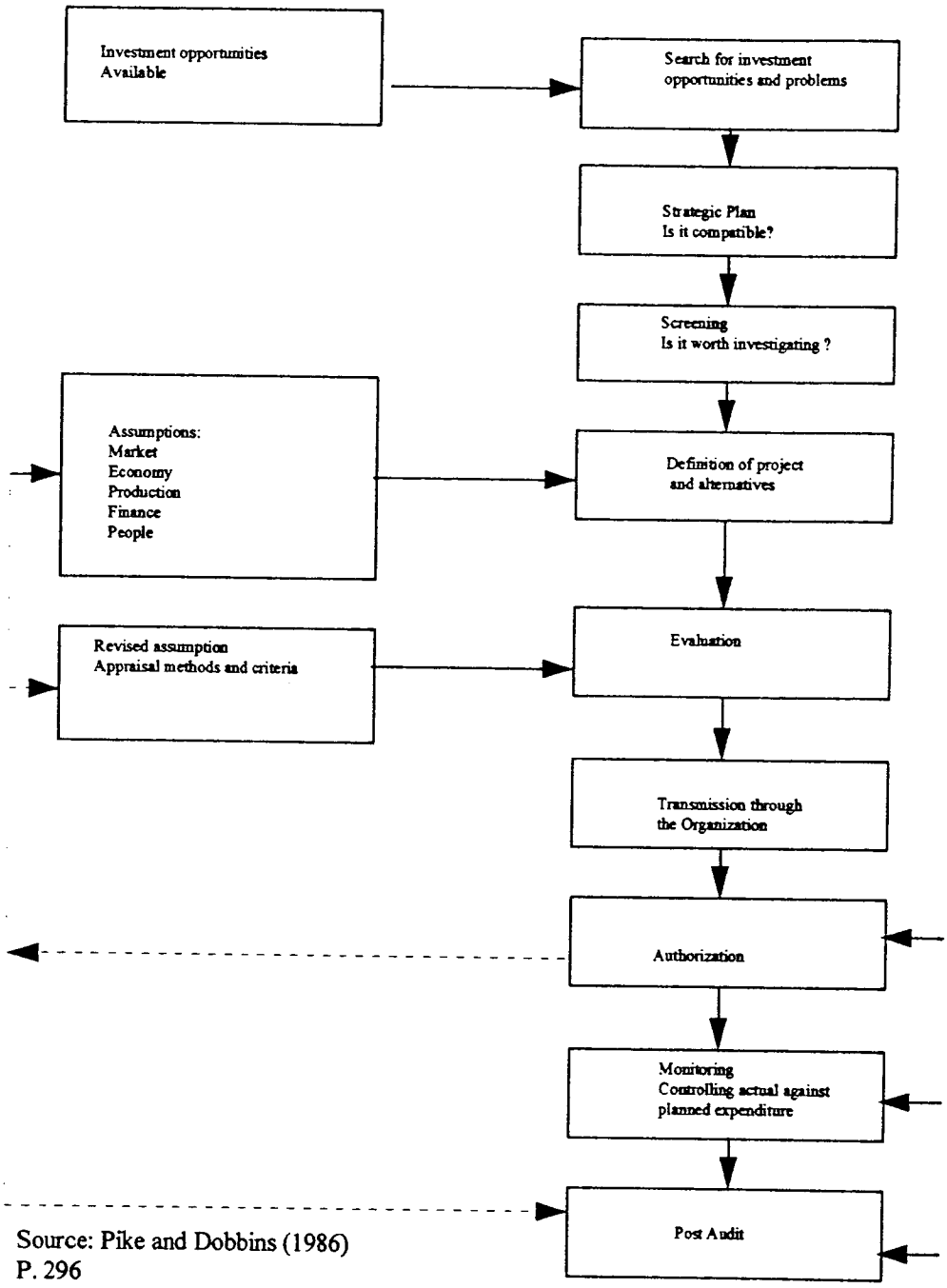
The decision phase starts when an application for funds is brought before the corporate team through written and verbal presentation. At this stage, the top management will normally incorporate the overall strategic considerations of the firm into the final judgement. An assessment of the management which will be responsible for implementing the project is also made at this stage and commitment to the success of the project will be formalized. King argues that empirical evidence suggests that

acceptance of projects are normal once they reach this stage. Rejection of a project will be viewed as repudiation of the judgement of those involved.

Following the same structure set by King, Pike (1982)- in his major study of investment practices among large UK companies- recognised all the capital budgeting phases proposed by King and added the implementation and control stage to the end of his model. According to Pike, the purpose of this stage is to ascertain whether planned capital expenditure will be exceeded and to assess the success or failure of the project. Potential for cost control is greatest in the early stages of implementation such as design, tendering and procurement stages, and least as projects move towards completion.

Feedback is viewed as an essential part of the capital budgeting process. Some procedure for comparing the actual profitability of the project, against the planned profitability is considered as essential, whether by post-completion audits or less formalized means.

Figure 3.4: Capital investment process



Source: Pike and Dobbins (1986)
P. 296

Pike & Dobbins (1986) proposed a model for the capital investment process composed of four stages (figure 3.4). These stages are: Project Generation, Evaluation, Authorisation, and Implementation & Post-Audit. Project Generation is equivalent to the first three stages of King's model. A continuous and systematic search for investment opportunities and requirements is the start of the investment process, and managers must be encouraged to generate proposals in line with corporate strategy. Each investment proposal is subject to a preliminary search and screening process where alternatives are generated, screened and reviewed to identify those which are sufficiently attractive to warrant further analysis. Next is the evaluation stage, which involves the assembly of economic data into estimated net cashflows which are evaluated to determine the viability of the project. Consideration should also be given to risk and uncertainty. The authorisation stage compares to the last two stages of King's model. At the end of the proposed model is the project implementation and post-audit stage, which involves monitoring and controlling the implementation of the project. Monitoring and evaluating the progress of the project would provide feedback for initiating corrective action for existing projects. Post-audits are designed to improve the quality of existing and future investment decisions

In conclusion, literature on the capital budgeting processes shows that it is a complex, lengthy process of a series of stages through time, in which the earlier activities and choices are crucial. It should be recognised that the need to exercise judgement is present throughout the whole procedure and that all stages in the process interact. There is no clear point where one stage finishes and another begins. It is frequently the case that the specification of the original problem is radically altered by information generated by later stages. In other words, even when a decision to go ahead is made,

problems may arise which require the decision to be re-evaluated (Tomkins, et al, 1978). However, the capital budgeting models cited above, illustrate the main elements of each stage of the process. Each of these stages is important within the decision model, but in practice each may be emphasized to a greater or lesser extent by any organisation.

3.10 Main Criticism of Capital Budgeting : Theory - Practice Gap:

Since 1951, when Joel Dean wrote his early work on the subject of capital budgeting investment decisions, a large body of literature has developed in this area. The majority of this literature implicitly accepts as its foundation the scientific model of the decision-making process. The scientific approach, or as it has been variously named the synoptic or comprehensive model of decision-making, has brought with it an implicit perspective of rationality. Economic decision-makers are presumed to define and order goals, to foresee all possible courses of action, to anticipate all possible outcomes from these actions and to make a "rational" choice of action which will optimize the attainment of the predetermined goals (Lindblom, 1968). Hollis and Nell (1975, p. 53-4) paint an amusing picture of this "rational economic man":

> *"He lurks in the assumption leading an enlightened existence between input and output, stimulus and response..... We do not know what he wants. But we do know that, whatever it is, he will maximize ruthlessly to get it.....As producer he maximizes market-share or profit. As consumer he maximizes utility by omniscient and improbable comparison of, for instance, marginal strawberries with marginal cement....Unlike the man in the street, he never misses an opening, ignores a price change, overrates the short-run or turns a blind eye to the unquantifiable".*

Several authors would argue that the economic model of decision-making "rationality" does not bear any resemblance to the nature and environment of the human decision-maker. Braybrook and Lindblom (1968) examined in detail what they called the

synoptic model of the decision-making process. They drew attention to the weaknesses of the model as a normative statement in that it is in no way adapted to (p. 113):

"1. man's limited intellectual capacities;
2. his limited knowledge;
3. the coastlines of analysis
4. the analyst's inevitable failure to construct a complete rational-deductive system or welfare function;
5. interdependencies between fact and value;
6. the openness of the systems to be analyzed;
7. the analyst's need for a strategic sequence to guide analysis and evaluation."

Braybrook and Lindblom argue that the inevitable failure in any practical situation to follow the procedure for decision-making specified by the scientific model, calls into question the applicability of adopting it even as a model..

Mukherjee and Henderson (1987) reviewed capital budgeting practices among large US companies relating to the four-stage framework of: Identification, Development, Selection, and Control. They observed that many capital budgeting practices are inconsistent with what is prescribed in the theory of capital budgeting. They stated that "*much of the gap between theory and practice can be attributed to deficiencies in the theory itself*"(p.85). Mukherjee and Henderson noted a number of limitations which could explain the differences between theory and practice noted in the survey. These limitations, according to Mukherjee and Henderson, are related to the theoretical foundations of normative capital budgeting models which include (Mukherjee and Henderson,1987):

1. An inability to incorporate the role of organisational structure and behavior in corporate decision making.
2. A failure to accommodate management behavior toward risk.
3. Implementation difficulties due especially to unrealistic assumptions about data availability. and

4. Inability to integrate strategic considerations in decisions made by the firm.

In his presidential address to the Financial Management Association, George Pinches (1982), supported with data from Gold (1976); Hastie (1974); Jansen (1977), and King (1975), states that the emphasis of capital budgeting is overly narrow and misplaced. Pinches (1982)) also asserts that by focusing on these narrowly defined problems, little attention is given to the overall strategic question of how effectively capital budgeting interfaces with the actual resource allocation process employed. He says that the major problem is not the lack of knowledge of specific details related to the "techniques" as they presently exist, but is the myopic (or short-sighted) view of capital budgeting held in both the business and academic communities.

Progress can be made in solving this problem by viewing capital budgeting as more broad in practice than the simple selection procedure discussed in textbooks. More attention must be focused on capital budgeting techniques relative to the strategic objectives and decisions of the firm. Focusing on the simple selection phase is myopic (Pinches, 1982).

The main observations made by Pinches concerning the capital budgeting decision-making process include (p. 8):

"1- Coalition, interpersonal factors, bargaining and policies often play an important role in the selection or rejection of capital budgeting projects.
2- The capital budgeting process is largely iterative, screening takes place in a somewhat sequential fashion.
3- Multiple criteria are employed for decision making.
4- Information problems and data uncertainties abound.
5- The proper treatment of risk is still a major source of concern.
6- The reward and punishment system employed has an important impact on capital budgeting decisions."

Chapter Summary:

This chapter provided an elaborate discussion of the key issues in the capital budgeting process. At, first several definitions of capital budgeting were presented. Then the main issues surrounding the capital budgeting investment process were discussed. Those issues included: the problem of uncertainty as it relates to capital budgeting and the concept of "satisfying behaviour" adopted by managers responsible for formulating capital investment proposals. The strategic nature of capital budgeting decisions as well as their long-term implications were also reviewed. An overview was presented of quantitative methods developed to appraise the capital investment decisions and to cope with the risk involved in future outcomes of these decisions. These quantitative techniques included evaluation techniques, risk assessment methods and management science techniques. The final phase of capital budgeting, namely the post-audit, was discussed, followed by a description of the empirical studies conducted to establish the relationship between the adoption of sophisticated capital budgeting methods and the firm performance in terms of profitability or decision making effectiveness. The chapter includes a section presenting in a chart-form, the main phases of the capital budgeting process as viewed by academicians in the US and UK. The chapter concludes by highlighting the main criticism of capital budgeting theory and the gap between capital budgeting practices and what is prescribed in theory .

Before concluding, it is useful to reflect on the most important areas that have been presented above. Capital expenditure decisions of corporations exert considerable influence on the overall growth of the economy and represent an important determinant of the future success of many organisations. Capital budgeting usually involves using substantial economic resources such as land, machines, buildings ,

natural and human resources which are limited in return for future, uncertain returns. Therefore, poor capital investment decisions not only misdirect these resources but can also undermine the future strategic direction and operations of the organisation.

Traditional capital budgeting theory has been criticized for focusing on pure quantitative evaluation techniques to the exclusion of other relevant factors that impact the investment process and its future prospects. It is noteworthy that organisational structure, management behaviour and management control may yield insight into the problem of the investment decision process (Tomkins et al., 1978). Theory of capital budgeting, if broadly defined to incorporate the main elements of the capital budgeting investment process as cited in the literature, can contribute to the successful implementation of capital investment decisions. This comprehensive approach to capital budgeting will be used as a basis for investigating the objectives of this research.

Therefore, many recent writers, (e.g Tomkins, 1991) are inviting researchers to pursue a more integrated view towards better understanding the problems of the investment decision making process. This will undoubtedly result in the creation of an organisational setting that is conducive to a more effective and efficient process of resource allocation, which would impact the profitability, competitiveness and survival of the organisation for many years to come.

CHAPTER FOUR

LITERATURE REVIEW

CAPITAL BUDGETING PRACTICES

4.1 Introduction:

Before undertaking a study of the capital budgeting practices of Bahraini's companies, a review of related studies based on Bahraini companies is necessary. Unfortunately, there have been no previous studies conducted on this subject in Bahrain. Therefore, to provide some background for the present study, a review of studies conducted among companies in the United Kingdom and the United States was made.

The literature documenting research into capital budgeting practices spans more than three decades. It reveals a predominant approach to discovering capital budgeting practices by survey, using questionnaire research instruments. The findings of such surveys have become the basis of inferences and conclusions by many research authors, conclusions which have become widely accepted as representing extant knowledge of capital budgeting practice.

This chapter presents a review of these surveys. The review does not precede 1950 since the publication of Joel Dean's book, Capital Budgeting (New York: Columbia University Press, 1951a) is generally considered the beginning of the formal capital budgeting literature.

4.2 Survey of Capital Budgeting Practices in the UK and the US:

A synthesis of capital budgeting surveys pertaining to large American firms, conducted between 1959 and 1980, was prepared by Mukherjee (1987, p. 36). A listing of twenty-two studies is given in Table 4.1. Numerous studies of capital budgeting practices have been carried out in the years following the period covered by Mukherjee. Table 4.2 provides a chronological list of these studies.

Table 4.1: Capital Budgeting Surveys of Large US Firms

Surveyed (Year)s	Authors	Method (s)	Sample Firms
1959	Istvan	Interview	Large Industrials
1959,1964 & 1970	Klammer	Questionnaire	Large Industrials
1960	Miller	Questionnaire	Fortune 500
1964	Christy	Questionnaire	S & P Stock Guide
1965, 1970 1975 & 1980	Klammer & Walker	Questionnaire	Large Industrials
1969	Mao	Interview	Medium/Large Co.
1969	Williams	Questionnaire	Fortune 500
1971	Fremgen	Questionnaire	Dun & Bradstreet
1970's	Petty et al	Questionnaire	Fortune 500
1975 & 1979	Kim & Farragher	Questionnaire	Fortune 500
1976	Gitman & Forrester	Questionnaire	Large Industrials
1978	Schall et al	Questionnaire	Large Industrials
1979	Oblak & Helm	Questionnaire	Fortune 500
1980	Rosenblatt	Interview	Fortune 500
1980	Gitman & Mercurio	Questionnaire	Fortune 1000
1980	Scapens & Sale	Interview & Questionnaire	Fortune 500

Source: Mukherjee (1987, p. 38).

Table 4.2 Capital Budgeting Surveys of Large US Firms after 1980

Year Results Published	Author	Method	Sample Firms
1986	Farragher	Questionnaire	Fortune Service 500
1987	Pope Ralph	Questionnaire	Small & Large Firms
1988	Mukherjee	Questionnaire	Fortune 500
1991	Ken & Cherkuri	Questionnaire	Forbes 500
1991	Gordon & Myers	Questionnaire	Large Firms
1992	Cooper et al.	Questionnaire	Fortune 500
1993	Smith Kimberly	Questionnaire	US 500 Industrial Firms

An up-to-date synthesis of capital budgeting studies pertaining to UK firms between 1966 and 1993 was prepared by Pike (1996, p 80). A listing of these studies is given in Table 4.3.

4.3 Common Features of Previous Capital Budgeting Surveys as Related to the Present Study:

1. Identification and generation of investment ideas.

2. Formal capital budgeting system.

3. Evaluation techniques used to select capital investment proposals.

4. Post-audits.

Table 4.3: Capital Budgeting Surveys in the UK

Year Studied	Year Results Published	Author(s)	No. of Firms	Response Rate	Sample Used
1966	1973	Rockley	69	29	BOT Returns
1973	1976	Carsberg & Hope	103	32	TIMES 1000
1974-5	1976	Westwick & Shohet	81	n.a.	Undefined
1975	1980	Jones	522	32	Large firms
1980	1981	Scapens & Sale	211	45	TIMES 1000
1980	1982	Pike	150	76	Largest firms
1981	1986	Jones	242	52	Large firms
1985	1985	McIntyre & Coulthurst	141	19	Medium firms
1985	1986	Lapsley	97	58	Public organ.
1986	1987	Mills & Herbert	131	51	Largest firms
1986	1988	Pike	100	72	Largest firms
1989	1993	Sangster	94	22	Scotland's top 500

Source: Pike (1996, p. 80)

4.3.1 The Identification and Generation of Investment Ideas:

King (1975, p. 73) identified the "triggering" stage of capital investment and observed that capital budgeting theory failed to recognise that "*in practice each opportunity for investment must be identified and exploited*". Reference to this stage was found in the Istvan survey. As noted by Mukherjee (1987), Istvan (1961) found that 47 out of the 48 firms interviewed did not make special efforts to stimulate ideas for capital expenditures. In contrast to Istvan's findings, Klammer (1972) found that 82 per cent of respondents actively sought investment ideas in 1959, with this figure rising to 94 per cent in 1970. Regarding the screening or reviewing committees to deal with investment proposals, Gitman and Forrester (1977) found that 75 per cent of US manufacturing firms used "central review committees" for approving capital investment proposals. Surveys seem to

indicate that the level of project generation - according to Mukherjee (1987, p. 39), *"correspond more closely to the "bottom-up" than "top down" procedures"* citing the work of Istavan (1961), Mao (1970) and Petty et. al (1975), in support of this conclusion. Pike (1996) reported that over the years 1975, 1980, 1986, and 1992, the percentage of large UK companies which required searching and screening of capital proposals was found to be 76, 84, 98, and 100 per cent respectively. In their research of capital budgeting practices into medium-sized companies in the UK, McIntyre and Coulthurst (1985, p.39) found that 49 per cent of their UK respondents indicated having a systematic search for investment ideas, while 90 per cent claimed to screen their ideas before final acceptance , but with no indication of whether a formal body existed to conduct such an activity. McIntyre and Coulthurst's findings revealed that all types of investment ideas were *"found to predominate from top management of the companies, indicating a rather more limited source than found in surveys of larger companies"*. Concerning the encouragement of new investment ideas, Northcott (1992) noted that not all ideas are encouraged . Scapens and Sale (1981) found from their surveys that most of their UK and US respondents controlled the types of proposals received through the capital expenditure budget, applying broad "guidelines" from company headquarters as to what constituted acceptable proposals. The basic aim, as noted by Northcott (1992), is to ensure that projects proposed are in line with group objectives. Scapens and Sale observed that "guidelines " acted as a limiting factor on the generation of investment ideas. More recent work into investment decision-making in 100 large divisionalised UK companies (Barton et al, 1992) revealed that the vast majority of investment proposals originated and

were defined at the divisional level and 70 per cent of parent companies claimed to have a formal system for encouraging the generation of capital investment ideas.

4.3.2 Capital Budgeting Manual or Formal Procedures:

Formal methods and procedures to guide investment analysis have been documented in the survey literature. Klammer (1972) found that the use of standard forms had been consistently high over the period 1959 to 1970, growing from 84 per cent to 97 per cent. UK surveys produced similar results. McIntyre and Coulthurst (1985) found that the majority of the medium-sized companies in their study had well written procedures and standard documentation for their capital budgeting. Specifically, 58 per cent of medium-sized companies had written capital investment procedures, while 59 per cent had standardised documentation for their capital investment projects. Pike (1996), observed that over a 17-year period there was an upward trend in the use of capital budgeting manuals or procedures among large UK companies. The percentages reported by Pike were 65 per cent, 76 per cent, 84 per cent, and 86 per cent in the years 1975, 1980, 1986, and 1992 respectively. In his 1988 study of Fortune 500 companies in the US, Mukherjee (1988) found that 60 per cent of his respondents had a complete budgeting manual with the rest relying on written procedures or letters to guide the budgeting process. Based on an in-depth review of those manuals, Mukherjee noted that the capital budgeting process of these companies can be viewed in a three-stage framework: Planning stage, Appropriation stage, and Audit or Control stage. He also noted, that, while the capital plan comes from the top, the capital budget is developed at the divisional or plant level and flows upward.

4.3.3 Formal Analysis - Evaluation Techniques and Risk Appraisal:

4.3.3.1 Evaluation Techniques:

The most extensively researched area of past surveys concerned the selection process in terms of techniques for evaluating capital investment projects, (King,1975, and Pinches, 1982) The extent to which discounted cash flow (DCF) methods have been adopted in practice formed the basis of much of the investigation of capital investment practices, Mukherjee (1987) and Northcott (1992). Surveys suggest that the use of DCF methods has increased significantly over the years. In 1959, Istvan noted that only 10 per cent of the firms in his sample were using DCF techniques. The surveys that addressed this issue, (Klammer,1972; Fremgen, 1973 ; Klammer and Walker, 1984,1987 ; Gitman and Forrester, 1977 ; Schall et al, 1978 ; Oblak and Helm, 1980 ; Scapen and Sale, 1981; Moor and Reichert, 1989 and Cooper et. al, 1992) - indicate that the vast majority of firms adopted DCF techniques in capital budgeting. Klammer (1972, p. 393) found high use of DCF (67 per cent), as did Fremgen (1973, p.20) with 76 per cent, Gitman and Forrester (1977, p. 69) with 66 per cent, and Klammer and Walker (1984, p. 138) with 75 per cent use of DCF techniques. Pike (1996) reported a steady progress in the adoption of DCF techniques among large UK companies over a 17-year period (Table 4.4). This finding of increasing popularity of DCF techniques among UK firms is supported by Sangster (1993). Pike also found that the application of multiple investment criteria has become a common practice of UK companies with the percentage of companies using four evaluation techniques increasing from 12 per cent to 36 per cent between 1980 to 1992 respectively (Table 4.5). Of the DCF techniques, the internal rate of return is most often cited as being "important",(Fremgen,1973, and Pike, 1988a).

Extensive use of DCF techniques seems to be in line with theoretical prescription, Mukherjee (1987). However, despite the advocated superiority of the NPV method in the financial literature, practitioners favour IRR over NPV, (Williams, 1970; Fremgen, 1973 ; Kim & Farragher, 1981; Petty et. al., 1975; Gitman & Forrester, 1977 ; Schall et. al., 1978 and Oblak and Helm, 1980 in US, and Levy and Sarnat, 1978 ; Pike, 1982 and Mills, 1988 a,b) in the UK.

Table 4.4: Investment Evaluation Techniques (100 large UK firms)

Year of Survey	1975	1980	1986	1992
Payback	73	81	92	94
Accounting rate of return	51	49	56	50
Internal rate of return	44	57	75	81
Net present value	32	39	68	74

IRR users justify their choice in a variety of ways. First, several authors including Bower and Lessard, 1973; Levy and Sarnat, 1978, and Pike (1982) have noted that the percentage expression of IRR may have psychological appeal because it gives an immediate ranking of projects with different time-scales and outflows. Second, IRR apparently removes the need for a pre-determined cut-off rate and practitioners who do not feel confident about the proper discount rate are less likely to be comfortable with the computed NPV, Pike (1982) and Mills (1988 a,b). Finally, as reported by Mukherjee, (1987)- one of the often mentioned drawbacks of the IRR method- the multiple rates of return- was not found to be a common experience in the Fremgen study (1973).

As noted by Mills (1988a, p.26), an interesting and yet contradictory finding by McIntyre and Coulthurst (1985), which is difficult to reconcile with the results of the other surveys, is that NPV was used more than IRR.

Despite the increasing use of DCF techniques, non-DCF methods have also appeared to play an important role in analysing capital investment decisions, with payback period especially featuring as a secondary evaluation technique. For example Gitman and Forrester (1977, p. 68) reported that 41 per cent of their respondents used payback period as a secondary evaluation technique. Hendricks (1983) found 65 per cent secondary payback use, and Pike (1988a) recorded a 92 per cent frequency of payback being used as a support technique. High incidence of higher usage of payback has been reported in medium and small- sized businesses. For example, McIntyre and Coulthurst (1985), found that payback period was used by 80 per cent of the respondents in their study, in comparison with 44 per cent which use DCF techniques.

The usage of DCF techniques , however, has been reported to be related to company size, Pike (1982) and Mills and Herbert (1987). In other words, the percentage use of DCF techniques among large companies, is higher than that of small companies. This relationship between size and application of sophisticated techniques is not borne out by the Sangster study (1993). According to Sangster, there has been an increase in the use of these DCF techniques among smaller companies which has resulted in the diminishing of this "previously identified relationship". Sangster (1993) argues that the absence of this relationship is the result of organisational change, driven by the expansion of information technology. Mills (1988b) states that an increasing awareness of DCF methods may account for the use of more sophisticated practices.

Table 4.5: Combined Evaluation Techniques (response: 100 Companies)

Year of Survey	1975	1980	1986	1992
Firm using:	%	%	%	%
No Methods	2	0	0	0
A Single Method				
PB	14	12	6	4
ARR	12	7	0	0
IRR	5	4	2	0
NPV	0	1	0	0
Two Methods				
PB/ARR	14	13	10	8
PB/IRR	14	15	8	9
PB/NPV	4	6	5	6
ARR/IRR	0	2	2	0
ARR/NPV	1	1	1	0
IRR/NPV	1	4	3	5
Three Methods				
PB/ARR/IRR	7	10	5	5
PB/ARR/NPV	4	4	3	1
PB/IRR/NPV	10	9	21	26
ARR/IRR/NPV	1	1	0	0
Four Methods				
PB/ARR/IRR/NPV	11	12	34	36
Total	100	100	100	100

Key: PB: Payback IRR: Internal rate of return
ARR Accounting rate of return NPV: Net present value
Source: Pike (1996, p.83)

4.3.3.2 Risk Analysis:

Risk analysis in capital budgeting can be grouped into three categories (Gurnani, 1984)- risk recognition, risk assessment, and risk adjustment. One third of large US firms

surveyed by Mukherjee (1987) do not recognise risk, either formally or informally. A later study by Cooper et al, (1992) reported that 45% of large US companies use formal risk methods in analysing their capital projects. In terms of the assessment of risk, no specific method seems to predominate. In the risk adjustment category, varying the required rate of return to account for risk was found to be more popular than modifying the payback period in all surveys except Petty et. al (1975). Ken and Cherukuri (1991) reported that four-fifths of their respondents chosen from "Ranking the Forbes 500s" use sensitivity analysis for the purpose of risk assessment. This high usage rate of sensitivity analysis appears to be, according to Ken and Cherukuri, at the expense of the Monte Carlo Simulation which is complex and time-consuming. The most comprehensive study of handling risk and uncertainty among large UK companies, Ho and Pike, 1991, revealed the following:

1. Companies prefer relatively simple risk adjustment and sensitivity analysis with more emphasis on "total project risk".
2. Advanced risk adjustment techniques, such as risk simulation, covariance analysis and CAPM, although well-developed in the literature, are still in an experimental stage in practice.
3. The typical pattern of risk handling involves a single value estimate of risk adjusted IRR, alongside a payback calculation as a rough indication of risk, combined with management judgement based on experience and intuition.
4. Firms with higher market risk and/or larger asset size in general, as well as certain industries in particular, are more involved in utilising advanced risk analysis tools.

Ho and Pike (1991) found that over half of the respondents surveyed expect formal risk analysis to become more important over the next few years. In light of the growth in the availability and sophistication of computerised decision support systems and the rising levels of awareness of concepts underlying formal risk analysis techniques, this belief appears to be well-founded (Ho and Pike , 1991).

4.3.3.3 Management Science Techniques:

The use of management science techniques is still surrounded by uncertainty (Northcott, 1992). Klammer (1972) found in 1970 that 17 per cent of the firms responding to his survey used linear programming for capital budgeting techniques. Fremgen (1973) reported 20 per cent occasional usage of linear programming in investment analysis, whereas 19 per cent of the respondents to Kim and Farragher (1981) indicated employing linear programming. Application of decision trees is showing similar trends. The use of decision tree increased from three per cent in 1959, to four per cent in 1964, to nine per cent in 1970, Klammer (1972). Kim and Farragher (1981) reported 10 per cent and 12 per cent use of this technique in 1971 and 1979 respectively. Fabbozi (1978) and Petty and Bowlin (1978) reported some limited usage of other techniques such as regression analysis, econometric models, input/output analysis, queuing models, statistical sampling and risk return indifference curves. According to Gurnani, (1984, p.34) these techniques, *"are being used more by firms with larger capital budgets in relation to the lower investment expenditure firms"*. Cooper et al, (1992) found that 40 % of their respondents chosen from "ranking the Forbes 500s" use linear programming in investment analysis. Other techniques such as econometric models and decision trees were of limited use.

Examining to what extent management science techniques are employed by large UK firms, Pike and Sharp (1989, p.137) reported a slow increase in the use of mathematical programming from 11 per cent to 21 per cent over a period of 11 years (from 1975 to 1986). Around 60 per cent of this 21 per cent used this technique only "rarely" and about 14 per cent used it "always". Mathematical programming was used predominantly by large companies (with capital budgets of over £50 million, p.138) . Although Pike and Sharp noted (p.137) "*a significant association between the degree of usage of nearly all management science techniques and the extent to which computer software is applied to investment decisions*", they predicted only a 29 per cent use of mathematical programming by 1992 despite the increased availability of computers. While the adoption of management science techniques is rather slow, Pike and Sharp anticipate much higher usage of these techniques with the development of better software and improved training managers.

4.3.3.4 Choice of Cost of Capital or Hurdle Rate:

Surveys indicate that a minimum of three-quarters of firms in the US do employ, at least, one hurdle rate in capital budgeting, (Petty et. al., 1975 ; Schall et. al., 1978 , and Gitman and Mercurio, 1982). There appears to be a growing use of theoretically recommended methods of weighted average cost of capital (WACC), although the authors disagree as to the extent of its use. Brigham (1975) reported 61 per cent of WACC, in the same year that Petry (1975) found 34 per cent and Petty et. al. (1975) found 30 per cent use of WACC. Higher usage of WACC was reported in later studies. Schall et. al. (1978) and Oblak and Helm (1980), in 1979, and Gitman and Mercurio (1982) in 1980 reported that

respectively, 46 per cent, 54 per cent, and 83 per cent of US firms were using WACC as a hurdle rate. In a recent survey in the US, Ken and Cherukuri, (1991) found that 44 per cent of the respondents used a discount rate between 10 per cent and 14 per cent and rates between 15 per cent and 20 per cent were chosen by 17 per cent of firms. Another 17 per cent applied multiple discount rates to evaluate capital projects reflecting the degree of risk. In the UK, Pike, (1988a) found that two-thirds of his respondents were employing hurdle rates between 15 and 24 per cent. This situation, as noted by Pike, has changed very little in total to that reported in 1981. Pike and Wolf, (1988, p.50) indicates that the determination *"of such rates in many cases lacks much theoretical underpinning"*. Survey results suggesting the use of multiple discount rates for different project types, or regular updating of these rates to account for varying conditions have been mixed and inconclusive. Brigham (1975) claimed that over half the US firms he surveyed adjusted their discount rates according to risk (see also Petry, 1975), while Petty et. al. (1975) indicated that only one-third of respondents used more than one discount rate. Oblak and Helm (1980) ; McMahon (1981) and Baker (1981) later reported higher use of multiple discount rates, although inconsistent categorisations of these rates make comparison difficult, Northcott (1992). Brigham (1975) also found that 39 per cent of his respondents revised the discount rates less than once a year, with 32 per cent making irregular revisions. Runyon (1983) found that only 17 per cent of small businesses surveyed undertook "frequent" revisions of the required rate of return. Pike (1996) reported that the regular review of minimum required rate of return among large UK companies has steadily increased from 43 per cent to 69 per cent over a 17 year period (from 1975 to 1992).

4.3.4 Post-audit:

The final step of the capital budgeting process is post-audit or control as referred to by some authors (see Pinches, 1982). Post-audit of completed projects is advocated in academic literature on the premise that it will lead to an improved analysis in the future by uncovering flaws and biases in the past. The majority of research on post-audit has dealt with the proportion of firms conducting some kind of post-audit procedure, Northcott (1992). The importance of post audit is evidenced by its popularity in recent years (50 per cent in 1959, Istvan (1961), to 71 per cent in 1960, Miller (1960), to 88 per cent in 1972, Klammer (1973), and to 90 per cent in 1980, Gitman and Mercurio (1982). Scapens and Sale (1981) indicated that post-audits in the US became an acceptable practice in the late 1950s and reported that 84 per cent of US respondents conducted post audits, compared to only 36 per cent in the UK. Neal and Holmes' (1988, p.3) study lent support to Scapens and Sale's finding that post-auditing is "a less prevalent practice" in the UK than in the US. Recent studies have indicated an increasing rate of adoption of post-completion audits among large UK companies, Mills and Kennedy (1993). Since 1975, the percentage of large UK organisations that conducted post completion audits on larger projects has almost doubled from 33 per cent to 64 per cent and an even higher percentage (84 per cent) reported monitoring project performance on a regular basis, Pike (1988a).

There has been some attempt to relate the use of post-audit to characteristics of the firm, particularly by size. Pike (1983b) concluded that the use of post-audit was not influenced by firm size. McIntyre and Coulthurst (1985) found that more than half of the medium sized firms in their sample conducted post audits. In contrast to the Pike finding, they

observed that more consideration was given to post-audit by medium-sized companies than larger ones.

4.4 Survey of Capital Budgeting Practices for Countries other than the US and the UK:

Literature on capital budgeting for countries other than the US and the UK also exists and is as follows:

Australia: Anderson (1982), investigated the capital budgeting practices of Australian companies. His findings were: (1) 93 per cent of respondents had annual budgets exceeding $500,000, (2) the finance department had the major responsibility for analysing capital budgeting proposals, (3) a majority of respondents indicated that the most difficult and most critical stage of the capital budgeting process was that of project definition and cash flow estimation, (4) the most popular method used in making capital budgeting decisions was the internal rate of return method, (5) two-thirds of respondents allowed for risk in the capital budgeting process with the risk-adjusted rate of return being the most popular method used, (6) more than half of the respondents indicated that they undertake a post-audit of capital projects once implemented, and the major purpose of the post-audit was to compare the actual and forecasted cost and profitability of the project after implementation.

Lilleyman (1984), used mailed questionnaires to collect information from private and government organisations. His main findings were: (1) capital expenditure budgets were prepared regularly by 87 per cent of the respondents, (2) the use of discounted cash flow techniques (DCF) is common, and the payback period is widely used, (3) sensitivity analysis to assess investment risk was used by 59 per cent of the respondents, (4) cash

flow was considered as a major problem in capital budgeting by most respondents, and (5) a formal system to control capital expenditures has been utilised by 82 per cent of the respondents.

Freeman & Hobbes (1991), in their article; "Capital Budgeting: Theory Versus Practice", attempted to study the capital budgeting behaviour of Australian executives. They reported a divergence between some of the theories and the practice. Seventy-six per cent of the executives said that their firm accepted projects that failed to meet company benchmarks. The main reason for this, as reported by Freeman and Hobbes (1991) ,was the inability to factor strategic consideration into the evaluation process. Their findings indicate, however, that more firms are improving their evaluation procedures to account for the time value of money by using DCF methods, and more firms use non-DCF methods for atypical projects like research and development or exploration. Regarding the hurdle rates, 39 per cent use the cost of borrowing as a suitable benchmark. They also reported that nearly half of all respondents use the same hurdle rate for projects of different risk. Finally, they reported that 61 per cent of firms use sensitivity analysis when estimating risk, but only 15 per cent take the next step to probability simulation.

Canada: Vijay and Ashwani (1994) conducted an investigation of the state of the art of capital budgeting of large Canadian companies. The results indicate that most surveyed firms follow standardised methods of capital budgeting, with internal rate of return and payback period dominating the net present value method. Forecasting methods are dominated by subjective management estimates and expert opinions. Twenty-five per cent of the surveyed firms, including public firms, use cost of debt as their cost of capital.

Blazouske et. al. (1988) sent questionnaires to chief financial officers of all corporations listed in the 1985 Canadian Financial Post 500 Industrial List. The main findings were that most firms preferred the internal rate of return (IRR) over other techniques, and the net present value (NPV) was also common among responding firms.

Hoskins and Dunn (1974) have found that the capital budgeting process of large Canadian companies involved four stages: (1) preparation of projects proposal, (2) these proposals are included in the capital budget, (3) once the capital budget is approved, the individual proposal is developed by the division or section and resubmitted individually for approval, and finally, (4) the proposal is approved, based on the description and justification.

Colombia: Velez and Nieto (1986) used survey questionnaires to collect information about capital budgeting process followed by large firms in Bogota , Colombia. They found that the extent of the use of capital budgeting techniques was much higher in the large firms than in the smaller ones.

Jordan: Ramadan (1991) conducted a study on 37 Jordanian manufacturing firms in order to investigate the relationship between capital budgeting techniques and firm performance. Chi-square tests were performed, and the findings of the study indicated that there has been a growing tendency among Jordanian manufacturing firms to use sophisticated techniques. Furthermore, the study has shown that there is no statistical association between sophisticated capital budgeting techniques and firm performance.

Kuwait: Al-Deehani (1990) studied capital budgeting investment decisions in 10 Kuwaiti organisations by applying King's six-stage investment model (1975). Al-Deehain found that the use of formal analysis methods was limited with payback period being the most used method and DCF techniques almost never used. Qualitative, or subjective, factors

1. The use of non-sophisticated techniques such as the accounting rate of return and the payback period is much greater than the use of DCF techniques.

2. The use of DCF techniques by New Zealand firms appears to have increased over the past decade, but their usage as primary criteria still appears to be comparatively low when compared to US usage.

3. The use of WACC as a discount rate for DCF analysis is low, and the use of cost of debt alone is correspondingly high, relative to all of the comparative surveys.

4. Low usage of risk-adjusted discount rates to account for project risk

5. Shortage of capital was found to be a major concern of New Zealand firms.

4.5 Capital Budgeting Practices of Public Sector Enterprises and Non-Profit Making Organizations:

Four studies, (Miller, 1988; Khan, 1987 ; Doss, 1987, and Kee et. al., 1987), conducted a questionnaire survey on the capital budgeting practices of US cities and municipal governments. Among their findings were: (1) most cities prefer simple and informal methods such as payback and accounting rate of return to more sophisticated techniques, such as IRR and NPV, (2) larger cities used more sophisticated capital budgeting techniques than smaller ones. Three studies on capital budgeting practices of government-owned enterprises were found to have been conducted in the UK. Berry (1984) conducted a longitudinal case study on the capital budgeting process of a large nationalised company. The company generates, transmits, distributes, and markets electricity for use by the nation. Three years' data were obtained from the company's records. Information was also obtained from personal interviews with the managers at various levels within the

as noted by Al-Deehani often influence the progress of proposals through the capital investment evaluation process. The most apparent of these -according to Al-Deehani- is the initial categorisation of project proposals. Al-Deehani observed that as a result of early categorisation, some proposals may never enter the formal evaluation procedures, being judged instead by non-financial criteria.

Malaysia: Two studies on capital budgeting practices of Malaysian companies have been reported (Abdul Rahman , 1980 and Samidi, 1989). Based on a questionnaire sent to 113 large manufacturing firms in Malaysia, Abdul Rahman (1980) found that (1) the practices of Malaysian firms in the manufacturing sector in 1978 were more sophisticated than in 1973, and (2) a positive relationship existed between the firms' profitability and the degree of sophistication of their capital budgeting practices. Samidi (1989) studied the capital budgeting practices of government-owned enterprises and those of investor-owned enterprises in Malaysia. He found that Malaysian enterprises are using more sophisticated procedures in their capital budgeting decisions, with government enterprises being more sophisticated than their investor-owned counterparts. He failed, however, to confirm the Abdul Rahman findings that a positive relationship exists between capital budgeting practices and firm performance.

New Zealand: Patterson (1989) investigated capital budgeting practices of New Zealand companies through a questionnaire sent to the Corporate Secretaries of all 260 companies traded on the New Zealand Stock Exchange. Replies were received from 160 companies, and 99 firms returned completed questionnaires. The most important findings of the survey are:

1. The use of non-sophisticated techniques such as the accounting rate of return and the payback period is much greater than the use of DCF techniques.

2. The use of DCF techniques by New Zealand firms appears to have increased over the past decade, but their usage as primary criteria still appears to be comparatively low when compared to US usage.

3. The use of WACC as a discount rate for DCF analysis is low, and the use of cost of debt alone is correspondingly high, relative to all of the comparative surveys.

4. Low usage of risk-adjusted discount rates to account for project risk

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organisation. Berry found that the case study approach used was "feasible and more fruitful" than the main questionnaire approach used by many previous researchers in capital budgeting.

Lapsley (1986) investigated the quality and sophistication of investment appraisal techniques used in the UK public sector. The results indicated that discounting techniques were widely used among the responding firms. Other non-discounting techniques were also used by some firms to supplement the discounting techniques.

There is also a paucity of research on capital budgeting practices of non-profit organisations. One such study was conducted by Cleverley and Felkner (1984). The purpose of the survey was to test the association between capital budgeting practices and hospital performance. The authors found that hospital rates of return were not significantly associated with the capital budgeting practices of the hospital. On the other hand, a statistically significant relationship was found between the existence of long-term planning and the hospital's financial performance.

Another study by Kamath and Oberst (1992) was conducted to investigate capital budgeting practices of large US hospitals. The results from the survey of 427 hospitals include: (1) about 30 per cent of the hospitals formally evaluate all of their capital investments proposals while another 34 per cent formally evaluate half or less than half of their capital budgeting proposals, (2) only about 36 per cent of the responding hospitals explicitly account for risk in evaluation of capital investment proposals, (3) an overwhelming majority of the responding hospitals report that qualitative factors enter their capital budgeting decisions, (4) the medical staff is found to participate in major capital investment decisions of 97 per cent of the responding hospitals, and (5) statistical

analysis revealed that the use of technically superior capital budgeting methods was independent of the various capital characteristics.

4.6 Survey of the Capital Budgeting methods used by Multinationals:

Oblak and Helm (1980), surveyed the capital budgeting techniques in use by large US multinational corporations (MNCs) , as well as their procedures to estimate project returns, risk, and the required rate of return. Survey questionnaires were sent to the principal financial officers of 226 Fortune 500 firms which operated wholly-owned subsidiaries in 12 or more foreign countries. The findings of their studies indicate that, (1) MNCs are conducting more detailed analysis of their foreign projects, (2) A higher percentage of MNCs use DCF methods and adjust for risk in foreign project evaluations, and (3) Test results revealed no significant association between sophisticated capital budgeting systems and MNCs financial performance. Shao (1994) examined capital budgeting practices used by affiliates of US-Based American enterprises operating in North America and Latin America by analysing their operations from the perspective of the foreign affiliate manager. The results revealed that foreign managers preferred to use sophisticated techniques as their primary method of analysis. The findings also indicated that, while many foreign managers performed quantitative assessment, some managers still used subjective assessment to determine project risk.

Chapter Summary:

This chapter provides a summary of the previous research on capital budgeting practices in developed as well as developing countries. It is evident from the surveys that the major firms investigated are utilising many of the tools of analysis presented in the financial theory for analysing capital investment projects. Some of the studies cited in the chapter have made some effort to relate company characteristics, such as size and type, to capital budgeting practices, while other studies have attempted to associate the firm's profitability with sophisticated capital budgeting practices. In general, several observations can be made regarding capital budgeting practice as reviewed in this chapter. These are:

1. Most companies consider the generation of capital projects ideas as an important activity in their capital budgeting process.

2. In large organisations, standardised documentation of procedures in the form of capital budgeting manuals are used to guide the capital budgeting process.

3. The quantitative financial analysis of proposals has been the focus of much of the surveys cited, and it appears that firms are continuing to move forward in the adoption of more theoretically prescribed evaluation methods, with the DCF techniques being used more as primary tools with IRR being consistently more popular than NPV.

4. The weighted average cost of capital is being used as a discount rate by a large number of companies. However, unsophisticated measures such as historical rates, cost of debt or arbitrary selected rates by management have often been reported.

5. Sensitivity analysis and revising the payback period appear to be the most popular methods for accounting for risk and uncertainty for investment projects.

6. Management science techniques were found to be of limited use in the capital budgeting process.

PART THREE

METHODOLOGY AND ANALYSIS

CHAPTER FIVE

RESEARCH METHODOLOGY

5.1 Introduction:

As a first step in developing the structure of this study, the researcher has reviewed the structure of the Bahrain economy, including the major industries and companies in each industry. Ten years' economic data was extensively examined in order to identify the major trends in the Bahrain economy. Such examination has yielded the following conclusions:

I. The contribution of the industrial sector to the gross national product has been increasing over the past ten years.

II. Oil production and refining has played a major role in the Bahrain economy during the early years of Bahrain's industrial development. However, in recent years chemical and aluminium industries have emerged as major industries.

III. A comprehensive review of the financial data published by major Bahraini companies, along with the National Statistics, have revealed a continuous increase in the accumulation of plant , equipment and other long-term assets.

5.2 Selection of Bahraini Companies:

Against this background, the researcher has outlined the objectives of his study to be the identification of the capital budgeting practices of the major Bahraini industrial companies, and to compare those practices against the capital budgeting practices of similar British companies. The five companies , Aluminium Bahrain (Alba), Bahrain National Gas Company (Banagas), Bahrain National Oil Company (Banoco), Gulf Petrochemical

Industries Company (Gpic), and Bahrain Flour Mills (Bflm), were selected because of their strategic importance and their major contributions to the Bahrain GNP in general and the leading role they play in the industrial sector in particular (Table 5.1).

Table 5.1: Contribution of Manufacturing Activities by Major Bahraini Companies

(BD- Million- Current Prices)

	1990	1991	1992	1993	1994
Activities					
Oil Industries	126.0	134.5	117.6	106.6	117.1
Aluminium Bahrain (Alba)	40.4	46.9	46.7	56.8	97.1
Aluminium Industries (Others)	17.9	16.6	15.7	13.4	16.8
Food Industries	10.6	11.0	14.1	11.5	14.6
Chemicals Industries (Gpic)	6.7	11.4	12.1	11.9	12.1
Dry Dock & Ships Repairing	9.9	12.3	10.1	10.6	12.6
Total Manufacturing Sector	251.9	265.5	251.6	257.3	321.6

Source: Economic Affairs- Directorate of Economic Planning- Ministry of Finance & National Economy- National Accounts 1994- State of Bahrain.

5.3 Comparative Approach:

As companies struggle to improve their practices and processes, it often helps to make comparisons with others. These comparisons, or benchmarks, can be conducted in whatever area needs improvement and should provide information that may lead to the increased success of a company (Hollstein, 1995). In this current study, benchmarking is used in a relative sense. In other words, it involves the comparison of Bahraini companies

with a number of British companies which have similar attributes. To ensure the suitability of the selected British companies for benchmarking purposes, these companies had to have sustained their profitability and growth in the five years prior to 1994 in order to be a candidate for selection. The Bahraini companies included in this study are capital intensive, export oriented, profit seeking and contribute more than 70 per cent of the country's total industrial output. These companies have enjoyed successful profitable operations since their inception, except during the period of economic disruption of the Gulf War (1990-1991). Their average annual capital expenditures ranged from BD 15m to BD 8m.

In the light of the above major characteristics of the Bahraini economy, and the economic role of the industrial sector, this study is designed to evaluate capital budgeting practices followed by Bahraini companies against those followed by a sample of carefully selected British companies.

The capital budgeting practices followed by Bahraini companies and those followed by British companies can be best described through the use of a capital budgeting system. The system used is largely based on the work of King (1975), Pike (1982), Kim (1982) and Mukherjee (1987). The components included in this system are: preparation of a long-term capital budget, systematic search for investment opportunities, screening and reviewing of capital projects proposals, evaluation techniques, risk analysis, expenditure control, existence of capital budgeting staff, management science techniques, and post-audits.

Each component of the proposed system will be investigated in both Bahraini and British companies in order to identify similarities and dissimilarities among those companies. In order to meet this goal, the following specific objectives are set:

1. To identify capital budgeting procedures which are workable in the Bahraini culture and economy so that, over time, knowledge of these procedures can be disseminated widely throughout Bahraini enterprises.
2. To determine the extent of the usage of discounted cash flow (DCF) techniques in the evaluation process of capital investment projects among the Bahraini companies.
3. To investigate the capital budgeting practices for a comparable sample of British companies carefully selected for this purpose.
4. To conduct a comparison of capital budgeting practices followed by Bahraini companies and their British counterparts.

5.4 Capital Budgeting System: A Basis for Formulating the Study Hypotheses:

The use of the term "system" has become increasingly frequent in management and business writings in recent years. Chase and Aquilano (1977, p. 31) define a system as "*a set of interconnected parts through which some activity is performed*". According to Davis (1974, p. 81), a system is a *"set of elements which operate together to accomplish an objective."* From these two definitions it is clear that there are many systems in any business firm, one of which is the capital budgeting system.

In this study, the capital budgeting practice that a firm uses in its quest for a profitable long-term investment decision will be regarded as a system which has a set of interrelated

parts. In fact, the capital budgeting system may be viewed as an integrated unit of a number of elements which are directly and indirectly interrelated with one other.

Figure 5.1 portrays the capital budgeting system illustrating the main activities involved in the capital budgeting process. This model of capital budgeting is largely based on the works of King (1975), Pike (1982), Kim (1982), and Mukherjee (1987).

The starting point is long range planning. Effective and realistic work in capital expenditure analysis is possible only when there is a well established long- range plan. Such a plan is necessary to help management shift from haphazard expenditure to improved control over the capital investment decision process.

The second step in the capital budgeting system is the development of a long-term capital budget within the overall framework of the long-range plan. This is necessary to organise the development of future growth and to direct a firm's capital budgeting programme. It also enables the financial officer to focus upon: (1) raising the amount of funds at the lowest possible cost, (2) investing those funds more economically, and (3) effectively controlling these capital expenditures.

The essential third step is the continuous and systematic search for investment alternatives. A financial manager normally deals with an almost infinite number of different investment opportunities with different potential returns.

The fourth step in the capital budgeting system is to eliminate obviously infeasible ideas. A summary screening is undertaken to ensure consistency with corporate policy. Projects are screened against pre-specified criteria. The screening which takes place here is

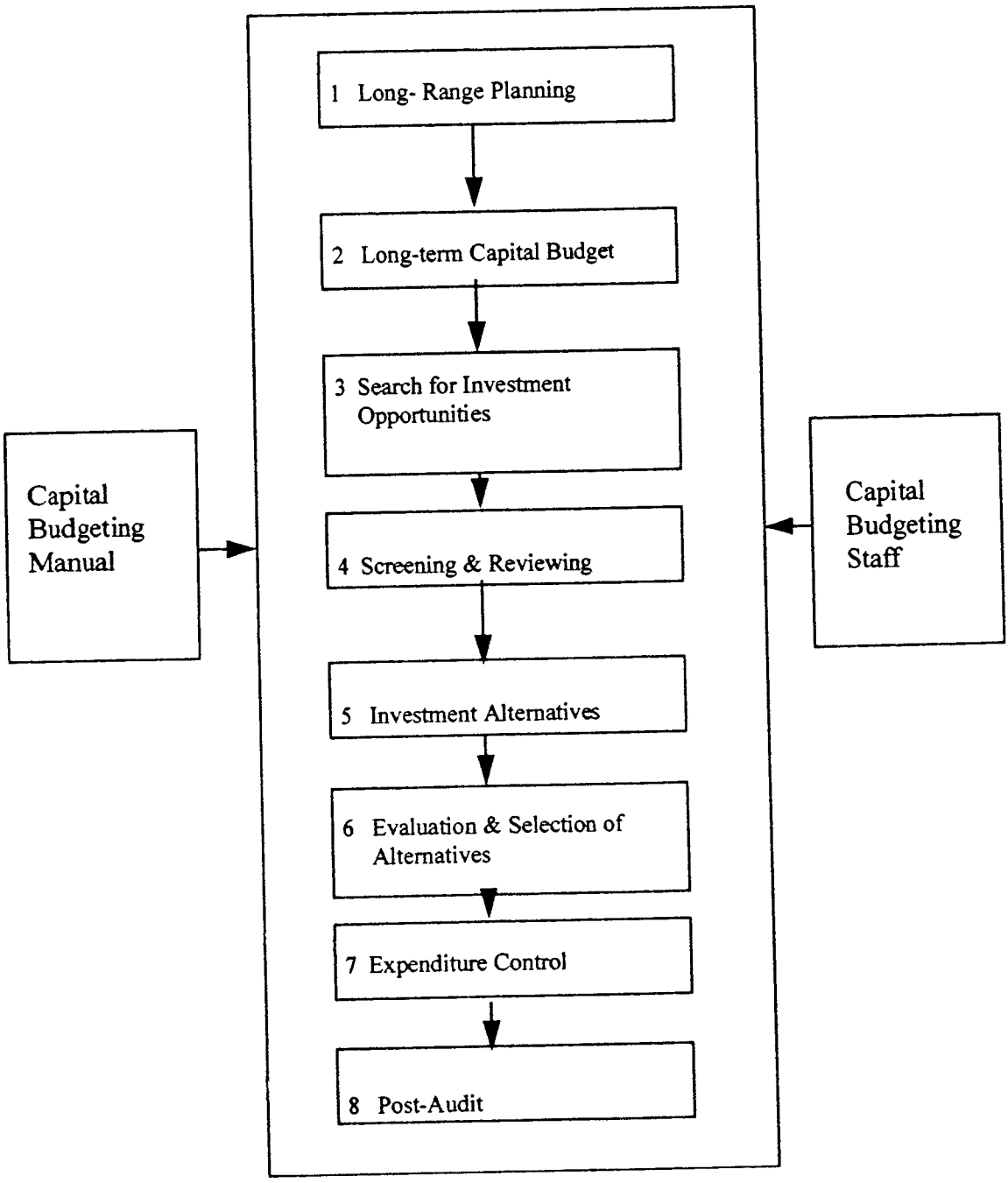
influential in deciding which projects will finally be accepted for investment (stage five in Figure 5.1).

The selection process normally involves deciding which projects are most profitable, and which combination of investment is best in the event of capital rationing. Issues to be addressed at this stage include which techniques should be used to evaluate competing projects, the determination of the relevant discount rate and the assessment and the relevance of non-financial issues. Normally, the selection process takes place after a thorough evaluation of each investment project, or group of projects. This activity appears as stage six in Figure 5.1

In any project evaluation process, an important task is to estimate the cost-revenue structure of each of the investment alternatives. This involves computing the cash outflows and inflows for the project. The determination of the net cash inflows is essential because they are the necessary ingredients for the project evaluation techniques which are used to compare the financial consequences of one project with those of other projects, in terms of maximising the stockholders' wealth.

There are several project evaluation methods that a firm can use when evaluating an investment project. The most commonly used are the payback period, the accounting rate of return, the net present value (NPV) and the internal rate of return (IRR). A variety of management science techniques can be used in addition to these four traditional methods, Northcott (1992) and Mills and Herbert (1987). These include linear programming, Project evaluation and review technique (PERT), computer simulation, game theory,

Figure 5.1 : A Capital Budgeting System



decision theory, and several other mathematical methods. The use of these techniques, in combination with traditional project evaluation methods, has been argued as providing the basis for more effective investment decisions than the use of only the traditional capital budgeting techniques.

Recognising that uncertainty of the future cash flow is an extremely critical variable (Van Horne, 1995), therefore, risk analysis and its application are crucial for profitable investment decisions. Not all potential capital projects are equal; some have greater inherent risk than others. Businessmen and investors usually adjust their return requirements to account for risk. That is, the greater the perception of investment risk, the greater the return required by the investors to compensate for the possibility that variations in returns might eradicate the financial benefits from the investment. This means that there has to be some kind of method for adjusting project estimates for risk. The most widely used of these methods include changing the discount rate, shortening the payback period, changing of cash flow projections, probability analysis, and/or sensitivity approach. The control of project expenditure is an important responsibility of the financial manager after its final approval. Expenditure control should increase the likelihood that the project finishes within the established time frame.

The final stage of the capital budgeting process is post audit. Such audit seeks to compare the actual performance with the forecast made at the time of approval, both to adjust the individual project and to appraise management of any discrepancy in information or to revise models that are being used to make future decisions.

5.5 Study Hypotheses:

The general environment consists of the cultural, economic, legal, political, and educational conditions in the locality within which an organisation operates. These general environment elements are important background influences on the whole management process (Schermerhorn, 1996, and Bjerk and Al-meer, 1993). Previous studies have established that differences in the capital investment process and other financial aspects tend to occur across nationality lines (Pattillo, 1976). Therefore, the development of hypotheses is based on the underlying assumption of differences in the capital investment process across international boundaries, and in particular between developed and developing countries. Hypothesised relationships are stated in the null form, with testing employing empirical data from interviews and responses to the study questionnaire from participating firms. While conventional statistical tests of hypotheses are not possible with a sample of this size, conclusions nonetheless can be drawn from an objective analysis of the data. This method of hypotheses testing has been applied in previous studies due to the inapplicability of using conventional statistical tests (Pattillo, 1976, and Al-Deehani, 1990).

Since one of the objectives of this study is to investigate the capital budgeting practices of two groups of companies representing two different environments (UK & Bahrain), the study hypothesis can be formulated to reflect the impact of the above mentioned environmental factors on the capital budgeting process in the two groups. Therefore, the main study hypothesis can be formulated as follows:

Ho: Given the different state of economic development in both the UK and Bahrain, as well as different cultural environments in both countries, the **"Capital Budgeting Practices adopted by Bahraini companies differ from those adopted by their British counterparts".**

Due to the fact that capital budgeting practices include several elements, the above hypothesis can be broken down into a number of sub-hypotheses as follows:

1. Administrative procedures before project approval.

2. Selection process.

3. Administrative procedures after project approval.

The scope of these procedures can be defined in operational forms as follows:

- **Administrative Procedures** - Administrative procedures before the project approval as used in this study encompass:

i) Planning Horizon- preparation of a long-range capital budget.

ii) Systematic search for capital investment proposals.

iii) Formal screening and reviewing of capital investment proposals.

iv) Existence of an up-to-date capital budgeting manual.

v) Existence of full-time capital budgeting staff.

- **Selection Process** - The term Selection Process refers to the following:

vi) Extent of usage of discounted cash flow techniques in evaluating investment projects.

vii) Application of formal risk analysis.

viii)Use of management science techniques.

- **Administrative Procedures after Project Approval-** These include:

ix) Use of expenditure control methods.

x) Use of post-completion audits.

After the development of the operational definitions of the key elements of capital budgeting practices, the main hypothesis, stated earlier can be divided into the following sub-hypotheses:

Hoa: The administrative procedures before project approval adopted by Bahraini companies differ from those adopted by their British counterparts with regard to the following:

1. Planning Horizon- preparation of a long-range capital budget.
2. Systematic search for capital investment proposals.
3. Formal screening and reviewing of capital investment proposals.
4. Existence of an up-to-date capital budgeting manual.
5. Existence of full-time capital budgeting staff.

Hob: Methods and procedures used by Bahraini companies in analysing investment proposals differ from those adopted by their British counterparts with respect to the following:

1. Capital investment appraisal techniques.
2. Risk assessment methods.
3. Use of management science techniques.

Hoc: The administrative procedures after project approval adopted by Bahraini companies differ from those adopted by their British counterparts regarding the following elements:

1. Existence of formal methods for controlling capital expenditure.

2. Formal post-completion audits.

Each component of capital budgeting practices stated as a sub-hypothesis will be evaluated by comparing the proportion of Bahraini companies and those of British companies that apply that component. For example, in the area of administrative procedures, the percentage of Bahraini companies who prepare a long-range capital budget will be compared with the percentage of British companies who do the same. The two groups of companies are considered similar in this area if the percentage variation between them is 20 per cent or less; otherwise they are dissimilar. Selection of 20 per cent as a tolerance level can be defended on the grounds that several studies utilising a matched-pair design have used 20 per cent as a tolerance level for matching companies selected in their sample (see for example, Haka (1983) and Ho and Pike (1992).

5.6 Criteria Used in Practice:

Review of relevant literature on capital budgeting practices reveals that the size and industrial characteristics of a company affect its reliance on either sophisticated or unsophisticated methods. For example, a high positive association between the size of a firm and the usage of sophisticated techniques has been established in many studies where company size was measured by turnover and/or total assets (see, for example, Klammer 1972; Christy, 1966; Schall and Sundem, 1980, and Kim and Farragher,(1981). Also,

industrial classifications seem to make a difference in a firm's preference for sophisticated techniques over non-sophisticated ones. For example, Mills (1988b) reported that certain types of organisations were found to use more sophisticated techniques in capital budgeting practices than others, despite the absence of a statistical association between industry and practice. Mills' observation is in line with that made by Scapens et al (1982). Also Brigham (1975), Mao (1970), Williams (1970), and Pike (1996) indicated that large corporations, chemical and petroleum utilities and capital intensive companies are expected to use sophisticated discounted cash flow techniques more frequently.

Based on the above observed association between company size, industrial classifications and capital budgeting practices, the following attributes were identified to exert the most influential impact on capital budgeting practices:

1. Turnover: measured by company sales.

2. Total assets attribute: measured by monetary value of the company's total assets expressed in a common currency.

3. Capital Intensity Ratio (CIR): measured by dividing a total of the depreciations for a specified period by the total assets for the same period. The higher the ratio, the greater the capital intensity of the company. Since the depreciation figures for Bahraini companies are not available, the CIR will be measured by dividing fixed assets by total assets.

4. Industry attribute: this attribute is reported to have influence on the company's capital budgeting practice (Mills, 1988b). The usage of this attribute has been justified on the grounds that companies operating in the same industry tend to have certain common characteristics that can be used as a basis for comparison.

5.7 Identifying the Attributes of the Bahraini Companies - A Basis for Selecting the British Companies:

The value of each of the first three attributes (turnover, total assets, and intensity ratio) was calculated for each of the Bahraini companies to be used at a later stage in identifying a comparable group of British companies. For each of these three attributes, a five year average can provide a reasonable representation of the value of each attribute. However, the 1990-1991 Gulf War caused severe interruptions and abnormal swings in the operations of the Bahraini companies and as such the figures for these two years did not represent the true financial position of these companies. In order to overcome this disruption, an average of the years 1992-1993 (after the Gulf War) was used.

5.8 Identifying the Study Population - Selecting the British Companies:

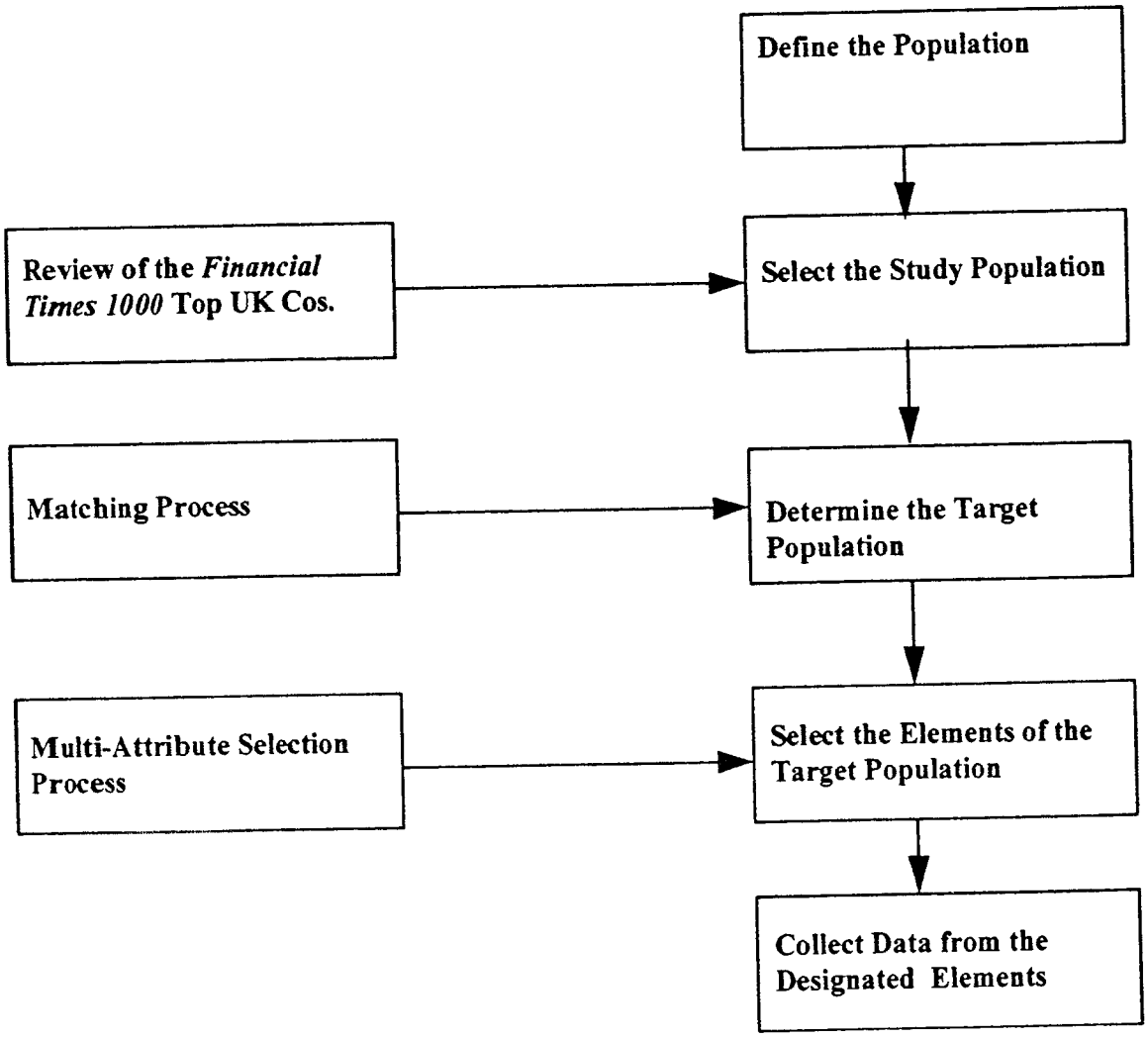
A five-step procedure for identifying the study population of the British companies on which information is sought is depicted in figure 5.2

These steps are explained in the following paragraphs:

Step 1. Define the population.
Step 2. Select the study sampling frame.
Step 3. Determine the Study Target Population* - Matching process.
Step 4. Select the Elements of the Target Population - Multi-Attribute Selection Process.
Step 5. Collect the Data from the Designated Elements.

* The target population is the population about which we wish to reach a conclusion (Daniel, 1990, p.4)

Figure 5.2 : Five-step Procedure for Identifying the Study Population of British Companies



5.8.1 Define the Population:

The population is defined in this study as the collection of elements that conform to some designated specifications. The specifications define the elements that belong to the target population and those that are not to be included (Churchill 1995). The potential population consists of all British companies operating in the following sectors: Oil and Gas , Chemical and Petrochemical, Aluminium and Metal Industries, and Food Manufacturing. Since a list of population elements- in this case British companies operating in referred sectors- is not available, the next step is to use an appropriate sampling frame.

5.8.2 Select the Study Sampling Frame:

The concept of a sampling frame is closely related to the population. It is defined here as the list of elements from which the sample is actually drawn. "*Ideally, it is a complete and correct list of population members only*" (Emory and Cooper, 1991, p.247) . As a practical matter , however, the sampling frame often differs from the theoretical population. The researcher used the financial reports of *Financial Times* 1000's top UK companies(1993) as the sampling frame. Since the sampling frame chosen does not represent an accurate list of population elements (identified above) by name or other identification code, the researcher has conducted a comprehensive, detailed review of the financial reports of *Financial Times* 1000's top UK companies (1993) to develop the list of elements that constitute the potential population of this study (i.e. the study sampling frame). The *Financial Times* list of companies was used in the present study since it

represents the most widely quoted list in the British financial press. Furthermore, it has been used in previous studies to investigate the capital budgeting investment process of large UK companies,(Carsberg & Hope, 1976; Scapens & Sale,1981, and Mills & Herbert (1987. For each company in each industry group, the four attributes identified as having an impact on capital budgeting practices were computed as they will be used for matching in subsequent stages.

5.8.3 Determine the Study Target Population- Matching Process:

The size of the target population represents the number of British companies which have similar attributes to those of Bahraini companies in order to be considered for potential inclusion in the study. In the current study, the number of British companies which will be matched against their Bahraini companies, depends on the extent to which these British companies are similar to their Bahraini counterparts. The term 'similar' as used in the matching process does not mean 'identical'; instead it allows for a reasonable percentage of variation in the attribute level. For example, when using the total asset attribute for matching, a variation of $\pm$ 20 per cent of total assets can be tolerated. The percentage of variation in the matching attributes differs from one study to another. The size of the two populations from which the samples are drawn has a major influence on the percentage of variation that can be tolerated. For large populations, the researcher can use a smaller percentage of variations in the matching attributes. However, for a smaller population, a large percentage can be tolerated (Haka, 1983).

This method of matching is considered more appropriate if the researcher plans to use a "matched-pair" design in the study. Since the researcher does not plan to use such a design in the present study, an alternative method of matching can be considered. This alternative method requires the researcher to specify the maximum value and the minimum value of each attribute based on the data collected from Bahraini companies. After specifying the range for each attribute, the researcher identifies all British Companies whose attributes fall in that range. This method provides more flexibility in the research design, and it proves to be more practical than using an average attribute for matching which does not necessarily reflect the true distribution of the population (Lee, 1993). This "max-min" range approach has been used in several previous studies (Ho and Pike, 1992).

5.8.4 Select the Elements of the Target Population - Multi-Attribute Selection Process:

The selection of the target population of British companies depends on the extent to which they are similar to their Bahraini counterparts. Therefore, the first stage in this selection process is to select the Bahraini companies for this study. A list of all Bahrain industrial companies was obtained from the Ministry of Oil and Industry in the State of Bahrain (Industry-Guide, 1993). According to recent economic statistics, the top five companies in that list produce more than 75 per cent of the country's industrial output (Ministry of Finance & National Economy, National Accounts, 1995). For the purpose of this study, these five companies will represent the population of the major Bahraini industrial companies. These companies are namely: Bahrain National Oil Company (Banoco),

Bahrain National Gas Company (Banagas), Bahrain Aluminium (Alba), Gulf Petrochemical Industries Company (Gpic), and Bahrain Flour Mills Company (Bflm). It is anticipated that large companies are likely to be more familiar with and more interested than smaller companies in the capital budgeting process and the techniques used in this process (Pike, 1996, and Northcott, 1992).

The **second stage** in the selection process is to specify the "max- min" values for each of the three attributes used in this study (turnover, total assets, and capital intensity) for the five Bahraini companies. These attributes have been identified in the literature as the most influential factors affecting capital budgeting practices (see section 5.6, p 128-129). Table 5.2 shows the values of these attributes for each of the Bahraini companies.

Table 5.2: The Values of Capital Budgeting Attributes for the largest Bahraini Companies- (£M) Exchange Rate, 1 Bahraini Dinar (BD) = £ 1.64, 1994)

Company (Industry) / Attribute	Banoco (Oil)	Alba (Alum.)	Banagas (Gas)	Gpic (Oil & Chemical)l	Bflm (Food)	Max. value	Min. value
Turnover £	720	310	130	215	65	720	65
Total Assets £	223	860	225	318	90	860	90
Capital Intensity*	0.57	0.75	0.6	0.8	0.4	0.8	0.4

*This attribute is calculated by dividing fixed assets by total assets

The **third stage** is to identify the British companies that can be considered for potential inclusion in the study population. This involves listing all British companies in the

Aluminium, Oil & Gas, Chemical, and Food industries (the same industries used for the selection of Bahraini companies). After reviewing the *Financial Times*, 1993 for the top UK companies, 205 companies were identified as belonging to these four industries. The **fourth stage** in the selection process involves identifying the target population from these companies, that is the British companies whose attributes are similar to those of Bahraini companies. In other words, each company in the target population must have each of its three attributes falling in the "max-min" ranges specified in Table 5.2. From among the 205 companies, sixty seven companies were identified as having all of these attributes. The sequence of the selection process is depicted in Figure 5.3.

Figure 5.3: Multi-Stage Selection Process for Identifying the British Target Population

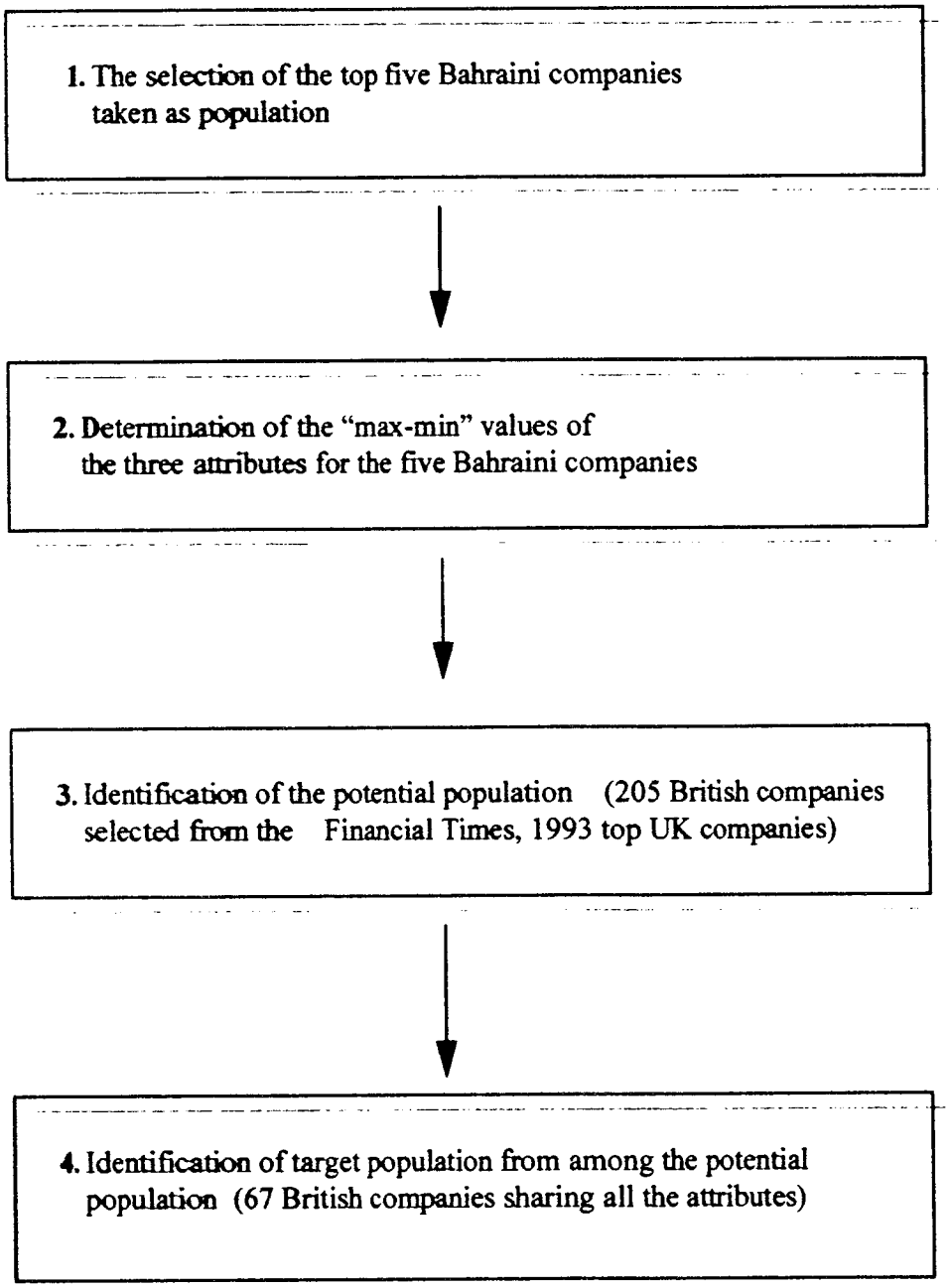


Table 5.3 compares the "max-min" values of the attributes of the Bahraini companies with those of the 67 British companies selected. Appendix E presents a complete list of these 67 companies together with the values of their attributes.

Table 5.3: The Values of Capital Budgeting Attributes of Bahraini Companies and their British Counterparts

Attribute / Nationality of Companies	Turnover (£000)		Total Assets (£000)		Capital Intensity Ratio	
	Max.	Min.	Max.	Min.	Max.	Min.
Bahraini Companies*	720	65	860	90	0.80	0.40
British Companies	670	75	632	92	0.80	0.41

*Reproduced from Table 5.2

5.8.5 Collect the Data from the Designated Elements:

Quite often, the information needed to solve a research problem is not available in published documents. In this situation the researcher must rely on primary data, which is collected specifically for the study. This presents the researcher with several questions: Should the data be collected by observation or questionnaire? If a questionnaire is employed, should it be structured as a fixed set of alternative answers or should the responses be open ended?. These and other questions demonstrate the most important considerations at this phase of the research process (Churchill, 1995).

Information sources are classified into primary and secondary types. "*Secondary data are statistics not gathered for the immediate study at hand but for some other purpose*" (Churchill,1995, p.270). Data may be internal (accounting records, sales invoices, salesman reports) or external (census data, and other government reports). A vast inventory of information is stored in books, pamphlets, periodicals, microfilm and other media. "*Primary data, in contrast, is originated by the researcher for the purpose of the investigation at hand*"(Churchill, 1995, p. 270).

5.8.5.1 Data Collection Methods:

There is a variety of different scientific approaches which social scientists can use to obtain information to achieve the study objectives and test the research hypotheses. The most popular methods for collecting information are the case study, the survey, the laboratory experiment, and the field experiment (Tull and Hawkins, 1976). Because of the nature of this study, the survey seems to be the most appropriate method for obtaining the information needed. According to Kerlinger (1986) survey research is the branch of social science that:

> "*Survey research studies large and small populations (or universes) by selecting and studying samples chosen from the populations to discover the relative incidence, distribution, and interrelations of sociological and psychological variables.*" *(Kerlinger, 1986, p. 377).*

Obtaining information through survey can be carried out by face- to- face interviews, by telephone, by mail, or by a combination of these techniques. The capital budgeting studies discussed in Chapter Five used personal interview, mail questionnaire survey, or a

ıbination of these two methods. After considering the type and quantity of data quired from this study, it was decided to choose the mail questionnaire method as the ost feasible means of obtaining the necessary data from British companies. The mail ırvey was employed because: (1) the population of firms to be investigated is eographically dispersed, so that cost and time of other research methodologies is rohibitive, and (2) the questions posed in the study should have been answerable with acts known to the respondents. The nature of the questions is another reason why a mail uestionnaire is suitable for this research. Two types of questions are commonly used: ixed alternative (or closed) and open-ended (or open) (Zikmund, 1991). The fixed-ılternative questions *" require classification of the answers into standardised groupings prior to data collection. Standardising alternative responses to a question provides comparability of answers, which facilitates coding, tabulating, and, ultimately, interpreting the data"* (Zikmund, 1991,p. 299). The choice of fixed-alternative questions is in line with the type of information required for this study. The information desired is basically factual, and in general fixed-alternative questions are more efficient for getting the factual data. The fixed-alternative question is thus most productive when possible replies are *"well known, limited in number and clear cut. Thus they are appropriate for securing factual information and for eliciting expressions of opinion about issues on which people hold clear opinions* (Selltize et al. (1976, p.316). These fixed-alternative questions force the respondents to give simple answers to complex questions, but for the purpose of this study, the simplified answers are sufficient.

The second survey method used to collect primary data is the personal interview method. Personal interview represents the oldest survey method and is still widely used, especially in marketing research (Tull and Hawkins, 1976, p. 106). The alleged strength of the personal interview method lies in the depth and detail of information that can be secured (Emory & Cooper, 1991, p. 320). This is because *"the interactive situation may influence the respondents to please or impress the interviewer"* (Lansing and Morgan, 1971, p. 160). Several empirical studies, however, dispute the alleged advantages of the personal interview over the mail questionnaire method. For example, a study by Nuckols (1964) showed that several factors favoured the mail survey over the personal interview: (1) Mail panel members reported more accurately and with less bias than did personal interview respondents, because mail panel members had ample time to check their records before responding, and (2) respondents, given the anonymity of a mail questionnaire, are less reluctant to give potentially embarrassing responses.

The telephone interview is the last of the survey methods to gather primary data. The telephone interview, as the name suggests, administers the questionnaire by telephone. Telephone interviewing is becoming increasingly popular, and there is evidence to suggest that *"it is now the prime method of survey research"* (Zikmund, 1991, p. 167). The two primary reasons *"are widespread incidence of telephone ownership and the increased costs for personal interviews* (Emory & Cooper, 1991, p. 330-331). The telephone surveys have the advantage of speed and low cost. Their principal disadvantage, obviously, is the limit on interview length which makes it difficult to obtain detailed information.

The above discussion of the advantages and disadvantages of the various survey methods should demonstrate that each method of data collection has its uses , and none is superior in all situations. The situation and the nature of the data often suggests one approach over the others. Rather than being mutually exclusive, the three approaches often can be used most productively in combination. Some of the studies on capital budgeting mentioned in Chapter Four used a combination of mail questionnaire and personal interview methods.

5.9 Questionnaire Development:

Reviewing the literature on the capital budgeting practices of the UK and US companies provides information on what aspects of capital budgeting practices the questionnaire should include. The questionnaire for this study was designed with the sole purpose of tapping information on the Capital Budgeting Practices of the Bahraini companies and their British counterparts identified in this study. It was developed based on: (1) suggestions made by Mukherjee (1987) and (2) a questionnaire used by Haka (1983), Kim (1982) , Pike (1984) and Schall et. al. (1978) (see Appendix C).

The questionnaire for this study was pre-tested because it is always advisable to start every research project with a pilot survey (Churchill, 1995). A pilot test was conducted for the purpose of detecting weaknesses in questionnaire design and to make sure that potential respondents understand the wording of the questionnaire. A draft copy of the study questionnaire was printed and distributed to a number of graduate students at Henley Management College as well as several corporate managers seeking their opinions, comments, and suggestions regarding the scope, structure, clarity, and understandability of

the questionnaire (Appendix A presents a copy of the letter sent to the participants in questionnaire pre-testing signed by the study supervisor). Received comments and suggestions were incorporated in the preparation of the final questionnaire. The questions and choice alternatives were revised and modified over a period of several months and the final questionnaire was prepared.

5.9.1 Questionnaire Organisation:

The questionnaire is divided into two parts. The first part was designed to cover the main dimensions of capital budgeting practices followed by companies participating in this study. These dimensions include: the preparation of a long-term capital budget, the systematic search for investment projects, the systematic reviewing and screening of capital projects, evaluation techniques used, risk analysis, expenditure control, and post audits of capital investment projects. The second part of the questionnaire was designed to measure the degree of sophistication of the capital budgeting practices of the sampled companies.

5.9.2 Classification of the Survey Questions:

The questions in the first part of the questionnaire are organised in four categories: Administrative Aspects and Procedures (AP), Selection Process (SP), Management Science Techniques (MST) and Trends in Capital Budgeting Systems (TCBS), see Table 5.4.

Table 5.4: Categorisation of Questions Included in the Study Questionnaire

Category* / Question No.	AP	SP	MST	TCBS
1	■			
2	■			
3	■			
4	■			
5	■			
6	■			
7		■		
8		■		
9		■		
10			■	
11		■		
12		■		
13	■			
14	■			
15	■			
16	■			
17		■		
18	■			
19	■			
20				■

AP- Administrative Procedures, SP- Selection Process, MST- Management Science Techniques, TCBS- Trends in Capital Budgeting System

5.9.3 Types Of Questions :

The questionnaire used in this study is divided into two parts. The questions in part one are of three types: 1) dichotomous (Yes/No), 2) fixed alternatives and 3) is most attitudinal in content, asking respondents to respond according to a five-point semantic differential scale ranging from "very important" to "relatively unimportant". The second

part of the questionnaire seeks information on the sophistication of the capital budgeting system and the relative importance respondents attach to different components of the system.

5.10 Measuring Sophistication of Capital Budgeting Practices:

The sophistication of capital budgeting practices was the subject of a study in the US by Kim (1982). In addition, Pike (1984) has examined the sophistication of capital budgeting practices of large UK firms.

Part two of the questionnaire is designed to measure the sophistication of capital budgeting practices for responding companies. Respondents were asked to rate and indicate the relative importance of nine components of the capital budgeting system by giving a percentage weight- on a scale ranging from 0 to 100 for each component. Kim (1982) identified the following nine components of capital budgeting sophistication:

"1.The preparation of a long-range capital budget.
2. A systematic search for alternatives to investment projects.
3. The existence of a formal screening and reviewing body.
4. The use of capital budgeting evaluation techniques.
5. The use of management science techniques.
6. Risk analysis.
7. The employment of full-time capital budgeting staff.
8. Expenditure control.
9. Post- audits".

5.11 Breakdown of the Responses to the Survey:

The British companies who were to receive the questionnaires had been previously identified. The chief financial executive, the finance manager or director of finance of these companies were then contacted by telephone, to inform them that a survey on the capital budgeting practices of their companies was soon to be undertaken. The telephone call also mentioned the purpose of the survey and requested the co-operation of the executives.

On June 13, 1995, the research package was mailed to every chief financial executive or director of finance of the 67 selected manufacturing companies previously identified. The package consisted of:

1. A cover or accompanying letter,

2. A copy of the study questionnaire.

3.A prestamped and self-addressed envelope for returning the completed questionnaire.

The cover letters and envelopes were addressed by name to the chief executive or director of finance of each company investigated in this study to convey a personal touch and to increase the response to the survey.

The cover letter was jointly prepared by the researcher and his supervisor. The purpose of the letter was to:

1. Identify the research and the researcher.

2. Describe what was needed.

3. Describe how the questionnaire data was to be used.

4. Act as a motivator for response through stressing the contribution of the study,

5. Reduce the threat of disclosing company information by emphasising that the confidentiality of the data would be fully maintained.

Responses to the survey came as early as five days after mailing the research package. Five weeks later, by the end of the week ending July 14, 1995, there were 31 returned questionnaires of which 9 declined to respond and the remainder were fully or partially completed.

The 12 intended respondents who declined to respond presented the following reasons:

1. I'm too busy to attend to your questionnaire.

2. Company policy does not release information.

3. Company prohibits the release of information.

The twenty-two respondents who fully or partially completed the questionnaire can be broken down as follows:

1. Three questionnaires are unusable as five or more questions were not answered.

2. Nineteen questionnaires were usable.

In accordance with the data collection strategy, the researcher decided to contact the non-respondents through a telephone call in order to determine who might respond. The following categories of responses were received:

1. I have mailed the questionnaire.

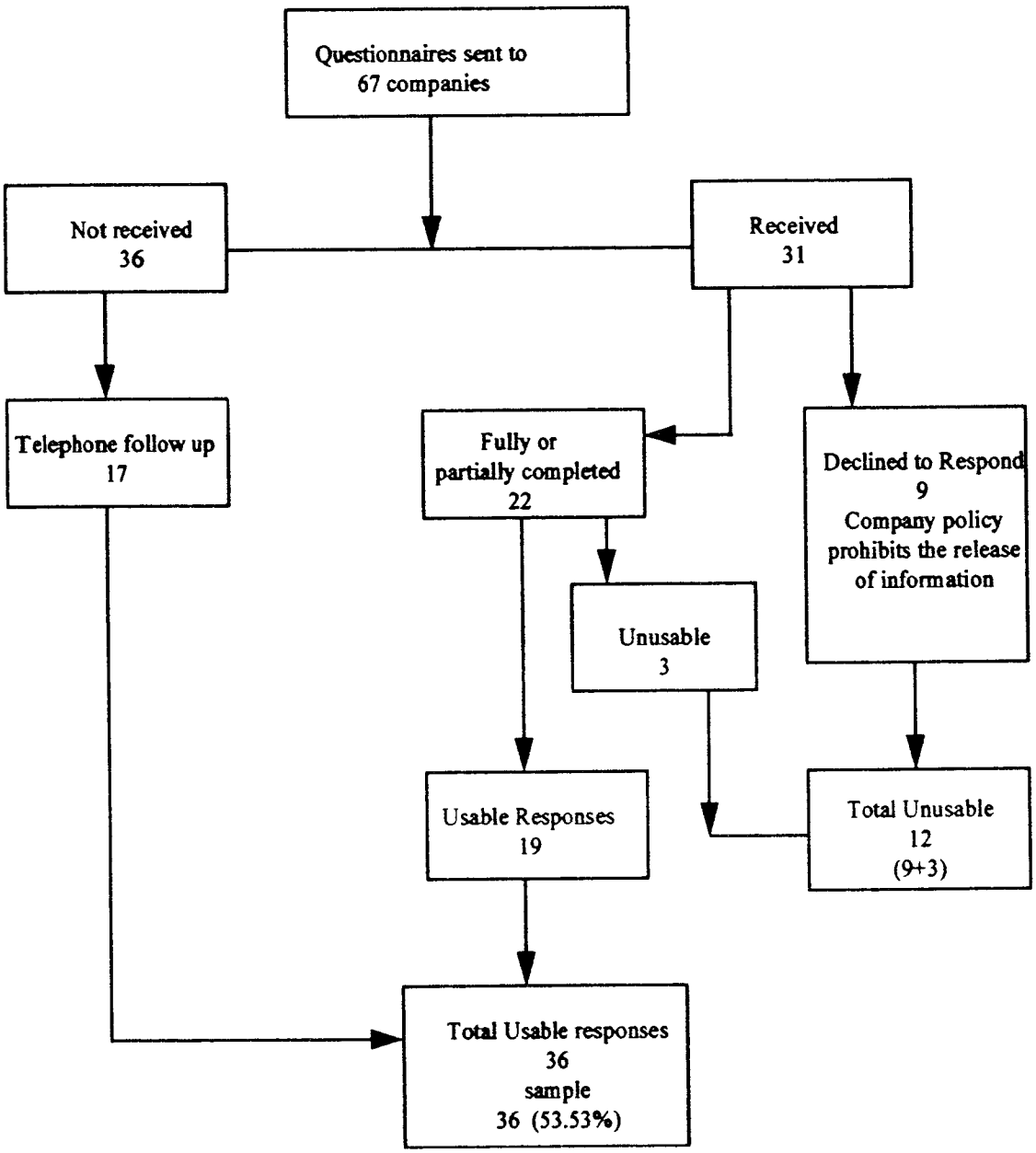
2. I will respond to your questionnaire and have it mailed to you.

3. No response.

Seventeen more responses were obtained from those executives associated with categories one and two.

Positive replies were returned by 36 of the 67 companies or 53.7 per cent. The 36 companies constitute the sample of British companies for this study. A breakown of responses to the survey is shown in Figure 5.4.

Figure 5.4
Breakdown of the Responses to the Survey



5.12 Problems Encountered in the Questionnaire Surveys:

Several researchers have indicated that mail questionnaire surveys of capital budgeting practices suffer from two limitations. These are "response bias" and "non-informed respondents". Response bias means the possibility that companies which respond are more sophisticated in their capital budgeting practices than those which do not respond. This defect is serious and, if not dealt with properly, could make the mail questionnaire method worse than useless (Kerlinger, 1986). One way to increase the response rate of mail surveys is by motivating the potential respondents to reply. Two factors play an important role here. The first is to increase the motivation as much as possible in the initial contacts with the respondents (Blumberg et al, 1974). The second approach is to remind the potential respondents through repeated mailings of follow- up letters or other contacts, such as telephone calls (Tull and Hawkins, 1976). This study initially established contact between the researcher and the firms' directors of finance or chief executives by mailing to each of them in advance a letter explaining the purpose of the research. This disclosure of information helps increase the motivation of the respondents to answer the questionnaire because, as Tull and Hawkins put it, (1976, p.391) " *The initial response rate to a mail survey is strongly influenced by the respondent's interest in the subject matter of the survey*".

To minimise the non-response bias, a technique proposed by Oppenheim A. N. (1966) was used to compare the results from late respondents to the questionnaire to the results from the early respondents. The technique presumes that results from late respondents are

answered in the same manner as early respondents. This technique was possible because the postmark date on the return envelopes was noted for each respondent, and the questionnaires were colour coded to distinguish between the different dates. The questionnaire was mailed to the 67 companies that were previously identified. Thirty-one companies responded after one week from the mailing date with nineteen usable responses (early respondents). To seek further responses and test for non-response bias, follow-up telephone calls were made to the remaining 36 companies. Seventeen companies responded after 10 days (late respondents). No significant differences were found between the responses of the two groups (early and late respondents). These results give the researcher strong evidence that "non-response" was not detected in the study and hence the 36 companies responding to the study questionnaire represent fairly the 67 companies (the population of this study according to the researcher's criteria).

The problem of non-informed respondents was also addressed because it suggested that responses to questionnaires do not always reflect a company-wide situation. From this view, responses are provided by one individual whose time is relatively unimportant. Thus, the respondents would not be in a position to know what practices a corporation actually employs for decision-making. This study anticipated this problem. All respondents were asked to identify themselves as well as their company. The data indicated that the questionnaire was answered by relatively well -informed management personnel .

5.13. Statistical Tests:

In the absence of any strong hypothesis about the nature of industry and size differences regarding capital budgeting practices, and because this study is a comparative analysis of theoretically prescribed capital budgeting practices used by the respondents, a model was needed to test whether firms in different industry and size groups used different capital budgeting methods and procedures.

Size and industry similarities were used to divide the respondents of 36 companies into two size categories (medium and small), and three major types of industries. These industries are: Chemical, Oil and Gas, Aluminium, and Food and Allied products.

Chi-square tests (χ^2)were performed on the responding British firms to determine whether firms in different types of industries and of different sizes use the same capital budgeting methods and techniques for guiding their capital investment process. Chi-square is a test of statistical significance which determines whether a systematic relationship exists between two variables, in this case between the investment practice and size and industry.

The Chi-square nonparametric test was chosen because of the following advantages:

1. Nonparametric tests can be used with qualitative variables (nominal level data) from a single sample. Other tests, such as "t"-tests, "Z"-tests, anova, binomial distributions, or "F" test, all require observations that are at least ordinal (ranked).

2. Nonparametric tests do not have to make assumptions regarding the distribution of the sample population. They are distribution-free tests (Lee, 1993) .

Because the assumptions for nonparametric testing are somewhat weaker than those required for parametric testing, the conclusions drawn from the results will be more general (Bavishi, 1979).

The Chi-square analysis was used only to test the sample of British companies for homogeneity as a prerequisite for further "descriptive" analysis. The data was then analysed as a single homogeneous sample from a single population and is presented in percentage form so that the reader may see only what broad pattern of capital budgeting practices are emerging among respondents. In conducting the chi-square tests, the critical probability was established at 5 percent. This reflects a willingness to employ a decision rule that leads to the rejection of a true hypothesis 5% of the time.

Another statistical test used in this study is the **Kendall's coefficient of concordance (W)**. The objective of this test is to analyse the association among three or more rankings. In this study, the test was used to test the agreement among British respondents regarding the relative importance of the nine components of the capital budgeting practices previously identified. Details of the test appear in **Section Five of Chapter Six.**

The Mann-Whitney *U* test (MWU), another nonparametric test was used to test whether two populations are identical in terms of the variables being considered and it directly considers the rankings of observations in each sample. In this current study, the Mann-Whitney U test (MWU) was used to test whether small and medium sized-companies have identical distributions regarding their capital budgeting sophistication systems. The Mann-Whitney *U* test was used because it does not require the normality assumption associated with the t-test.

Chapter Summary:

This chapter has presented the justification for using the research methodology adopted in this study. The research methodology comprises the following steps:

1. Selecting the Bahraini companies which are the subject of this study.
2. Identifying the main criteria reported in the literature to a have bearing upon capital budgeting practices. These criteria include: industry type, company size in terms of total assets and total turnover, and the capital intensity ratio.
3. Based on the above, the attributes of the Bahraini companies have been identified and the maximum and minimum ranges for each attribute specified.
4. A five-step procedure was used to identify the study population of the British companies that match the Bahraini companies. The *Financial Times'* 1000 top UK Companies for 1993 was used as a sampling frame for selecting the British companies.

The second part of the chapter dealt with the following:

1. An overview of different data collection methods and appropriateness of the survey questionnaire for seeking information from the British respondents.
2. Review of relevant literature on questionnaire design and development of the study questionnaire. The questions were designed to investigate the capital budgeting practices of the companies participating in the study and to measure their capital budgeting sophistication. The problems associated with questionnaire based design and ways to overcome these problems were also discussed.

3. The methods and procedures used to secure the co-operation of the British companies and to motivate them to respond to the study questionnaire.

4. An overview of the statistical methods used to evaluate the responses to the study questionnaires.

CHAPTER SIX

ANALYSIS AND RESULTS

THE CASE OF BRITISH COMPANIES

6.1 Introduction:

This chapter presents the results of the mail questionnaire survey on the capital budgeting practices of British companies conducted in June 1995. The analysis is used descriptively, in this chapter, and the survey results are displayed in the form of tabular data.

In addition to providing a coverage of the capital budgeting practices of these companies, wherever possible, the survey results have been compared with previous research findings.

Sixty-seven companies, previously identified as having similar attributes to their Bahraini counterparts, were extracted from the 1993 Financial Times top UK companies. Of the 67 questionnaires sent to senior executives of British companies, 36 were returned in a usable form, giving a response rate of 54 per cent.

This chapter is divided into the following three sections:

1. Introduction
2. Profile of the British companies
3. Analysis and Results

The chapter concludes by providing an overall summary of the main findings

For the purpose of presentation, the survey results are displayed according to three categories. These categories are:

1. Administrative Procedures before and after Project Approval
2. Selection Process
3. Trends in Capital Budgeting System

6.2 Profile of the British Companies:

6.2.1 Respondents by Size:

The British companies included in this study are classified into small and medium-sized companies according to the volume of turnover. Pike (1982), Scapens et al. (1982) and Mills and Herbert & (1987) examined the relationship between capital budgeting practice and company size, where company size was measured by turnover and/or capital expenditure and/or profit before interest and tax.

In order to assess the impact of size on the capital budgeting practices of the companies in the survey, a series of chi-square tests of independence were conducted. The purpose of this is to determine whether the companies should be treated as two sized categories or one homogeneous group. The group which most resembles the Bahraini companies is used as a benchmark in the second phase of this study. The breakdown of companies into different size categories - as measured by turnover - is shown in Table 6.1. As Table 6.1 shows, the representation of small and medium-sized companies in the sample is similar to their representation in the target population - 61 per cent for the medium size, and 39 per cent for the small size in the sample versus 58 per cent for the medium size, and 42 per cent for the small size in the population.

Table 6.1 : Profile of Respondents by Size

Size*	No. of Responses (%)*	Target Population (%)*	Response Rate (%)
Medium	22 (61)	39 (58)	56
Small	14 (39)	28 (42)	50
Total	36(100)	67 (100)	53.7

* Medium (Turnover £M 250-750)
Small (Turnover £M < 250)
(%)* Representation in the population and the sample

6.2.2 Respondents by Industry:

The sampled companies were categorised by three major types of primary business as summarised in Table 6.2.

It is worth mentioning that the response rate from aluminium companies is relatively higher than the percentage of aluminium companies in the target population (13/36 or 36 per cent versus 17/67 or 25 per cent). To deal with this discrepancy, the researcher had two options:

1. To disregard a number of responses received from aluminium companies to maintain consistency with the percentage of the aluminium companies in the target population.
2. To include all the responses received from aluminium companies and ignore the deviation as long as the magnitude is considered to be within the tolerance level.

The researcher has decided to adopt the second option (since the magnitude of the deviation is 11 per cent (36 per cent response in the sample-25 per cent in the population). This choice is reinforced by the fact that the sample size is relatively small at 36. Dropping some responses received from aluminium companies will further reduce the sample size. However, the percentage of responses rate from other industry groups is well within the tolerance level (up to 20 per cent).

Table 6.2: Profile of Respondents by Industry

Industry	No. of Responses (%)	Target Population (%)
Chemical, Gas & Oil	14 (39)	31 (46)
Aluminium	13 (36)	17 (25)
Food & Allied Products	9 (25)	19 (28)
Total	36 (100)	67 (100)

6.2.3 Profile of Respondents' Job Title:

Of the total respondents 36, 32 (88.8 per cent) had the word Finance, Financial and Accountant in their job title. Chief accountants formed the largest group (33 per cent) with Finance Directors representing the second largest (25 per cent). It seems that the accounting bias of the respondents was shown to be because of the greater degree of direct personal involvement with capital project appraisal by those involved in the accounting function, i.e. some of the addresses (managing directors) stated that they had passed the questionnaire to members of the accounting function for this reason. Table 6.3 shows the profile of the respondents.

Table 6.3: Profile of Respondents' Job Title

Respondents' Job Title	Number	Percentage of Total (%)
Finance Director	9	25
Chief Accountant	12	33
Financial Controller	5	14
Finance Manager	6	17
Chief Executive	4	11
Total	36	100

6.3 Analysis and Results :

This section presents the study analysis and results of the two parts of the study questionnaire.

6.3.1 Analysis Related to Part One of the Questionnaire :

6.3.1.1 Criteria used for Defining Capital Expenditure :

Respondents were asked to indicate the criteria they employ in defining their capital expenditure.

Twenty medium and nine small-sized companies define capital expenditure by size and the economic life of the project. Four of the small companies indicated that capital expenditure is defined by the size of expenditure alone. Two of the medium-sized companies define capital expenditure as follows:

A capital expenditure is defined as a commitment of resources in the hope of realising benefits (both economic and non-economic) over a reasonably long period of time in the future (a chemical company).

A capital expenditure is a proposed expenditure to be charged in whole or in part to fixed capital (a chemical company).

6.3.1.2 Capital Expenditure Categories:

Capital investment proposals are often classified by type, so that different acceptance criteria can be applied to differing categories of investment and these classifications vary between individual companies (Gurnani, 1984). There are several methods of classifying projects in, principle, although in practice this may not be important:

"looking at surveys of practice there is little evidence indicative of comprehensive systems of project classification....." McIntyre & Coulthurst (1985)

Approximately 53 per cent of British companies in this survey reported having systems for classifying their capital projects (Table 6.4). This is made up of eleven medium and eight small-sized companies out of a total of 36. Table 6.4 shows that out of a total of 36, three have five project types, three have four types, two have three, and eleven have two types. It is quite obvious from the Table that replacement and cost reduction are the most widely used classification systems among the respondents.

Table 6.4 : Categories of Capital Expenditure by Size

Project Classification / Size of Company	Replacement	Cost Reduction	Capacity Expansion	Necessity	Improvements	Number of project types
Medium						
Co. 1	X	X	X	X	X	5
Co. 2	X	X	X	X	X	5
Co. 3	X	X	X	X		4
Co. 4	X	X	X	X		4
Co. 5	X	X		X		3
Co. 6	X	X				2
Co. 7	X	X				2
Co. 8	X	X				2
Co. 9	X	X				2
Co. 10	X	X				2
Co. 11	X	X				2
Small						
Co. 1	X	X	X	X	X	5
Co. 2	X	X	X	X		4
Co. 3	X	X		X		3
Co. 4	X	X				2
Co. 5	X	X				2
Co. 6	X	X				2
Co. 7	X	X				2
Co. 8	X	X				2

McIntyre and Coulthurst (1985) found, among the medium-sized companies they studied, that just over half of them saw the justification for classifying their capital projects. Some of the previous surveys indicated a similar state of affairs. Neither Williams and Scott (1965) nor Carsberg and Hope (1976) commented upon classification. Petty et. al. (1975) similarly found little evidence of formal classification, and in Pike (1982, 1988a) and Rockley (1973) there are no references to the matter. The finding of this study in this area is in line with that of McIntyre and Coulthurst (1985) who concluded that medium-sized companies have been shown to pay more attention, if only marginally, to classification than large companies.

6.3.1.3 Administrative Procedures Before Project Approval:

The administrative procedures before project approval can be divided into two main phases. Phase one includes the long-term planning, long-range capital budget, and project search (activities 1,2,3 in Figure 5.1 p.123). Phase two includes screening and reviewing as well as development of investment alternatives (activities 4 and 5 in Figure 5.1, p 123). These, as well as other capital budgeting activities, are usually prepared according to a capital budgeting manual and are carried out by the capital budgeting staff. Table 6.5 and 6.6 display the results related to the administrative procedures before project approval.

Long-range capital budget : Approximately two-thirds of the sampled companies prepare a long-range capital budget (Table 6.5). Size and industrial sector seem to have no influence over the use of long-range capital budget as indicated by the chi-square results. The incorporation of long-range capital budgets in business plans was

Table 6.5 : Administrative Procedures before Project Approval : Analysis by Size

Size of company / Administrative procedures	Medium 22 (100%)*	Small 14 (100%)*	Total 36 (100%)**	χ^{2*} SIG'N
Long-range capital budgets	16 (73)	8 (57)	24 (67)	.33
Require a specific search for investment projects	15 (68)	8 (57)	23 (64)	.50
Have a formal screening and reviewing body	14 (64)	8 (57)	22 (61)	.69
Have at least one full-time staff assigned to capital budgeting	17 (77)	5 (36)	22 (61)	.013
Have an up-to-date capital budgeting manua	15 (68)	7 (50)	22 (61)	.27

* Percentage out of all companies in a particular group size
** Percentage out of all companies (Total 36)

mentioned by several respondents, perhaps indicating a more systematic approach to the entire area of strategic investment planning.

Specific search for investment projects: 64 per cent of all companies require a specific search for alternatives to capital projects. The chi-square results show that size and industry type have no effect on the requirement for specific search for investment projects. Some respondents who have no such activity, indicated that generation of good projects was a problem in the absence of profitable investment opportunities.

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*Yates propossed a correction procedure for use when computing χ^2 from the data of a 2X2 contingency Table. The procedure is known as Yates's correction factor for continuity. The purpose of this procedure is to correct for the use of continuous distribution χ^2 to approximate the discrete distribution. Its use is not recommended for χ^2 since it would result in an unnecessary loss in power- that is a tendency not to reject the null hypothesis when it is false, (Daniel, 1990)

Others indicated that constraints on the size of the company's investment programme prevented them from engaging in active and regular search for investment opportunities. McIntyre and Coulthurst (1985), found that only 70 firms in their survey indicated that they had formal procedures for searching for capital investment projects.

Table 6.6 : Administrative Procedures before Project Approval : Analysis by Industry

Industry / Administrative procedures	Chemical, Oil & Gas 14 (100%)*	Aluminium 13 (100%)*	Food &Allied Products 9 (100%)*	χ^2 SIG'N
Long-range capital budgets	9 (64)	8 (62)	6 (67)	.96
Require a specific search for investment projects	9 (64)	8 (62)	6 (67)	.96
Formal screening and reviewing body	8 (57)	8 (62)	6 (67)	.90
Full-time staff assigned to capital budgeting	10 (71)	7 (54)	5 (56)	.60
An up-to-date capital budgeting manual	8 (57)	8 (62)	5 (56)	.95

* Percentage out of all companies in a particular industry type

They reported that this component of capital budgeting practices was the least observed by surveyed firms.

Requirement for a formal screening and reviewing body: Approximately 61 per cent of all companies have a formal committee for screening and reviewing capital

investment proposals. Of medium and small-sized companies, 64 and 57 per cent respectively, have this committee. Once again, size and industry type have no influence on such a requirement, as indicated by the results of chi-square tests. From those who do not have formal review bodies, some indicated that such an activity falls within the responsibility of the executive authority in the company.

Existence of at least one full-time staff assigned to capital budgeting: Approximately, two-thirds of the respondents have at least one staff member assigned to capital budgeting. Of medium-sized companies, 77 per cent have at least one full-time staff responsible for capital budgeting. However, this percentage declines to 36 per cent for small-sized companies reflecting a significant difference between the two groups, as indicated by the chi-square results in Table 6.5. It would appear that investment specialists are a rarity in firms with a turnover of less than £250 million per annum. These firms might not have the financial resources to afford employing specialised staff to operate exclusively in the field of capital budgeting ; or they might perceive the benefits derived from employing such specialised staff insufficient to justify the cost required. Table 6.6 shows the differences in usage rates between the three industrial sectors with the aluminium sector having the lowest percentage of the three (54 per cent).

Existence of an up-to-date capital budgeting manual: Of medium and small-sized companies, 68 per cent and 50 per cent, respectively, have an up-to-date capital budgeting manual, and around 60 per cent of the total companies were found to have an up-to-date capital budgeting manual. Chi-square results indicate that size has no significant effect on this dimension of the capital budgeting process. Table 6.6 indicates

that industry type also has very little effect on the requirement for a manual. For example, the chemical and food industries have almost the same percentage (57 per cent) while Aluminium companies have more than 60 per cent.

In follow-up questioning on the specific number of capital budgeting staff, 10 medium-sized companies responded that they have one staff member, four indicated that they have two staff, and three said that they have three staff. For the small-sized companies, all five companies which responded positively indicated that each of them has one staff member assigned to capital budgeting.

Finally, companies that have reported that they have an up-to-date capital budgeting manual were asked to indicate the last time their manuals were reviewed. Three medium-sized companies reviewed their manuals less than two years ago, seven reviewed the manuals in the last three to five years, and five reviewed the manuals more than five years ago. Regarding small-sized companies, all six companies that have a capital budgeting manual reviewed their manuals more than five years ago.

6.3.1.4 Administrative Procedures After Project Approval:

This sub-section presents the analysis and results of the following dimensions of the capital budgeting process, these are: (1) Expenditure control, (2) The comparison of actual and estimated periods of project completion time, and (3) Post-completion audits.

Table 6.7 shows that two-thirds of companies employ some formal method for controlling capital expenditure for major projects. The proportion of medium-sized companies, which have such a method, is greater than that of small-sized companies (73 per cent (16/22) versus 57 per cent (8/14)). The size and type of industry do not

appear to have an influence upon the employment of such a method as indicated by the chi-square results (Tables 6.7 and 6.8).

Regarding the use of post-audits by participating companies, Table 6.7 shows that around 56 per cent of all companies conduct post-audits of capital projects. This comprises 64 per cent of medium-sized companies (14/22) and 43 per cent of small-sized companies (6/14) which are engaged in post-completion audits. The use of post-

Table 6.7: Administrative Procedures after Project Approval: Analysis By Size

Size of companies / Firms	Medium 22 (100%)*	Small 14 (100%)*	Total 36(100%)**	χ^2 SIG'N
Have a method for controlling expenditure for major projects	16 (73)	8 (57)	24 (66)	.33
Have a method for controlling the completion time period of major projects	15 (68)	6 (43)	21 (58)	.13
Have a Post-audit system	14 (64)	6 (43)	20 (56)	.22

* Percentage out of all companies in a particular group size.
** Percentage out of all companies (Total 36).

audits is not size-dependent, as indicated by the chi-square results. Industry analysis (Table 6.8) indicates that the three industrial sectors have almost the same percentage distribution regarding the use of a formal post-audit system.

In addition, companies which conduct post-audits were asked whether they are conducted on all capital projects. All respondents indicated that post-audits are not conducted on all investment projects and companies are selective in the capital investment projects for which post-audits are conducted. Typically only major projects

Table 6.8 :Administrative Procedures after Project Approval: Analysis By Industry

Industry / Administrative procedures	Chemical, Oil & Gas 14 (100%)*	Aluminium 13 (100%)*	Food & Allied Products 9 (100%)*	Total 36 (100%)*	χ^2 SIG'N
Existence of a method for controlling expenditure for major projects	10 (71)	8 (62)	6 (67)	24 (67)	.86
Existence of a method for controlling the completion time period of major projects	10 (71)	7 (54)	5 (56)	21 (58)	.84
Existence of a Post-audit system	8 (57)	7 (54)	5 (56)	20 (56)	.95

* Percentage out of all companies in a particular industry type

are being post-audited - an observation that corresponds with pervious study done by Gordon and Myers (1991).

Furthermore, respondents who do not carry out post-audits were asked to indicate on an ordinal semantic scale ranging from very important (1) to relatively unimportant (5), the importance of a number of reasons that might prevent companies from carrying out post-audits.

Table 6.9 reveals that the most common reason for not conducting post-audits is "changes in environmental conditions" with a mean value of 2 according to the ordinal semantic scale. The same Table shows that the third and fourth reasons, "Potential benefits do not justify cost " and "difficulty of separating cost and benefits of a project from other company activities", rank second and third in importance with mean values of 2.4 and 2.7, respectively. Lack of suitable resources was not regarded as an important reason (mean value of 3.3).

Table 6.9: Factors Inhibiting Companies from Conducting Post-Audits

Reasons for not carrying out post-audits	Mean*	Number of companies
1. Lack of suitable resources	3.30	16
2. Difficulty of separating the cost and benefits of a project from other company activities	2.70	16
3. Potential benefits do not justify cost	2.40	16
4. Changing environmental conditions make post-audits impossible	2.00	16

* The mean values as reported in the above table are based on a scale ranging from (1) very important to (5) unimportant. Number of companies is based on the 16 medium-and small- sized companies which indicated that they have a post-audit system.

In addition, the 20 companies which conduct post-audits were asked about the potential benefits of using them. Table 6.10 shows that the most important benefits of post-audits are "the improvement of decision making" and "highlighting reasons for achieving a better performance for future projects" with mean values of 1.38 and 1.67 respectively. Respondents slightly agree or were undecided about the other benefits of post-audits (statements 2, 3, 4 and 5).

6.3.1.5 Selection Process :

The selection process involves deciding which projects are profitable, which of the mutually exclusive projects are superior, and which combination of investment is best in the face of capital rationing. The determination of the hurdle rate and the assessment of the risk of the project under consideration are also part of this phase of the capital

budgeting process. In the following paragraphs, the four issues related to the selection process are discussed. These issues are: (1) the project evaluation methods or techniques used, (2) risk analysis, (3) capital rationing, and (4) cost of capital.

Table 6.10: Potential Benefits of Post-Audits

Post-audits :	Mean*	Number of companies
1. Improve the quality of decision making	1.38	20
2. Encourage greater realism in project appraisal	2.76	20
3. Provide a means of improving the control mechanism	2.67	20
4. Enable the speedy modification of under performance/over performance projects	3.10	20
5. Increase the frequency of project termination for bad projects	3.00	20
6. Highlight reasons for successful projects which may be important in achieving greater benefits from future projects	1.67	20

* The mean values as reported in the above table are based on a scale ranging from (1) very important to (5) unimportant. Number of companies is based on the 20 medium and small-sized companies which indicated that they have a post- audit system.

6.3.1.5.1 Evaluation Techniques :

Table 6.11 displays the different evaluation techniques used by the companies in the study sample. The Table reveals the following:

Payback Period (PB): Approximately 59 per cent and 50 per cent of medium and small-sized companies respectively, indicated that they use the payback period method. Size appears to have a very little influence upon the usage of the payback period.

Accounting Rate of Return (ARR): Approximately 59 per cent and 64 per cent of medium-and small-sized companies indicated that they use accounting rate of return. Once again size seems to have a little effect the upon usage of this technique.

Internal Rate of Return IRR): IRR is the most popular single technique among the sample companies. 91 and 93 per cent of medium-and small-sized companies respectively, use this technique.

Net Present Value (NPV): Net present value is the least applied technique as indicated by the results in Table 6.11. Only four medium-sized companies (18 per cent) and three small-sized companies (21 per cent) indicated that they use this evaluation method in appraising their capital investment proposals.

Table 6.11: Evaluation Techniques Used: Analysis by Size. Most Firms Used More than One Evaluation Technique

Size of company / Evaluation techniques	Medium	Small	Total
	22 (100)*	14 (100%)*	36 (100%)**
Payback	13 (59)	7 (50)	20 (56)
Accounting rate of return	13 (59)	9 (64)	22 (61)
Internal rate of return	20 (91)	13 (93)	33 (92)
Net present value	4 (18)	3 (21)	7 (19)

* Percentage of all companies in particular group size

** Percentage out of all companies

Table 6.12 displays the breakdown of evaluation techniques by type of industry. The Table shows that the three industries exhibit a similar degree of usage regarding the different evaluation techniques as indicated by the percentage distribution.

Table 6.12: Evaluation Techniques Used: Analysis by Industry

Industry / Evaluation techniques	Chemical, Gas and Oil 14(100%)	Aluminium 13 (100%)	Food & Allied Products 9 (100%)
Payback period	8 (57)	7 (54)	5 (56)
Accounting rate of return	7 (50)	9 (69)	6 (67)
Internal rate of return	13 (93)	12 (92)	8 (89)
Net present value	2 (14)	3 (23)	2 (22)

6.3.1.5.1.1 Combination of Methods :

Table 6.13 shows that all companies use at least one or multiple evaluation methods. One medium and two small-sized companies claim to use only IRR as their main evaluation technique.

Table 6.13 shows that the main combinations being:

(1) Accounting rate of return and internal rate of return: 11 companies out of 36 (31%).

(2) Payback period and internal rate of return: 10 companies out of 36 (28%).

Table 6.13: Evaluation Techniques - Combinations of Methods Used by Companies

Size of company / Evaluation methods	Medium 22	Small 14	Total 36 (100%)
No Method	0	0	0
Single Method			
PB	0	0	0
ARR	0	0	0
IRR	1	2	3
NPV	0	0	0
Total users of single method	1	2	3 (8)
Two methods			
PB, ARR	0	0	0
PB, IRR	8	2	10
PB, NPV	0	0	0
ARR, IRR	7	4	11
ARR, NPV	0	0	0
IRR, NPV	0	1	1
Total users of two methods	15	7	22 (61)
Three methods			
PB, ARR, NPV	2	1	3
PB, ARR, IRR	2	3	5
PB, IRR, NPV	0	0	0
ARR, IRR, NPV	1	0	1
Total users of three methods	5	4	9 (25)
Four Methods			
PB, ARR ,IRR ,NPV	1	1	2
Total users of four methods	1	1	2 (6)
Grand Total	22	14	36 (100)

* PB. Payback
ARR. Accounting rate of return
IRR. Internal rate of return
NPV. Net present value

Table 6.13 also indicates that 8 per cent of all companies use a single evaluation method, 61 per cent use a combination of two methods, 25 per cent use a combination of three methods, and 6 per cent use four evaluation methods.

Where three methods are used, payback period (PB), internal rate of return (IRR) and accounting rate of return (ARR) seem to be the most popular combination.

It can be seen from Table 6.13 that none of the medium or small-sized companies uses non discounting techniques, payback or accounting rate of return, individually or in combination with each other.

6.3.1.5.2 Risk Analysis :

Information was sought about formal methods of assessing the riskiness of capital projects, and the methods used in adjusting project estimates for risk. The risk is "*the likely variability of future returns for the asset.*" "*Risk analysis is treated in one of two distinct ways: either it is ignored... or it is treated in highly formalistic, mathematical manner*", (Weston and Brigham, 1979, p.181). Both approaches can be dangerous because (1) the riskiness of projects and imperfect predictions are important in investment decision taken with the objective of producing profits in the future, and (2) the mathematical techniques are not always suitable for solving real business problems.

Businessmen and investors should not make an investment decision solely on the basis of expected return. Decision makers must assess the risk of an investment, and then ask whether the return is sufficient to compensate for the risk assumed. Since few of the financial variables are known with precision in advance, there has to be some kind of a method of adjusting project estimates for risk. For this reason, although there is no agreement on the question of whether having a formal method of considering risk of the project would result in a greater profit, those firms that have a formal method for analysing risk are likely to be in a position to make effective capital budgeting

decisions (Kim, 1975). Table 6.14 shows that approximately 64 per cent of respondents have a formal method for assessing the risk of capital investment projects (68 medium versus 57 small as a percentage of each size group). Distribution of this percentage among participating companies is illustrated in Table 6.14. Around one-third of companies in the sample do not have formal methods for assessing risk. This result does not come as a surprise. Mukherjee (1987) reported that one- third of large American companies *"do not recognise risk, either formally or informally"*(p.45). Furthermore, the use of a formal method for assessing risk is not influenced by either size or industry type as indicated by the chi-square results.

Table 6.14: Utilisation of Formal Methods for Assessing Risk: Analysis By Size and Industry

A	Size			χ^2 SIG'N
	Medium 22 (%)*	Small 14 (%)*	Total 36 (%)*	
Firms have a formal method for assessing risk.	15 (68)	8 (57)	23 (64)	.50
B	Industry Type			
	Chemical, Oil & Gas 14 (%)*	Aluminium 13 (%)*	Food & Allied Products 9 (%)*	
Firms have a formal method for assessing risk.	9 (64)	8(61)	6(66)	.96

* Percentage out of all companies in a particular group size or industry type.
** Percentage out of 36

Table 6.14, panels A & B show utilisation of a formal method for assessing risk by size panel (A), and industry, panel (B). The application of formal risk assessment methods

for appraising risk is almost identical among the three industrial sectors as indicated in panel B of Table 6.14.

The companies which do not formally analyse risk indicated the following reasons for not doing so:

1. Most of the expenditure is on investments that are well-known to the company and as such, they do not require formal risk analysis.

2. Investment in capital projects is surrounded by uncertainty which is impossible to quantify.

3. Risk judgement is incorporated into the economic factors affecting the project

4. Risk assessment methods are highly complex and time-consuming.

In a follow-up question, the respondents who have a formal method for analysing the risk were asked to indicate which risk appraisal technique(s) they use. The survey revealed the following results regarding the frequency of utilisation of different appraisal methods, *based on the 23 companies that analyse risk formally

	%*
Sensitivity Analysis	60.8
Shortening Payback Period	30.4
Raising Required Rate of Return	26
Probability Analysis	13

Table 6.15 shows that sensitivity analysis is the most popular risk assessment method used by 61 per cent of all companies which assess risk formally and it is applied almost equally by both medium and small-sized companies (60 per cent and 63 per cent, respectively). Shortening the payback period and raising the required rate of return rank second (30per cent) and third (26 per cent), respectively. It seems that they are

Table 6.15: Adopted Methods of Risk Appraisal: Analysis by Size

Size of company / Risk assessment methods	Medium 15 (100%)	Small 8 (100%)	Total 23 100%)
Shortening payback period	3 (20)	4 (50)	7 (30)
Risk adjusted discount rate	4 (27)	2 (25)	6 (26)
Probability analysis	2 (13)	1 (13)	3 (13)
Sensitivity analysis	9 (60)	5 (63)	14 (61)
Capital asset pricing model	1 (7)	0	1 (4)

Note: The percentage shown is related to the number of firms which use a formal method for appraising the risk (Total 23). The total percentage in the last column exceeds 100 per cent because some companies use a combination of methods analysing the risk.

used as supplementary tools by some companies in addition to sensitivity analysis. However, these latter techniques are criticised on the ground that they simply make a particular project less attractive. The higher discount rate, or shorter payback period, do not evaluate the degree of risk, but they are designed to avoid risk (Mukherjee, 1987).

The results displayed in Table 6.16 show the distribution of risk assessment methods by industry type. The Table reveals the following:

1. Regarding the use of non-sophisticated risk techniques, the survey results show that 40 per cent of the food companies adopt the shortening of payback period. This percentage declines to 38 per cent in the case of aluminium companies, and 20 per cent

Table 6.16 Adopted Methods of Risk Appraisal: Analysis by Industry

Industry / Risk assessment methods	Chemical, Gas & Oil 10 (100%)	Aluminium 8 (100%)	Food 5 (100%)
Shortening payback period	2 (20)	3 (38)	2 (40)
Risk adjusted discount rate	1 (10)	3 (38)	2 (40)
Probability analysis	2 (20)	1 (13)	0
Sensitivity analysis	6 (60)	5 (62)	3 (60)
Capital asset pricing model	1 (10)	0	0

in the case of chemical companies. The usage of risk adjusted discount rate exhibits a similar pattern for the three groups. Sensitivity analysis is the most popular technique across the three industries in this study with the three industries exhibiting similar usage of that technique (chemical, gas and oil, 60 per cent; aluminium, 62 per cent, and food 60 per cent).

2. Regarding the use of sophisticated risk assessment techniques, such as probability analysis and capital asset pricing model (CAPM), only two chemical, gas and oil companies and one aluminium company use probability analysis, and only one chemical, gas and oil company uses CAPM, with companies in the food sector having a zero usage rate of these techniques. McIntyre and Coulthurst (1985) in their study of capital budgeting practices in medium-sized businesses found no reference to the CAPM by the survey firms. Pike and Sharp (1989) argue that the CAPM has failed to produce the results expected of it as a practical tool for estimating capital project risk-

return relationship. They reported that only a few large UK firms are employing CAPM, and earlier surveys found no users of this technique at all.

6.3.1.5.3 Capital Rationing :

In the area of capital rationing , respondents were asked to indicate on an ordinal scale ranging from very important (1) to relatively unimportant (5), the relative importance of each of a number of constraints on the size of their companies' investment programmes. Constraints on the size of capital investment programmes can be broken-down into three areas: (Pike, 1983a), (1) demand constraints- general economic condition and lack of profitable investment opportunities, (2) financial constraints- unwillingness to increase level of borrowings and lack of capital available, and (3) managerial constraint- that is lack of trained managers capable of implementing investment opportunities.

Table 6.17 reveals that the highest priority on the importance of these constraints was given to the two demand constraints of general economic uncertainty and lack of profitable investment opportunities- both of which are different from capital availability and management capacity constraints as indicated by the mean values.

The same Table sheds light on the nature of financial constraints. The evidence suggests that capital rationing is more likely to result from expenditure limits imposed by companies by their own choice. The self- imposed expenditure limit arising from an unwillingness to increase borrowings has a lower mean than market-imposed capital constraints. Self-imposed borrowing constraints (22 per cent) are far more common than the "purer" forms of capital rationing (14 per cent) usually referred to in theory (Brigham & Gapenski, 1990).

Table 6.17: Constraints on Capital Investment Decisions

Constraints	Mean*	Very Important %
Lack of capital available from capital markets	3.14	14
Unwillingness to increase level of borrowings	2.92	22
Lack of profitable investment opportunities	2.19	36
Lack of trained managers capable of implementing investment opportunities	3.36	14
General economic uncertainty	2.13	38

* Lower number indicates greater importance

6.3.1.5.4 Cost of Capital :

The cost of capital to a firm is the minimum return which suppliers of the capital require. Thus, it is a price which the firm has to pay for obtaining capital. The concept of cost of capital, the discount rate or the hurdle rate, is of utmost significance in financial decision-making. It is a criterion for funds allocation and selection of investment projects. Cost of capital is closely related to the risk associated with the firm's cash flows. The greater the risk, the greater the cost of capital or discount rate. The weighted average cost of capital (WACC) is often reported as a preferred method for computing the cost of capital or discount rate, (Northcott,1992; Mills and John, 1993, and Mukherjee,1987). The advantage of the WACC technique is that it is easy

to understand and widely used in practice, Van Horne (1995). In its simplest form, the WACC is a weighted average of the company's more expensive cost of equity with its less expensive cost of debt*. In order to investigate the usage of WACC, the participating companies were asked what discount rate was used when discounting project cash flows. Table 6.18 demonstrates that weighted average cost of capital, is the most popular technique among medium and small-sized companies with percentages of 73 and 43, respectively. Approximately 61 per cent of companies claim to use WACC. Out of 36 companies, 10 (28 per cent) used the less expensive cost of debt as their cost of capital and 7 companies (19 per cent) exercise personal judgement in estimating their cost of capital. It is important to point out that there are different methods to estimate WACC and there has been no consensus on the best method for its computation, Gurnani (1984). An important question arises of how British companies calculate their cost of capital. It is difficult to answer this from the data collected, but as one executive stated: "*the company uses the historical cost of capital and develops guidelines for incorporating the risk differences*". Another executive stated: "*We use WACC and incorporate the cost of equity of the most efficient competitor*". Others expressed doubt about the accuracy of the equity component in their cost of capital. However, previous research (e.g. Westwick and Shohet, 1976) identified a tendency for firms to calculate hurdle rates or cost of capital on non-theoretical grounds, typically using overdraft rates.

* The company's WACC reflects the average risk of all projects; therefore, it can be used for investment evaluation only when the risk of project under consideration is equal to the company's average risk A simple, practical approach to incorporate risk differences is to develop project risk indices and incorporate them in setting the hurdle rates. Part of the strength of this approach lies in its requirement for decision-makers to explicitly consider risk and the rate of return, rather than mechanically applying a single rate to all investment projects (Northcott, 1992, and Gurnani, 1984).

Table 6.18: Measures of Companies' Cost of Capital

Size of company / Cost of capital approach	Medium 22 (100%)*	Small 14(100%)*	Total 36(100%)*
Cost of debt	4 (18)	6 (43)	10 (28)
Weighted average cost of capital (WACC)	16 (73)	6 (43)	22 (61)
Risk free plus a premium	5 (23)	3 (21)	8 (22)
Personal judgement	3 (14)	4 (29)	7 (19)

* Total is more than participating companies because some companies are using more than one technique.

6.3.1.6 Management Science Techniques:

It is well recognised that management science or operations research techniques (MST or ORT) can play a prominent role in the solution of business problems of over-increasing complexity and scope, Kim (1975), Moore and Reichert (1989), and Pike (1989). In recent years, however, there has been a growing interest in the application of these techniques in areas such as financial planning, capital budgeting, and strategic planning. The use of these techniques among large UK companies is not widespread (Pike and Sharp, 1989). To gain more information about the usage of Management science techniques (MST), the participating companies were asked whether or not they use one or more of the several MST techniques. Their responses are given in Table 6.19.

As the Table shows, 47 per cent of companies use management science techniques in capital budgeting. Table 6.19 shows the number of companies that use management

Table 6.19: Adoption of Management Science Techniques (MST) by Size

Size of company / User, Non-User of MST.	Medium 22 (%)	Small 14 (%)	Total 36 (%)
User	10 (45)	7 (50)	17 (47)
Non-User	12 (55)	7 (50)	19 (53)

* χ^2SIG'N =0.79

science techniques in risk analysis. It is worth noting that both small and medium-sized companies have similar usage rates of these techniques (50 per cent versus 47 per cent respectively.

The chi-square figure indicates that there is no significant difference between the two size groups regarding the frequency of using management science techniques in risk analysis. Table 6.20 presents the distribution of the MST techniques by company size. The Table shows that PERT (Project Evaluation and Review Technique) or CPM (Critical Path Method*) and computer simulation are the most popular techniques among the companies and are used by approximately 47 per cent and 41 per cent, respectively. While computer simulation is the most popular technique among the medium-sized companies (50 per cent), PERT is the most popular technique among small-sized companies (43 per cent). Table 6.21 presents the distribution of management science techniques by industry type. The Table illustrates that the three industrial sectors exhibit to some extent a similar usage rate of certain techniques. For

* PERT is basically the same as critical path method, but it attempts to pay greater attention to estimating the duration of each project activity.

example, the usage rate for decision theory is 33 per cent for chemical, 25 per cent for aluminium, and 33 per cent for food. However, the most popular techniques across industries are PERT (62 per cent) and simulation (54 per cent).

Table 6.20 : Use of Management Science Techniques by Type: Analysis by Size

Size of company / Management science techniques	Medium 10 (100%)	Small 7 (100%)	Total 17* (100%)
Decision theory	3 (30)	1 (14)	4 (24)
Simulation	5 (50)	2 (28)	7 (41)
Mathematical programming	2 (20)	1 (20)	3 (18)
PERT/ Critical path method	5 (50)	3 (43)	8 (47)

* Total is more than the number of participating companies because some companies use more than one technique.

Table 6.21: Use of Management Science Techniques: Analysis by Industry

Industry / Management science techniques	Chemical, Gas & Oil 6 (100%)	Aluminium 4 (100%)	Food & Allied Products 3 (100%)	Total 13(100%)
Decision theory	2 (33)	1 (25)	1 (33)	4 (31)
Simulation	4 (67)	2 (50)	1 (33)	6 (54)
Mathematical programming	2 (33)	1 (25)	0 (0)	3 (23)
PERT/Critical path method	4 (67)	2 (50)	2 (67)	8 (62)

6.3.1.7 Trends in Capital Budgeting Systems :

To obtain an overall assessment of the nature and scope of the changes in the capital budgeting systems over the past five years, respondents were asked to indicate whether their capital budgeting systems over this period had become more sophisticated, more effective in evaluating, more effective in controlling investment projects, or remained unchanged. The results are presented in Table 6.22.

Table 6.22: Trends in Capital Budgeting Systems

Size of company / Capital budgeting techniques have become:	Medium 22 (100%)	Small 14 (100%)	Total 36 36(100%)
A. More sophisticated	14 (64)	8 (57)	22 (61)
B. No change	8 (36)	6 (42)	14 (39)
χ^2SIG'N .96846			
Capital budgeting techniques have become:			
A.. More effective in evaluating projects	12 (55)	6 (43)	18 (50)
B. No change	10 (45)	8 (57)	18 (50)
χ^2SIG'N .49412			
Capital budgeting techniques have become:			
A.. More effective in controlling projects	8 (36)	5 (36)	13 (36)
B. No change	14 (64)	9 (64)	23 (64)
χ^2SIG'N .96846			

The results in Table 6.22 indicate that 22 out of a total of 36 companies (61 per cent) judged their systems to be more sophisticated, 18(50 per cent) indicated that their systems had become more effective in evaluating investment projects, and 13 (36 per cent) claimed that their systems had become more effective in controlling projects. Five conclusions emerge from Table 6.22. Firstly, approximately 60 per cent of companies reported an increase in the sophistication of their capital budgeting systems. The primary explanation offered being the expansion of facilities based on information technology (i.e. computers and computer packages). This is an area of management decision making which ideally lends itself to these developments (Pike, 1988a). Secondly, the two groups of companies, to some extent, exhibit a similar pattern regarding changes in their capital budgeting system. This might be explained by the fact that these companies, irrespective of their size, have a similar perception regarding the importance of upgrading their systems to cope with the rapidly changing environment. Thirdly, the percentage of medium-sized companies which experienced changes in their system is a little more than that of small-sized companies. However this difference between the two groups is not statistically significant. Fourthly, both medium and small-sized companies have identical responses regarding the increased effectiveness of capital budgeting systems in controlling capital investment projects, with 36 per cent of companies in each group. Fifthly, it is quite apparent from the Table that sophistication is not viewed by some companies as effective in evaluating and controlling capital investment projects. In other words, there is a mixed perception by the British respondents as to the effect of sophistication on their capital budgeting systems. This disparity in perception could be due to the degree of comprehensiveness

of the changes in the capital budgeting system of these companies. Some might have experienced changes across their entire system, whereas others experienced only partial changes. However, Pike's study (1988a), although it has different survey population from the current study, indicated that adoption of sophisticated techniques such as discounted cash flow (DCF) and post-completion audits is associated with greater perceived effectiveness in selecting and controlling capital projects.

6.3.2 Analysis and Results related to Part Two of the Questionnaire (Sophistication of the Capital Budgeting System):

The purpose of Part two of the questionnaire is to measure the degree of sophistication of the capital budgeting system. Capital budgeting is viewed as a system of interrelated components and the degree of its sophistication is a substitute variable for the entire decision process and may be described as an integral mix of components.

6.3.2.1 Components of Capital Budgeting Sophistication:

This study assumes that the degree of sophistication of the capital budgeting system can be assessed in terms of nine factors (Kim, 1982). These factors are::

1. The preparation of a long-range capital budget (LRC).
2. A systematic search for alternatives to investment projects (SSR).
3. The existence of a formal screening and reviewing body (SCR).
4. The use of capital budgeting evaluation techniques (EVT).
5. The use of management science techniques (MST).
6. Formal risk analysis (RA).
7. The employment of full-time capital budgeting staff (FCBS).
8. Expenditure control (EXP).
9. Post- audits. (PA).

Respondents were asked to assign a weight to each of these nine factors reflecting the relative importance their companies attach to them. Twenty six companies out of 36 completed this part of the questionnaire and the results are presented in Table 6.23.

Table 6.23: Ranking of Capital Budgeting Components

Components* / Companies	LRC	SSR	SCR	EVT	MST	RA	EXP	FCBS	PA
1	2	4	3	1	6	5	6	7	8
2	2	4	3	1	6	5	6	7	8
3	2	4	3	1	7	5	6	7	8
4	2	4	3	1	6	5	6	8	8
5	2	4	3	1	6	5	6	7	8
6	2	4	3	1	6	5	6	7	8
7	6	2	4	1	8	5	3	9	7
8	1	7	3	2	7	4	5	8	6
9	3	5	2	1	6	5	4	8	9
10	7	2	6	1	8	5	3	9	4
11	6	2	5	1	8	3	4	9	7
12	7	4	3	1	8	2	5	9	6
13	2	4	5	1	9	6	3	8	7
14	5	2	2	1	8	3	4	7	6
15	2	1	5	1	8	4	6	9	7
16	3	2	5	1	9	4	7	8	6
17	6	2	7	1	8	5	4	8	3
18	2	3	6	1	8	4	5	9	7
19	2	4	3	1	8	6	5	8	7
20	1	2	4	3	7	6	5	9	7
21	5	2	3	1	8	4	7	8	6
22	4	3	5	1	8	6	4	9	7
23	2	1	5	4	7	6	3	8	4
24	3	2	4	1	8	5	6	8	7
25	5	2	6	1	8	4	3	9	7
26	1	3	4	2	8	7	5	9	6
Total	85	87	105	33	194	124	127	212	174

*

LRC. Long- range capital budget
SSR. Searching for investment alternatives
SCR. Screening and reviewing
EVT. Evaluation Techniques
MST. Management Science techniques
RA. Risk analysis
FCBS.Full-time capital budgeting staff
EXP. Expenditure control
PA. Post-audits

Table (6.23) shows the relative importance attached to these components by the respondents as reflected in the ranking of these components from the most important (rank 1) to the least important (rank 9).

6.3.2.2 Kendall's Coefficient of Concordance W :

Kendall's coefficient of concordance (W) is used for analysing the ranking of the capital budgeting components. When there are k sets of rankings, Kendall's Coefficient of Concordance (W) can be employed to examine the association among the k variables. One particularly important use of the coefficient of concordance "is in examining interjudge reliability" (Churchill, 1995).

The limits of W are zero, with no agreement, and one, with perfect agreement among the ranks.

A W value of .7599 with a chi- square value of 158.0638 and .0000 level of significance was obtained by running the SPSS package using the ranked data. Another run of SPSS using the weights assigned by respondents produced a W value of .7583 and a chi- square of 157.7224 and .0000 significance level.

The calculated value of W = .7599 suggests that although the agreement in the rank is not perfect, it is certainly good. It appears that the respondents are applying essentially the same weights in ranking the capital budgeting elements.

To calculate the weight of each of the nine components of capital budgeting elements listed above, the relative weight assigned by each respondent was summed across all companies to obtain the total weight and then this sum was divided by the number of companies to arrive at the final average weight for that component. This average

weight is then used as a basis for calculating the degree of the capital budgeting index for each of the sampled companies.

Table 6.24 shows the weight assigned by each company to each of the nine capital budgeting elements

Table 6.24: Weights Assigned by Companies to the Capital Budgeting Components

Components* / Companies	LRC	SSR	SCR	EVT	MST	RA	FCBS	EXP	PA
1	17	11	14	23	7	10	6	7	5
2	17	11	14	23	7	10	6	7	5
3	17	11	14	23	7	10	6	7	5
4	17	11	14	23	7	10	6	7	5
5	17	11	14	23	7	10	6	7	5
6	17	11	14	23	7	10	6	7	5
7	9	15	11	25	5	10	5	12	8
8	22	6	13	18	5	11	6	10	9
9	12	10	14	21	9	10	7	11	6
10	8	15	9	20	7	10	6	13	12
11	8	15	10	34	2	12	1	11	7
12	5	14	15	20	3	18	1	13	11
13	15	12	11	30	1	10	2	13	6
14	10	13	13	23	4	12	5	11	9
15	17	16	12	18	3	15	2	10	7
16	15	20	10	27	2	13	3	4	6
17	7	20	4	35	2	8	2	10	12
18	15	14	10	17	7	13	5	11	8
19	20	10	15	26	3	8	3	9	6
20	20	17	13	15	6	10	1	12	6
21	9	18	15	23	5	10	5	7	8
22	18	15	10	26	3	9	1	12	6
23	15	17	10	11	9	9	8	12	9
24	15	20	14	25	1	12	1	6	6
25	10	15	9	22	7	11	6	12	8
26	23	14	11	17	6	6	4	10	9
Total	375	362	313	591	132	277	110	251	189
Average	14	14	12	23	5	11	4	10	7
Ranking	2	2	3	1	7	4	8	5	6

*components:

LRC.Long-range capital budget; SSR. Searching for investment alternatives; SCR.Screening and reviewing; EVT Evaluation techniques; MST. Management science techniques ; RA. Risk analysis; FCBS. Full time capital budgeting staff; EXP. Expenditure control; PA. Post-audits.

6.3.2.3 Average Weights and Ranks of Capital Budgeting Components :

Based on the above weights, the nine components of the capital budgeting index can be ranked in the order shown in Table 6.25, along with the weights assigned to each component.

Table 6.26 presents the ranking and weight of the capital budgeting components established by this study for British companies and those established by Kim (1982) for large American companies

Table 6.26 reveals the following:

1. Overall, the weights and ranks established by this study and that established by Kim exhibit a high degree of similarity in the areas of : evaluation techniques (same weights, same ranks), preparation of a long-range capital budget (same weight, slight difference in weights), formal screening (same rank, slight difference in weights).

2. For the remaining components of the capital budgeting system, some differences in weights and ranks were observed. However, those differences appear to be minor especially in the ranking of the components, where most of the differences are only within one rank (i.e. 5 versus 6, or 7 versus 8).

Based on the above results, it appears that the UK companies and the US companies have a high degree of similarity in their views of the relative importance of the different components of capital budgeting system, despite the relatively long time period elapsed between the two studies (Kim, 1982, current study, 1996) and despite the different characteristics of the companies in the two samples. Companies included in Kim's study were mainly large US companies, while companies included in this study are mainly medium and small ones .

Table 6.25: Average Ranking of Capital Budgeting Components

Capital Budgeting Components	Rank	Weight (%)
Preparation of long-range capital budget	2	14
Systematic searching for alternatives to capital investments	2	14
Formal screening and reviewing committee	3	12
Evaluation techniques	1	23
Management science techniques	7	5
Risk analysis	4	11
Full-time capital budgeting staff	8	4
Expenditure control	5	10
Post-audits	6	7

6.3.2.4 Computation of the Degree of Sophistication of the Capital Budgeting System:

On the basis of responses to the second part of the questionnaire, the degree of capital budgeting sophistication (DCBS) of each company was computed. The DCBS is determined on the basis of nine essential components (Kim, 1982). Each component is assigned a weight according to the scale established by this study. Companies having all nine components are given full points (100 per cent). However, the lack of any of the weights will reduce the total score of the company by the weight of the component(s) lacking. The computed DCBS score for each company is presented in Table 6.27.

6.3.2.4.1 Distribution of the Capital Budgeting Sophistication Indices for Small and Medium-Sized Companies :

The capital budgeting sophistication index, which represents a modified version of the Kim (1982) index, is considered an appropriate tool for evaluating the overall status of the capital budgeting systems of the companies in the survey. The index was modified to account for differences between the perceptions of American managers and their British counterparts regarding the relative importance of capital budgeting components. This modification was achieved through asking British managers to assign weights to the different components of the capital budgeting system stated in the original Kim index, then using those weights to calculate the capital budgeting sophistication index for each company The proposed index was calculated in the previous section. The results are presented in Table 6.27. These results indicate that out of 36 companies, twenty-two have capital budgeting sophistication indices which fall between 70 and 100, six companies have indices that fall between 60 and 70 and eight companies have indices which fall below 60.

To compare the degree of sophistication indices of the capital budgeting system for the two groups, medium and small, as presented in Table 6.27, the mean sophistication index was calculated for each group. The results are presented in Table 6.28. The mean sophistication index for the medium-sized companies is 71.8, while the mean index for the small companies is 70.5. The overall mean index for the 36 companies is 71.3

Table 6.26: Comparison between Weights-Ranks Established by the Current Study & those Proposed by Kim

Capital Budgeting Components	Current Study		Kim Study	
↓	Rank	Weight (%)	Rank	Weight (%)
Preparation of a long-range capital budget	2	14	2	17
Searching for alternatives to capital investments	2	14	4	11
Formal screening and reviewing committee	3	12	3	14
Evaluation techniques	1	23	1	23
Management science techniques	7	5	6	7
Risk analysis	4	11	5	10
Full-time capital budgeting staff	8	4	7	6
Expenditure control	5	10	6	7
Post-audits	6	7	8	5

Table 6.28 provides the capital budgeting sophistication indices for both the medium and small-sized companies participating in this study. These values are extracted from Table 6.27

To investigate whether there is a significant difference between the two mean sophistication scores, a t test can be used. However if the assumption of a normally distributed population is invalid, the t test should not be applied. In such cases, the Mann-Whitney U test (MWU) is an acceptable option for analysing the data. The

MWU test is a nonparametric counterpart of the t test used to compare the means of two independent populations. The null hypothesis (Ho) under MWU test is that the two populations are identical in terms of sophistication scores, and the alternative hypothesis (Ha) is that the two populations are not identical in terms of sophistication scores. The large sample size case for the MWU test is appropriate whenever the sample sizes for both populations are greater than or equal to 10 (Lee, 1993).

The results of the MWU test indicated that the computed test statistic (z) was 0.65. At .05 level of significance, and in order to reject the null hypothesis, z must be less than -1.96 or greater than +1.96. Since $z = 0.65$, the null hypothesis Ho cannot be rejected. Thus, we conclude that the two populations are the same.

The results of the Mann-Whitney U test appear in Table 6-29.

Table 6.27: Computation of Capital Budgeting Sophistication Score

Index Components* / Companies	EVT	LRC	SSR.	SCR.	RA	EXP	PA.	MST	FTCBS	SCORE**
1	23	14	14	12	11	10	7	5	4	100
2	23	14	14	12	11	10	7	5	4	100
3	23	14	0	12	11	10	7	0	4	81
4	23	14	0	0	0	10	7	0	4	60
5	23	14	14	0	11	10	7	0	4	74
6	23	14	14	12	0	0	0	5	4	72
7	23	0	14	0	11	10	7	5	4	74
8	23	14	0	12	11	10	7	5	4	86
9	23	14	14	0	11	0	0	0	4	66
10	23	14	0	12	0	10	0	0	4	63
11	23	0	14	12	11	10	7	5	4	86
12	23	0	0	12	0	0	0	0	0	35
13	23	0	14	12	11	10	7	5	4	86
14	23	0	14	0	0	0	0	0	0	37
15	23	14	14	12	11	10	7	5	4	100
16	23	14	14	0	11	10	7	5	4	88
17	23	14	0	12	0	10	7	0	4	70
18	23	14	0	12	0	10	7	0	4	70

*Index components

EVT. Evaluation techniques.
LRC. Long-range capital budget.
SS.R. Searching for investment alternatives.
SCR. Screening and reviewing body
RA. Risk analysis.
EXP. Expenditure control.
PA. Post-audits.
MST. Management science techniques.
FTCBS. Full time capital budgeting staff.

** The score index is computed by adding all the points given by a company to each of the nine elements of the capital budgeting practices.

Table 6.27 (Cont.): Computation of Capital Budgeting Sophistication Index

Index Components* / Companies	EVT	LRC	SSR.	SCR.	RA	EXP	PA.	MST	FTCBS	SCORE**
19	23	14	14	0	11	10	7	5	0	84
20	23	14	14	0	11	0	0	0	0	62
21	23	14	14	12	11	10	7	5	4	100
22	23	14	14	12	11	10	7	5	4	100
23	23	14	0	12	11	0	0	0	0	60
24	23	0	14	12	11	10	7	0	0	77
25	23	0	0	12	0	0	0	0	0	35
26	23	0	14	0	0	0	0	0	0	37
27	23	0	0	0	0	0	0	0	0	23
28	23	14	14	0	0	10	0	5	0	66
29	23	14	14	0	0	0	0	0	0	51
30	23	14	0	12	11	10	7	5	4	86
31	23	14	0	12	11	10	7	5	4	86
32	23	14	14	12	11	10	7	5	4	100
33	23	14	0	12	11	10	0	5	0	75
34	23	0	14	12	11	10	0	0	4	74
35	23	0	14	0	0	0	0	0	0	37
36	23	0	14	0	11	0	0	0	0	48

*Index components

EVT. Evaluation techniques.
LRC. Long-range capital budget.
SR. Searching for investment alternatives.
SCR. Screening and reviewing.
RA. Risk analysis.
EXP. Expenditure control.
PA. Post-audits.
MST. Management science techniques.
FTCBS. Full time capital budgeting staff.

** The score index is computed by adding all the points given by a company to each of the nine elements of capital budgeting practices.

Table 6.28: Capital Budgeting Sophistication Index for Medium and Small-Sized Companies

Medium-Sized Companies	Sophistication Index
1	100
2	100
3	60
4	72
5	88
6	66
7	63
8	35
9	100
10	74
11	70
12	62
13	100
14	68
15	77
16	35
17	66
18	51
19	86
20	75
21	74
22	48
Mean for Medium-Sized Companies	71.8
Small-Sized Companies	Sophistication Index
1	81
2	74
3	86
4	86
5	86
6	37
7	70
8	84
9	100
10	37
11	23
12	86
13	100
14	37
Mean for Small-Sized Companies	70.5
Overall Mean	71.3

Table 6.29: Results of the Mann Whitney Test for the comparison between Capital Budgeting Sophistication Indices of Small and Medium-Sized British companies.*

Sophistication Indices for Small-Sized Companies	Rank for Small-Sized Companies	Sophistication Indices for Medium-Sized Companies	Rank for Medium-Sized Companies
81	22	100	32.5
74	19	100	32.5
86	26	60	9
86	26	72	17
86	26	88	29.5
37	4.3	66	12.5
70	15.5	63	11
84	23	35	2.5
100	32.5	100	32.5
37	4.3	74	19
23	1	70	15.5
86	26	62	10
100	32.5	100	32.5
37	4.3	68	14
		77	21
		35	2.5
		66	12.5
		51	8
		86	26
		75	21
		74	19
		48	7
	262.4		387

* The first step in the MWU test is to rank the combined data from the lowest to the highest. Using the combined data of 36 observations shown in Table 6-28, we found the lowest data value of 23 (eleventh item of small-sized companies) and assigned to it a rank of 1.

In ranking the combined data, we found that two or more data values are the same. In this case, these same values were given the average ranking of their positions in the combined data set.

The next step in the test is to sum the ranks for each group. These sums are shown in Table 6.29. The test procedure can be based upon the sum of the rank of either group. Using the ranks for the medium-sized group the sum T=387

Given that the sample sizes are greater than or equal to 10, we can use the normal approximation to the sampling distribution of the rank sum,T. The appropriate sampling distribution is given by the following:

Mean: $u_T = 1/2\ n_1 (n_1 + n_2 + 1)$

Standard Deviation $\delta = [(1/12\ n_1 n_2 (n_1 + n_2 + 1)]^{1/2}$

From Medium-Sized group we have

$u_T = + 1/2 .\ 22\ (22+14+1) = 407$

$\delta = [(1/12 . 22 . (14)\ (22+14+1)]^{1/2} = 30.8$

Using this information we can calculate the standard normal variate

$$Z = \frac{T - uT}{\delta} = \frac{387 - 407}{30.8} = -.65$$

At an alpha ($.\delta$) = .05 level of significance, z must be less than -1.96 or greater than +1.96 to reject the null hypothesis Ho. Since z =.65, Ho cannot be rejected. Thus we conclude that the two populations are identical. That is, the populations of capital budgeting sophistication indices of the two groups (Medium and Small) are the same.

Chapter Summary and Conclusions:

The primary objective of this chapter is to investigate the capital budgeting practices of 36 small and medium-sized UK companies listed in the "*Financial Times, 1000 Top UK Companies, 1993*". These were previously identified in the methodology chapter to serve as a benchmark for Bahraini companies in the area of capital budgeting practices. Another objective of this investigation is to measure the degree of capital budgeting sophistication of the British companies in the sample. The survey questionnaire is designed to provide data regarding the entire capital budgeting process- from long-term planning and search for investment opportunities through to post-auditing implemented projects.

The main findings of this chapter are outlined below:

1. Capital budgeting practices as defined by this study appear to be systematically applied by the participating companies. Preparation of a long-range capital budget, search for alternatives to capital investment projects, existence of screening and reviewing body and full time capital budgeting staff, application of evaluation and management science techniques, using formal risk analysis, exercising control over capital expenditure and conducting post-completion audits on capital projects have been found to be used by more than 50 per cent of the sampled companies. The application by companies of a more systematic and formalised investment system and superior investment techniques in approaching their capital investment decisions indicates that these companies appreciate the importance of these methods in reaching a successful investment decisions over relying on an informal and subjective judgement in evaluating their investment projects.

2. In the area of capital evaluation techniques, the results indicate that both DCF techniques, (IRR and NPV) and less sophisticated methods (payback and accounting rate of return) are used almost equally by the sampled companies. One of the major findings of this survey is that all British companies participating in this study use discounted cash flow techniques (DCF) individually or in combination with payback or accounting rate of return. However, the most popular DCF technique is the one which provides a rate of return measure- the internal rate of return (IRR). This is consistent with the businessman's desire for a rate of return figure which is normally perceived to be more convenient and suitable for decision making than other techniques. While 90 per cent of all companies indicated that more than one technique was employed, there was a tendency for the net present value (NPV) to appear less often than in other methods where multiple techniques were employed.

3. Size and industry type appear to have no real influence on the capital budgeting practices adopted by companies participating in this study. This indicates that companies approach their investment decisions in the same manner irrespective of their size and industry. The absence of any major significant differences between the two groups of British companies can be explained by the fact that the sizes of the British companies in the survey, as measured by the volume of turnover, are too close to each other to be considered two separate size categories*. The mean turnover index for medium sized companies is £340 m, whereas the mean turnover index for small sized companies is £245 m.

* The definitions of medium and small companies adopted in the current study corresponded with those used by Scapens et al(1982) and Mills and Herbert (1987), where company size is measured by turnover, i.e. medium companies have a turnover of £m250-750 and small companies have a turnover of less than £m250.

4. Regarding the risk analysis of capital investment projects, the results indicate that more than 60 per cent of respondents have a formal method for appraising risk and uncertainty, while 37 per cent do not have such methods. This suggests that a great majority of small and medium sized companies give explicit consideration to risk. A variety of techniques ranging from very simple ones to complex statistical analysis were used. It seems that the best method of accommodating risk depends upon the nature of the project. Although the majority of the companies are giving consideration to risks, no dominant method of risk assessment or of risk adjustment has emerged. The two most popular techniques of risk assessment are sensitivity analysis and revising the payback period. Change of the required rate of return, probability analysis and the "Capital asset pricing model" (CAPM) are also being used by a small number of companies. It is most likely that the availability of computer software has encouraged companies to conduct sensitivity analysis on capital investment projects. Regarding management science techniques, the findings indicate that their application is still far from ideal. Though capital limitations do exist, mathematical programming is not widely used. Perhaps, management is not fully aware of these techniques or it doubts the benefits that can be derived from their use, and as a result is unwilling to expend the resources required for the analysis.

One important aspect of this survey is its attempt to measure the degree of sophistication of the capital budgeting systems of the sampled companies which has been investigated before in large companies in the UK and the US. The findings reveal that the importance of capital budgeting elements prescribed in financial literature are commonly shared between companies in the US and the UK regardless of their size.

That is clear from the comparison between the findings of this study and that of Kim's(1982), which indicates a high degree of similarity in their perception of the relative importance of various elements of capital budgeting practices.

In conclusion, the findings suggest that although some deficiencies are observed in the capital budgeting system by a minority of companies participating in this survey, the overall study results show that small and medium-sized British industrial companies are using adequate procedures and methods in their capital investment decisions.

CHAPTER SEVEN

ANALYSIS AND RESULTS

THE CASE OF BAHRAINI COMPANIES

7.1 Introduction:

The objective of Phase One of the analysis, capital budgeting practices of British industrial companies, was to conduct a thorough investigation of capital budgeting practices of a sample of medium and small-sized British companies. For that purpose the sample of British companies was divided into two sub-samples, small and medium-sized companies. The objective of such a division was to evaluate whether the two sub-samples are significantly different and hence to decide which of the two groups can serve as a benchmark for Bahraini companies. However, the results of the analysis have shown that the two groups have exhibited enough similarities in their capital budgeting practices to be treated as one group against which the sample of Bahraini companies can be compared and benchmarked.

This part of the analysis presents the results of the empirical investigation of capital budgeting practices of Bahraini companies and a comparison between the Bahraini companies and their British counterparts. This chapter is divided into the following seven sections.

1. Introduction
2. An Overview of Bahraini Companies and the Data Collection Method.
3. Factors Affecting Managerial Decision-Making in Bahraini Companies
4. Analysis of the Responses of Bahraini Companies to the Study Questionnaire
5. Capital Budgeting Sophistication Index for Bahraini Companies
6. Evaluation of the Study Objectives
7. An Overall Comparison of the Responses to the Study Questionnaire between Bahraini Companies and their British counterparts

The chapter concludes by providing an overall summary of the main findings.

7.2. An Overview of the Bahraini Companies and the Data Collection Method:

Five Bahraini companies from three industrial sectors (a) Gas, Oil & Chemical, (b) Aluminium, and (c) Food and allied products, were included in this study. These companies are:

1. Bahrain National Oil Company (Oil & Gas)
2. Bahrain National Gas Company (Oil & Gas)
3. Gulf Petrochemical Industries (Chemical)
4. Aluminium Bahrain (Aluminium)
5. Bahrain Flour Mills Company (Food)

The above five companies represent the major industrial sectors in which the Government made considerable capital investment during 1980-1993. The Ministry of Finance and National Economy put the investment figure for this period at BD 1250 million, around £m 2083 (Ministry of Finance and National Economy, Quarterly Economic Report, 1994). It has been the Government's hope that this investment would bring about greater participation of the Bahraini workforce in the industrial sector of the economy, as well as greater utilisation of Bahraini resources, and to serve as a model for small and medium-sized companies operating in Bahrain. The characteristics of these companies represented the basis for selecting their British counterparts (chapter 2).

Personal interviews were used to obtain primary data from the Bahraini companies.

The data from Bahraini companies were collected in two stages. In stage one, the study questionnaire was mailed to the five Bahraini companies participating in this study. Responses received from those companies were used as the basis for comparison with British companies regarding the capital budgeting practices in both

groups. Stage two involved conducting interviews with Bahraini officials. Two types of interviews were employed in this study, the first of which was used to assist in the analysis of questionnaire responses. The interviews were structured, and corresponded with questions developed specifically for the questionnaires**. They were conducted as soon as possible after the receipt of completed questionnaires, with a view to providing enrichment of the questionnaire responses.

The second of these types of interviews was conducted in order to gain more insight into the capital budgeting process of the Bahraini companies. The interviews were conducted by the researcher between October, 1995 and January, 1996, with the executives directly involved in the capital budgeting decision process of each company. The officials interviewed included: accountants, general managers, finance managers, chief executives, marketing and production managers. Each interview lasted from two to three hours and nine of the fourteen interviews made were allowed to be tape recorded. The purpose of tape recording was to ensure that no important information pertaining to these companies would be lost or omitted.

Additional data were obtained from other sources such as the companies' annual reports, financial statements, other documents made available to the researcher by the companies, and information related to the same companies from the Ministry of Oil and Industry in the State of Bahrain.

The information obtained from the executives and the additional data made available to the researcher were used in preparing a descriptive analysis of the capital budgeting process used by each company.

Table 7.1 provides the corporate titles of individuals interviewed in the companies.

** The questionnaires were the same as those used for British companies

Table 7.1: Corporate Titles of Executives Interviewed

Title	Number of Executives
General Manager (Chief Executive)	2
General Manager for Finance	5
Chief Accountants	3
General Manager (Marketing)	2
General Manager (Production)	2
Total	14

7.3 Key Factors Affecting Managerial Decision-Making in Bahraini Companies:

After detailed examination of the capital budgeting process for Bahraini companies, the following observations can be made:

7.3.1 Role of Government in the Capital Budgeting Decision Process:

Due to the strategic role played by the selected five companies in the national economy, the influence of the Government is largely felt in the strategic decisions of those companies. This influence extends to the capital budgeting decisions of major investment projects, such as the most recent expansion undertaken by Aluminium Bahrain (Alba). These investments are perceived by the Government to have a far-reaching economic effect and therefore Government approval and support are always necessary. Another aspect of the Government's role in capital investment decisions includes extending guarantees to the lenders providing the necessary financing for the investment projects. In addition, some investment proposals may be provided by the

Government due to the perceived impact of those projects on the national economy. Perceived benefits from those projects include increasing export revenues, providing more jobs or contributing to the modernisation programmes for the country's industrial sector.

7.3.2 Qualification of Managers in Bahraini Companies:

Personnel development is an area which is considered to be of the utmost importance by the board and executives of Bahraini companies, both in the interest of investment in the country's human resources in general, and in the interest of the government policy of "Bahrainisation". Employees are given every opportunity to deepen their job knowledge, improve their skills and widen their horizons. The training programmes of Bahraini companies cover all levels of staff from vocational trainees to senior management. As well as in-house courses, training takes place off-plant at educational establishments, such as the University of Bahrain and the Bahrain Training Institute, with which companies enjoy close links. Where specialist programmes are not available locally, companies' staff attend full-time academic courses overseas, including the UK and the US. During 1995, approximately 225 employees from these companies studied for higher educational qualifications, either in Bahrain or abroad. The interviews conducted by the researcher showed that key posts in the Bahraini companies are held by well-educated, highly professional managers, who have completed several training programmes both at home and overseas (mostly in the US and UK).

7.3.3 Operating Environment:

Bahrain has long been considered the most open country in the Gulf Co-operation Council (G.C.C)* (Arab Banking Corporation, 1994). The country's laws and regulations allow for free movement of capital and manpower in and out of the country. This fact is reinforced (supported) by the large number of offshore banking units operating in the country. The presence of foreign expertise in various sectors of the economy has contributed significantly to improvements in the decision-making process in most Bahraini companies. Furthermore, most of the Bahraini managers working in those companies normally work alongside foreign managers (from the US, the UK, and other European countries) which allows them to acquire managerial skills through interaction with their foreign counterparts.

7.3.4 Use of Foreign Consultancy for Investment Projects:

Most Bahraini companies indicated that for large projects especially those involving utilisation of advanced technology, foreign consultancy is normally requested to support the local managerial teams in evaluating those projects. In such cases co-ordination between the foreign consultants and the local team is essential. For this purpose, the use of foreign consultants provides an opportunity for training local management on key aspects of capital budgeting decisions.

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* The Gulf Co-operation Council (G.C.C.) was formed in 1981. It includes Bahrain, Kuwait, Qater,Oman, Saudi Arabia, and the United Arab Emirates. The GCC's primary objective is to foster economic integration among its members.

7.3.5 Regional and International Competitiveness Pressure:

Due to the export-oriented nature of the Bahraini companies covered in this study, these companies faced three major problems. First, the drop in the price of crude oil which affected their total revenue. Second, the pressure exerted on the aluminium and petrochemical industries from other existing factories in the region (Saudi Arabia, United Arab Emirates, Qatar and Iran). Third, the possible imposition by Europe and America of the carbon tax which is aimed at reducing the consumption of petrochemical products as a measure to protect the environment. These pressures made the companies aware that large investment in plant modernisation and improving the quality of their operations was needed to counteract and lessen the negative effects of these pressures. Bahraini companies-to a great extent- managed to overcome the threat posed by these external pressures by developing markets for their product, improving the quality of their products and signing long-term contracts for the delivery of their products and supply of raw materials.

7.4 Analysis of Bahraini Companies' Responses to the Study Questionnaire:

In this section, the responses to the study questionnaire are presented in accordance with the same procedures followed in the presentation of the results of British companies.

7.4.1 Criteria used for Defining Capital Expenditure:

All the Bahraini company officials stated that capital expenditure is defined by the size and economic life of the project. The following paragraphs provide the definition of capital expenditure as stated in the capital budgeting manual of each company:

Bahrain National Oil Co. (Banoco). Any expenditures, other than those for the replacement of depreciated assets and which are expected to enhance the tangible assets (value of the business), are considered capital expenditure.

Bahrain National Gas Co. (Banagas). All expenditures which add to the company's acquisition of fixed assets and will deliver quantifiable as well as non-quantifiable benefits in the future (usually more than one year) are considered capital expenditures .

Aluminium Bahrain (Alba). Capital expenditure is that which adds to the total fixed assets of the company, from which the company will derive a continuing benefit for more than one year.

Gulf Petrochemical Industries Co. (Gpic). For an item to be classified as capital expenditure, it should enhance the reliability of the existing operation and /or provide other tangible benefits to the company with a life of at least one year .

Bahrain Flour Mills (Bfml). The Finance Manager provided the following definition: *"All additions to the fixed assets of the company and which are expected to provide benefits to the company for at least one year are considered capital expenditures".*

7.4.2 Capital Expenditure Categories:

Four Bahraini companies classify their capital expenditure into different categories. Typical classifications include: replacement, capacity expansion, acquisitions of new equipment and fixed assets, mandated or necessity projects including environmental projects, and improvements. These classifications are summarised in the descriptive analysis of the capital budgeting process of each company.

7.4.3 Administrative Procedures before Project Approval:

Based on the interviews conducted by the researcher, it was found that Bahraini industrial companies participating in the study have some of the essential components

for an efficient capital budgeting system. As shown in Table 7.2, four companies have long-range capital budgets. The same Table shows that four companies have a screening body to review project proposals and three companies have a formal risk assessment method to appraise their investment projects before making a decision to accept or reject a proposal. Three companies have full-time staff assigned for capital budgeting activities and four companies have a capital budgeting manual.

Of the companies that indicated that they have an up-to-date capital budgeting manual, two companies (Alba & Banoco) reported that their manuals were reviewed less than five years ago, and two companies (Gpic and Banagas) indicated that their manuals were reviewed more than five years ago.

Table 7.2: Use of Administrative Procedures before Project Approval by Bahraini Companies

Administrative procedures	Number of Companies
Long -Term Capital Budget	4
Systematic Project Search	0
Screening Body	4
Risk Analysis	3
Full-time Capital Budgeting Staff	3
Capital Budgeting Manual	4

7.4.3.1 Contents of Capital Budgeting Manuals:

The capital budgeting manuals for Bahraini companies are not equally comprehensive. Some of these manuals provide detailed explanation of every stage of the capital

budgeting process and the responsibilities of the personnel involved at different stages of the process, while others emphasise a particular aspect of the process. Three main phases were generally shared in each manual. These phases are:

1. Planning of expenditure.

2. Authorisation system .

3. Decision and implementation.

The following paragraphs present a brief description of each of these phases:

1. Planning of expenditure:

The Bahraini companies emphasise the importance of a system of centralising investment decisions and decentralising operating decisions. The expenditure planning includes both a long-range capital budget and an operating budget. A long-range capital budget stresses the strategic aspect for the company's operation that meets the company's objectives in the long run, whereas the operating budget usually has a six-month to one year time-frame in order to establish near-term capital spending which is consistent with the company's long-term objectives. The preparation of a long-range capital budget is usually the responsibility of the board of directors under the direction of the respective shareholders. With respect to the operating budget, this is submitted annually and developed at the plant level and flows upwards according to the company's organisational structure.

2. Authorisation system:

The inclusion of a capital project in the annual capital budget is achieved through the routing and approval of a project proposal request. The manuals elaborate on the procedures relevant to the appropriation and approval of capital expenditures. The procedures outlined in the manuals for this stage are designed to:

a. Provide adequate information for those who are to authorise expenditure for fixed assets and related items before commitments are actually made.

b. Ensure that expenditure is based on sound economic principles.

c. Maintain the control of expenditure in accordance with the purpose for which such expenditures are to be made.

In addition to the above, the contents of the capital appropriation system include information on the alternative proposals (other than the one being considered), the cash flow estimates, selection criteria and the treatment of risk.

3. Decision and implementation:

The implementation process follows the project approval, where certain special departments or personnel are assigned the responsibility of handling the details of project implementation. References to post-audit are non-existent in the manuals of all Bahraini companies. Regarding the control system, these companies collect performance data on all capital projects, but they do not formally relate the actual project performance with what was expected.

7.4.4 Administrative Procedures after Project Approval:

All the Bahraini companies indicated that they have a method of controlling the relationship between money actually spent in carrying out a major project and the money approved for it. Regarding the project completion time, two companies were found to have a method of comparing the actual time spent in carrying out the project with the time estimated. With respect to the post completion audit, all five Bahraini companies indicated that they do not have a formal system for carrying out post-audit of their capital projects. Several reasons have been cited for not conducting post completion audits. Among the reasons cited were:

1. Administration costs are too high to justify potential benefits

2. Economic uncertainty

3. Control over spending at the outset is perceived to be more effective in ensuring the success of the capital project

4. Normally a capital budgeting decision is considered a group decision and so it is difficult to trace it to a particular member

7.4.5 Selection Process:

7.4.5.1 Selection Techniques:

Table 7.3 shows the capital budgeting evaluation techniques used by Bahraini companies. From the Table, it is quite apparent that most companies use discounted cash flow methods (DCF), such as internal rate of return (IRR), and the net present value (NPV). The same Table also indicates that some companies use more than one technique to evaluate their capital investment proposals. This could be due to the various types of projects undertaken by the Government. The sizeable share of Government ownership in those companies may necessitate the use of more than one technique as is common practice in most Government projects. Government-owned companies are mostly involved in large projects which demand thorough evaluation as to their expected costs and benefits before such projects are finally selected for implementation.

Table 7.3 : Evaluation Techniques used by Bahraini Companies

Evaluation techniques	Number of companies
Payback Period (PB)	5
Accounting Rate of Return (ARR)	3
Internal Rate of Return (IRR)	4
Net Present Value (NPV)	2

7.4.5.2 Risk Analysis:

Risk is also assessed before a final investment decision is made by the companies. Shortening payback period and sensitivity analysis are used by 60 per cent of the Bahraini companies and are considered the most popular risk assessment methods. Two Bahraini companies (40 per cent) claim to use risk adjusted discount rates. The certainty equivalent approach was not used due to the difficulty of factoring in all the variables necessary for the determination of cash flows. The Capital Asset Pricing Model (CAPM) was not applicable for their companies as the Bahraini officials indicated. There are three reasons which can be cited for not using CAPM. Firstly, the Bahrain stock market is still in its early stages, and as such, the variable inputs necessary for applying CAPM, such as Beta and Return on Market Portfolio, are far from being developed. This hinders the application of CAPM. Secondly, out of the five Bahraini companies selected in the study sample, four companies are not listed on the Stock Exchange due to their quasi-public nature (the Government owns a large portion of their shares). As a result, the variable inputs necessary for applying CAPM cannot

be obtained. Thirdly, some Bahraini managers are not fully familiar with the CAPM model which makes its application difficult. Personal judgement of the managers is normally considered a significant element in risk assessment. Table 7.4 displays the risk appraisal methods used by Bahraini companies.

7.4.5.3 Capital Rationing and Cost of Capital:

In the area of capital rationing, most Bahraini companies indicated that general economic uncertainty was the main constraint on the investment programme. None of the Bahraini companies considered the lack of capital from the capital market, the lack of trained managers capable of implementing investment opportunities or the unwillingness to increase level of borrowings as crucial constraints on their investment programmes.

Table 7.4: Use of Risk appraisal Techniques by Bahraini Companies

Risk assessment methods	Number of companies
Shortening payback period	5
Probability theory	0
Risk adjusted discount rate	2
Sensitivity analysis	3
Certainty Equivalent Approach	0
Capital Asset Pricing Model	0

Note: Most companies used more than one technique

Regarding the hurdle rate or cost of capital, four companies use borrowing rate/market rate as a means for determining their discount rate or cost of capital. Bahrain Flour

Mills Co.(Bfml) does not have a formal definition of cost of capital. The cost of capital concept is used by Bahraini companies as a cut-off rate or as a threshold criterion for accepting or rejecting projects. When ARR (accounting rate of return) is used, the cut-off ranges from 10 per cent to 20 per cent, and from 15 per cent to 25 per cent when IRR (internal rate of return) was employed. When NPV (net present value) criterion was used, the discount rate ranged from eight per cent to 12 per cent.

The reasons for this range of figures vary. The major reason is that companies base their nominal cut-off rates on past experience. Some companies refer to this rate as a "moving target", depending on their current performance. No systematic method was used to figure out this value.

7.4.6 Management Science Techniques:

Although management science techniques can be useful tool in appraising capital investment projects, it is surprising to find that none of these techniques are being used by Bahraini companies, with the exception of one (Banoco) which uses PERT/CPM.

7.4.7 Trends in Capital Budgeting Sophistication System:

Discernible trends in sophistication of the capital budgeting system were found in the following areas:

1. Formal analysis of risk. The incorporation of more advanced risk assessment methods, such as sensitivity analysis, in the analysis of investment decisions.

2. Employment of more than one technique in evaluating capital investment proposals. The (DCF) techniques, such as net present value and internal rate of return are being used in combination with other non-sophisticated techniques in appraising investment projects.

3. Expenditure control and monitoring performance. Some Bahraini companies reported that control over expenditure had been achieved through computerisation which makes it easy to trace the expenditure from its initiation to its final approval. Also, the computerisation of the accounting system provides the managers and staff involved in capital budgeting with easy access to the information which enables them to base their decisions on accurate and reliable information.

All but one company indicated that their capital budgeting procedures and techniques had become more sophisticated and effective in evaluating and controlling capital projects. One company, which did not experience any change in its capital budgeting system indicated that its capital budgeting procedure was adequate for handling its investment decisions (Bfml).

7.5 Capital Budgeting Sophistication Index:

To measure the capital budgeting sophistication index for Bahraini companies, the weights assigned to capital budgeting components, as established by this study, were applied to them. The procedure followed for the British companies was repeated for the Bahraini companies (see Table 7.5).

Based on the figures in Table 7.5, it appears that the three leading Bahraini industrial companies (Alba, Banoco, Gpic) have capital budgeting indices of 74 or more. The overall mean index is 61.6. However, the fifth company, Bahrain Flour Mills (Bfml), has a capital budgeting index of 22, which is significantly lower than other Bahraini companies. This low score is due to the fact that Bfml is a relatively small company with a limited number of investment projects, which does not justify the development and maintenance of a sophisticated capital budgeting system.

Table 7.5: Computation of Capital Budgeting Sophistication Indices for Bahraini Companies

Capital Budgeting Components ↓	Weight (%)	Banoco	Alba	Gpic	Banagas	Bfml
Long-range capital	14	14	14	14	14	0
Systematic search	14	0	0	0	0	0
Screening body	12	12	12	12	12	0
Evaluation techniques	23	23	23	23	23	12
Risk analysis	11	11	11	11	0	0
Management science techniques	5	5	0	0	0	0
Full time staff	4	4	4	4	0	0
Expenditure control	10	10	10	10	10	10
Post-audit	7	0	0	0	0	0
Total	100	79	74	74	59	22

The overall mean index = (79+74+74+59+22) /5= 308/5=61.6

7.6 Evaluation of the Study Objectives:

This section presents an evaluation of the data obtained via questionnaire and interview, annual reports, financial statements, Government documents and other sources relating to the five Bahraini companies used in this study. This evaluation is based on the four research objectives set below:

First objective: To identify capital budgeting procedures which are workable in the Bahraini culture and economy, so that, over time, knowledge of these procedures can be disseminated widely throughout Bahraini enterprises.

Second objective: To determine the extent of usage of discounted cash flow techniques (DCF) in the evaluation process of capital investment projects among the selected Bahraini companies.

Third objective: To investigate the capital budgeting practices for a comparable sample of British companies carefully selected for this purpose.

Fourth objective: To conduct a comparison of capital budgeting practices followed by Bahraini companies and their British counterparts and to evaluate their degree of compliance with the capital budgeting system adopted in this study.

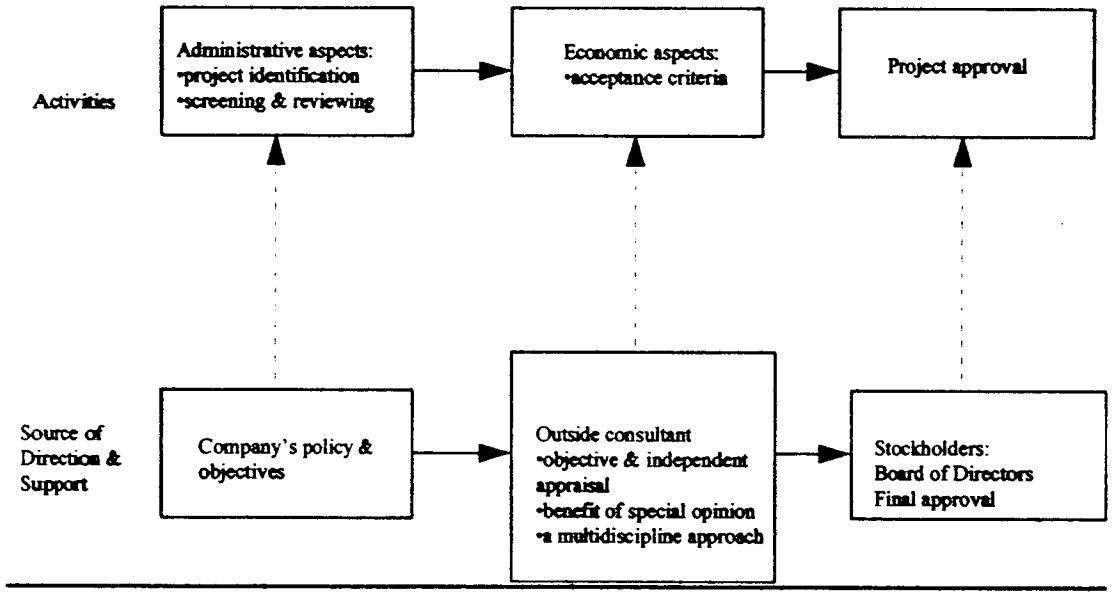
7.6.1 Evaluation of First Objective:

From the in-depth interviews with the officials responsible for capital investment decisions in the Bahraini companies, the capital budgeting process of these companies is composed of three stages: (1) administrative aspects and procedures, (2) evaluation and selection, and (3) decisions and implementation . Figure 7.1 depicts the activities involved in this process.

7.6.1.1 Administrative Procedures:

The capital budgeting process of the selected Bahraini companies was found to be guided by a formal procedure instituted by the firm's top management. This procedure sets out detailed guidelines which need to be followed by all officials responsible for the capital budgeting process. Out of the five Bahraini companies, four were found to have a comprehensive capital budgeting manual. The other company (Bfinl) has written procedures in the form of management circulars, issued by top management from time to time to guide the investment process.

Figure 7.1 : Capital budgeting process of Bahraini companies- Three stage-framework



Capital expenditures are classified as capital investment and operating expenditures. Capital investment expenditures concern the company's long -term interests, such as capacity expansion, introducing a new product or entering a new market. Operating expenditures are routine outlays that are required to maintain the company's present level of operations, and include both mandated projects and replacement projects. Mandated projects are those required by law or policy, such as the installation of pollution control equipment or the installation of equipment for the safety of employees.

Replacement expenditures are for the replacement and/or renewal of the existing fixed assets and facilities. The investment capital expenditure category usually requires much larger financial commitments than operating capital expenditures. One company divides its capital expenditure into four categories according to the types of products being produced. Another divides its capital expenditure into two categories; new equipment and replacement.

Project capital ventures are generally identified by the company's top management (the chief executives or other functional or departmental managers) or the members of the company's board of directors. In one company, most new projects were initiated by the top management team. Three companies have a master plan of major long-term capital projects which were identified when the companies were established. Based on the master plan , the chief executives(who also represent the board of directors) select a few projects which they consider to have very good potential for generating profit.

These highest priority projects are then communicated to the capital budgeting division,which conducts a preliminary investigation as to the projects' viability. The

preliminary study report is then submitted to the chief executive for review and initial approval. In case of the other two companies, major projects are identified by the management committee as a result of regular meetings where current problems are discussed together with the strategies to pursue in order to achieve the company's objectives.

Replacement capital expenditure is usually identified by lower level staff members when they prepare the annual operating budget. Also, the lower level staff members identify minor capital projects when they provide regular feedback to the management through reports about the divisions' strengths, weaknesses, inefficiencies, and opportunities.

All five companies have long-term capital expenditure programmes which extend over the next five years. Two of the companies have specialised divisions to plan and control the capital expenditure and investments, which are headed by high-ranking officials who directly report to the firm's chief executives. These divisions are responsible for conducting the necessary investigations to verify the viability of identified capital projects. The existence of these special divisions clearly indicate the companies' recognition of the role of capital budgeting in the companies' activities. Three companies have no special divisions to handle capital budgeting activities. The capital budgeting activities in these companies are distributed among the officials or division heads through formal and informal communication.

Departmental budgets are prepared every year and presented to the top management. Amounts requested are usually approved for operating capital allocations, unless the budget increment exceeds a specified percentage (20 per cent) of the allocated amount.

7.6.1.2 Evaluation and Selection:

Before deciding on the capital projects proposals, a detailed description and justification is required including estimating cash flows over the expected life of the project. Those companies with a specialised department to handle capital budgeting activities, the estimation of cash flows and other analyses are usually prepared by the department members with information collected from other operating departments, including finance. For companies without a separate capital budgeting department, the respective department managers prepare the necessary detailed analysis for a proposal. A feasibility study is prepared on the basis of this data to be submitted to the board of directors through a top management committee. If the project is expected to use new or advanced technology, or if it involves a large sum of money, foreign consultants are sought to conduct the necessary feasibility studies. The board of directors makes the decision regarding the use of foreign consultants based on the advice of the management committee. Three Bahraini companies confirmed that they employ foreign experts to conduct feasibility studies on large capital projects, particularly if the estimated project costs exceed BD1 million or if the project involves the use of complex or high technology. These companies normally employ the same consultants to supervise the implementation of such major projects. The other two companies have a team to conduct the feasibility studies of new projects, but their results need to be supported by foreign experts before being considered by the top management.

All Bahraini companies, except one, have a specialised committee to review capital expenditure proposals. The members of the specialised committee are usually the same people as the members of the top management committee. This committee serves as a screening body before project proposals are forwarded to the board of directors for final approval.

The selection process involves deciding which projects are likely to be profitable and in the best interest of the company. This is based on certain specified criteria-both economic and social. For investment projects, the emphasis is on the expected rate of return which is computed using discounted cash flow techniques or the accounting rate of return. Four of the companies use a number of evaluation techniques to estimate the expected return from an investment. One company relied exclusively on the payback period in evaluating its investment projects. The officials in this company indicated that the payback period is more applicable for their investment projects than any other technique .

Assessment of project risk is required before final approval of the project. Sensitivity analysis and shortened payback period were found to be applied by four companies. One company stated that the assessment of risk is difficult to quantify and, as such, is based on intuition and personal judgement. The same company indicated that this issue is entirely left to the board of directors to decide. Those companies which employ the payback period indicated that they would decrease the payback period for more risky projects.

Approval levels for capital expenditure proposals vary according to the type and expected cost of the project. Investment projects require the approval of the board of directors, while replacement expenditure can be approved by the management committee, the managing director (chief executive) or other functional managers, depending on the estimated cost of the project. Two of the companies (Banoco & Banagas) require the approval of the Ministry of Oil and Industry before any major project can be implemented. Such approval in most cases is routine. This is to make sure that such a project is in line with the industrial development plan and guidelines set out by the Ministry. In the case of one company, the power to approve capital

projects is delegated down the management ladder with less expensive projects being decided at the lower level, while more expensive ones are decided by the top management.

Regarding capital expenditure control, cases of cost overrun or changes in the scope of approved projects are handled according to the capital expenditure type. In companies with a separate capital budgeting division, any cost overrun or changes in the scope of the approved project are handled by the capital budgeting department. If the amount used to rectify any significant changes in the projects exceeds a certain limit, the approval of the board of director will become necessary.

Allocation of funds to various projects, after their approval, is done by the finance department in the respective companies. Funds can only be spent in accordance with specified spending guidelines instituted by the company's top management. All requests for spending the approved funds should be made on specific capital expenditure requisition forms and submitted through the proper channel for approval by the finance department.

The choice of hurdle rate among companies also varies. It was found that the cost of borrowing funds was used by four companies as a benchmark against which their hurdle rates are set. These companies indicated that they use debt to finance their capital expenditures, especially if the project is large. Small-scale projects are usually financed with internally generated funds and thus a high return is not expected. One company indicated that the hurdle rate is a decision entirely taken by the board of directors. If a new project is part of an on-going project or it is necessary to increase the reliability of the operation, then such projects might be approved regardless of their expected rate. Another company indicated that the borrowing rate, plus a 10 to

15 per cent premium, is usually applied as a discount rate depending on the type of project under consideration.

7.6.1.3 Implementation:

The implementation process follows the approval of the project. Two companies have special project departments to handle the details of project implementation. The responsibility of these departments is to request a bid, select contractor (s) for various aspects of the project, and prepare the necessary contract documents. In another company, this responsibility rests with special staff within the technical services department.

The accountant's role in the capital budgeting process in some companies is limited to providing financial advice on the proposed projects and monitoring project expenditures. Supervising the project contractor, to ensure that the project is implemented in accordance with the approved plan and within the budgeted costs and time allowed, is the responsibility of the departments which proposed the projects. These departments are also required to prepare monthly and quarterly progress reports for submission to the management committee. The finance department of which maintains financial data as well as data on all projects in progress, prepares monthly and quarterly financial reports on all the projects.

7.6.1.4 Post-Completion-Audit:

None of the Bahraini companies indicated that they had a formal system of post-auditing capital expenditure projects. These companies collect data on all capital projects, but they do not formally conduct a comparison between what is achieved and what was expected. Most of these companies feel that the members of the management committee or any other special approving body are jointly responsible for the

achievement of the new project. These companies are of the opinion that post-audit procedures are doing more harm than good and are not suitable to the country's culture.

7.6.2 Evaluation Of The Second Objective:

To Determine the Extent of Usage of Discounted Cash Flow Techniques (DCF) in the Evaluation Process of Capital Investment Projects Among Bahraini Companies:

Four of the Bahraini companies in the sample are involved in petroleum, chemicals, and heavy manufacturing (Banoco, Alba, Gpic and Banagas), and are characterised as being capital-intensive by nature. These companies are involved in large and expensive projects that require detailed analysis and evaluation before the investment proposals can be accepted for implementation. These four companies have a comprehensive capital budgeting system or well written procedures to guide their investment process. One of these companies set up a specialised division within its organisation to co-ordinate capital budgeting activities. Most project proposals must be evaluated using both the discounted and non-discounted cash flows techniques with the internal rate of return cited as being the most popular among the DCF techniques. One company, though it does not fall under the heavy industries classification, spent around BD 10 million for capital expenditures over the period under review (1992-1993). Most of their capital budget was spent for operating capital purposes, rather than for project capital. Personal judgement of the managers involved plays an important role in evaluating operating capital proposals. In the case of its capital proposals, the company frequently uses the average rate of return and the payback period as the primary evaluation tools. Such DCF techniques are new to the company and the managers are not familiar with their long-term application. Because the strategic nature of the

company operation involves providing basic commodities for the people, their investment proposals are not subject to rigorous economic analysis most of the time. According to one company official, techniques such as the payback or the accounting rate of return, are sufficient for determining the viability of the proposals. The general manager of the company also indicated that the board of directors plays a very important part in arriving at investment decisions, particularly for project proposals.

7.6.3 Evaluation of the Third and Fourth Objectives:

The third objective of this study- The Capital Budgeting Practices of the British Companies- has been investigated and presented in Chapter Six. The following section will present the evaluation of the fourth objective.

7.7 Comparison Between the Responses to the Study Questionnaire of Bahraini Companies and their British Counterparts:

7.7.1 Definitions and Categories of Capital Projects

Among the primary criteria used for the identification of investment opportunities are the basic categories and definitions of capital expenditure projects (Haka, 1983). All five Bahraini companies indicated that the size and the economic life of the proposed expenditure define whether or not it is regarded as a capital investment. Only 80 per cent of British companies ,however, indicated that they use these two criteria for defining their capital expenditure.

In addition to definition, most of British and Bahraini companies also divide the projects into a variety of categories. Table 7.6 presents a classification of capital investment projects that are undertaken by British and Bahraini companies. Dean (1951b), Weaver (1974), Piper (1980), and Rosenblatt (1980) argue that clearly-defined and communicated procedures are particularly effective when some system of

project classification is in operation, specifying aspects of the required method for evaluating investment projects, documentation, depth of analysis, degree of urgency and level of project approval.

Table 7.6: Capital Expenditure Categories : Comparison between Bahraini and British Companies

Project Classification / British Company	Replacement	Cost Reduction	Capacity Expansion	Necessity	Improvements	Number of project types
3	X	X	X	X	X	5
3	X	X	X	X		4
2	X	X		X		3
11	X	X				2
Total 19						
Bahraini Companies						
Banoco	X	X	X	X	X	5
Alba	X	X	X	X	X	5
Gpic	X	X	X	X		4
Banagas	X	X		X		3
Bfml	X	X				2

According to the information provided in Table 7.6, replacement projects appear to be the most common type of projects undertaken by both British and companies Bahraini. These projects are necessary for maintaining the firm's productive capacity. The cost reduction projects show the same rank as the replacement projects. Cost reduction projects have become relatively common in recent years as a corporate response to increased competitive pressure. Necessity or mandatory projects are well represented in the Table, specifically in the case of Bahraini companies. For these projects, companies do not require a full blown financial analysis as is required for such categories as expansion projects. Such projects often cannot be quantified in terms of

incremental benefits (Fremgen, 1973, and Rosenblatt, 1980). Examples are projects that meet environmental, health and safety, and legal requirements. These projects, it could be argued, have an economic root in that failure to implement them can cost more in the long run through heavy government penalty, expensive lawsuits, or loss of employee morale (Mukherjee, 1987). Capacity expansion projects are also represented in the Table as these projects are normally undertaken to meet the growing demand for corporate products. Analysing these projects includes varying the hurdle rate and/or the payback period by project type. For example, the cost reduction category,according to one company, would require a medium return on a medium investment, while a project in the capacity expansion category would require high returns on a large investment. Haka, (1983) argues that top management can design the definitions used for capital budgeting or emphasise one or more category of projects at the expense of others so as to influence the investment search. By utilising these techniques, managers can in effect control the types of investment opportunities that are sought by the project proposers.

7.7.2 Administrative Procedures and Selection Process:

Table 7.7 presents the frequency of usage of administrative procedures and selection process by both British and Bahraini companies. The results indicate that while 80 per cent of Bahraini companies prepare long-range capital budgets, only 64 per cent of British companies do so. The high percentage of Bahraini companies that have this requirement is due in part to the fact that the government has a significant shareholding in these companies. Such a strong governmental presence calls on them to prepare long-range capital budgets which are partially tied to overall government economic plans.

Regarding the search for investment projects, the results in Table 7.7 indicate that 64 percent of British companies normally conduct a specific search for investment projects. This activity is likely to enhance these companies chances of identifying profitable investment opportunities.

Table 7.7: Administrative Procedures and Selection Process- Comparison Between British and Bahraini Companies

Companies / Administrative procedures before project approval	British Companies 36 (100%)	Bahraini Companies 5 (100%)
Preparation of a long- range capital budget	23 (64)	4 (80)
Requirement for a specific search for investment projects	23 (64)	0 (0)
Existence of a formal screening body	22 (61)	4 (80)
Formal risk analysis	23 (64)	3 (60)
Evaluation techniques (DCF)	36 (100)	4 (80)
Existence of at least one full-time capital budgeting staff	22 (61)	3 (60)
An up-to-date capital Budgeting manual	22 (61)	4 (80)
Administrative Procedures After Project Approval		
Methods for controlling expenditures for major projects	24 (67)	5(100)
Methods for controlling the completion time period of major projects	17 (47)	1(20)
Formal post-audit system	20 (56)	0 (0)

However, none of the Bahraini companies was found to engage in a regular search for investment projects which partially limits these companies chances of discovering potential investment, as was revealed by the interviewees. However, it is noteworthy that all Bahraini companies were aware of the origins of their capital investment ideas. The majority of ideas arose from managers, and some received contributions from the whole range of their staff. Some sources are casual, and some were team efforts. Stimulation and generation of investment ideas is an important stage in the capital budgeting process. No matter how sophisticated an organisation's attention to its capital budgeting system is, little can be achieved without good capital investment ideas. This is especially true as organisations move into an era where innovation is very crucial to their success. (Northcott, 1992).

With reference to other administrative aspects before project approval, the screening of capital ideas, existence of full-time capital budgeting staff, and an up-to date capital budgeting manual, the results show that Bahraini companies and their British counterparts are similar as they differ by less than twenty per cent in each one of these areas. It is noteworthy that both groups are identical with regard to the requirement for having at least one full-time capital budgeting staff. Klammer (1972), suggests that once staff are assigned, the capital budgeting system rapidly becomes more sophisticated because there is the time, opportunity, ability and interest to develop new methods.

Table 7.7 also shows that 64 per cent of the British companies have formal risk analysis method and 100 per cent apply DCF techniques (IRR and/or NPV) in evaluation their capital investment projects. The percentages for Bahraini companies are 60 per cent and 80 per cent respectively.

Moving on to the operational framework and budgeting control, the Table shows that eighty per cent of Bahraini companies have an up-to- date capital budgeting manual versus 61 per cent of British companies. Maintenance of such manuals might reasonably be expected to predominate in Bahraini companies in which the Government has a controlling interest. In these companies, planning and decision-making follow laid-down procedures and operate in a rational systematic manner, usually involving a number of personnel.

Regarding administrative aspects after project approval, the results indicate that 67 per cent of British companies have methods for controlling their capital expenditure, whereas all Bahraini companies (100 per cent) do so. This finding is not surprising given the fact that a large portion of project funding is normally contributed by the Government, which requires these companies to adopt a wide range of expenditure controls to ensure the efficient allocation of the country's limited resources among different investment projects. Usually, control is established by accounting procedures for recording expenditures. Progress expenditure reports normally include actual expenditure, amounts authorised to date, amounts committed against authorisation, amounts authorised but not yet spent, and estimates of future costs to completion. However, as the results indicate (Table 7.7), Bahraini companies were found to have limited control over the project completion time period, (20 per cent), while 47 per cent of British companies had this requirement. It is interesting to find that the percentage use of this aspect of administrative procedures (controlling the completion time period of major investment projects) for Bahraini and British companies would be the same as that of the management science techniques (MST) Usually, techniques such as CPM (critical path Method) and PERT (Project Evaluation and Review Technique) are used as procedures for scheduling and controlling projects. Finally, the

issue of post audit was investigated in the study. Comparing the two groups with regard to this administrative aspect, reveals that more than half of the British companies (56 per cent) use post-audits for their investment projects, whilst none of the Bahraini companies has this requirement. The reasons for not having a formal post-audit system are commonly shared between Bahraini companies and British companies which do not use post-audits. These reasons are: Firstly, environmental conditions or economic uncertainty challenge the benefits of post-audit. Secondly, the high administrative cost of introducing a formal post-audit system compared to its perceived benefits, is regarded as an equally important factor for not using post-audits for both group of companies. Bahraini companies, however, stressed the importance of exercising control over funds requested for capital expenditure. Lack of resources was not considered an important constraint on application of post-audits by either British or Bahraini companies.

7.7.3 Selection Process:

7.7.3.1 Evaluation Techniques:

Evaluation techniques used by Bahraini companies were compared with those used by their British counterparts. The results of the comparison are presented in Table 7.8. These results show that companies in both groups are using more than one technique in the evaluation of their investment projects. Of the non-sophisticated techniques, it appears that the payback period is the most popular among Bahraini companies (100 per cent), whereas accounting rate of return is the most popular among British companies (61 per cent). Of the sophisticated techniques (DCF) used by companies, internal rate of return (IRR) seems to enjoy popularity among both British and Bahraini companies (92 per cent and 80 per cent, respectively). There are four

principle reasons for the preference for IRR by British and Bahraini companies in the survey. These are: (1) the IRR provides managers with a simple measure of investment worth which is expressed in percentage terms, (2) the IRR approach has the advantage that it is not necessary to know the cost of capital in order to undertake the NPV calculation. (3) IRR is a convenient way of selecting among competing capital projects, and (4) IRR allows the separation of its calculation from its application as a decision tool. This allows the analyst to concentrate on the collection of data that is required for producing a proposal's IRR, then management receives the proposal and decides the cut-off rate (Pike & Dobbins, 1986).

Table 7.8: Evaluation Techniques used by British Companies and Bahraini Companies

Companies / Evaluation techniques	British companies 36 (100%)	Bahraini companies 5 (100%)
Unsophisticated techniques (PB, ARR)		
Payback period (PB)	20 (56)	5 (100)
Accounting rate of return (ARR)	22 (61)	3 (60)
Sophisticated techniques (IRR,NPV)		
Internal rate of return (IRR)	33 (92)	4 (80)
Net present value (NPV)	7 (19)	2 (40)

7.7.3.2 Risk Analysis and Management Science Techniques:

Risk assessment methods used by the Bahraini companies were compared with those used by their British counterparts. The results of the comparison are presented in Table 7.9. Three methods are commonly employed for analysing risk: shortening payback period, raising the required rate of return, and sensitivity analysis.

Three Bahraini companies out of five (60 per cent) versus 23 British companies out of 36 (64 per cent) claim to formally apply risk assessment in their investment decisions. Table 7.9 shows that risk adjusted discount rate is the least applied method by both groups of companies while the popularity of sensitivity analysis is shared between them. Table 7.9 also shows that none of the Bahraini companies applies the more sophisticated risk adjustment techniques, such as the capital asset pricing model or probability analysis. The environment in which these companies operate makes it very difficult to apply market based methods. Variable inputs necessary for applying such techniques are not yet developed. Furthermore, interviews with Bahraini managers revealed that they exercise personal judgement, in conjunction with formal risk assessment methods, in reaching an investment decision to account for a number of qualitative factors which are difficult to quantify.

Use of management science techniques seems to be still in its infancy and especially for the Bahraini companies in the survey. Mathematical programming, decision theory and computer simulation are not used in most cases. Only one Bahraini company out of five (20 per cent) uses PERT (Project Evaluation and Review Technique) while the British companies exhibit an almost similar percentage usage of this technique. The Bahraini company which indicated that it used PERT method is the same one that had a formal method for controlling the completion time period of major projects.

Table 7.9: Risk Assessment Methods used- Comparison between British and Bahraini companies

Companies / Risk assessment methods	British companies 23*(100%)**	Bahraini companies 3*(100%)**
Shortening payback period	7 (30)	3 (100)
Risk adjusted discount rate	6 (26)	2 (67)
Sensitivity	14 (61)	3 (100)
Probability analysis	3 (13)	0

* Number of companies which formally analyse risk
**Percentage of companies which formally analyse risk.

One Bahraini manager stated: "*We realise that these techniques are available to assist capital budgeting decisions and it will not be surprising to find greater use of these techniques among Bahraini companies in the future*".

7.7.4 Trends in the Capital Budgeting System:

While 22 British companies (61 per cent) indicated that their capital budgeting system had become more sophisticated over the past five years, four Bahraini companies (80 per cent) claimed the same. The same four Bahraini companies indicated also that their capital budgeting system had become more effective in evaluating and controlling projects against 18 (50 per cent) and 13 (36 per cent) for British companies respectively. Interviews with Bahraini managers reveal that sophistication has been achieved through the employment of multiple evaluation criteria and risk recognition.

7.7.5 The Capital Budgeting Sophistication Index:

Table 7.10 shows the mean score for each element of the capital budgeting system for both British and Bahraini companies. The mean index for each element is calculated by

Table 7.10: Mean Indices of Capital Budgeting Components for British and Bahraini companies

Companies / Capital Budgeting Components	British companies	Bahraini companies
Long-range capital Budget	9.2	11.2
Evaluation techniques	23	20.7
Search for alternatives to capital investments	9.5	0
Formal screening and reviewing committee	7.3	9.5
Risk analysis	7	6.6
Expenditure control	6.3	10
Post-audits	3.8	0
Management science techniques	2.8	1.2
Full-time capital budgeting staff	2.4	2.4
Total	71.3	61.6

summing the scores of all companies for the element in question, and dividing by the total number of companies. The sum of these indices produces the capital budgeting mean index for Bahraini and British companies. Table 7.10 shows that the level of sophistication of capital budgeting system in Bahraini companies, is lower than that in British companies. The score for Bahraini companies regarding certain elements of the capital budgeting index is relatively higher than the same score for British companies, (i.e. preparation of long-range capital budget-11.2 for Bahraini companies versus 9.2 for British companies, and expenditure control-10 for Bahraini companies and 6.3 for British companies). This disparity, however, might have been the result of the nature of the respective questions. The term "formal", as used in the questionnaire, may be

strictly defined by British companies, while, the same term could be broadly defined by their Bahraini counterparts, as revealed in the interviews conducted with those Bahraini companies.

Regarding long-range capital budgets, the sizeable share of Government ownership in those companies puts more emphasis on those budgets as they are considered part of the national planning for various sectors of the economy. Moreover, Government is the main supplier of funds for capital investment projects and, as such, those plans are normally required to determine the required financing for future periods. Concerning expenditure control, Government activities are controlled and evaluated on a regular basis to provide feedback for future planning, as well as to ensure the efficient use of the country's scarce resources. As a result, expenditure control appears to be a common activity for all Government owned companies.

Based on the above, it appears that the study hypothesis stating that the capital budgeting practices of Bahraini companies differ from their British counterparts can be accepted regarding the following areas (sub-hypotheses),(reference is made to Table 7.7)

1. Systematic search for investment projects- the difference in the percentage usage between the two groups is more than twenty (64 per cent for British companies versus 0 per cent for Bahraini companies).

2. Expenditure control- the difference in the percentage usage is more than 20 per cent (67 per cent for British companies versus 100 per cent for Bahraini companies).

3. Post audits - the difference in the percentage usage is more than 20 per cent (56 per cent percent for British companies versus 0 per cent for Bahraini companies).

4. Total usage of management science techniques - the difference in the percentage usage is more than 20 per cent (47 per cent for British companies versus 20 per cent for Bahraini companies).

Furthermore, the comparison indicates that the following sub-hypotheses can be rejected (British and Bahraini companies are similar).

1. Existence of a formal screening body- the differences in the percentage usage is less than twenty per- cent (61 per cent for British companies versus 80 per cent for Bahraini companies).

2. Evaluation techniques-based on the frequency of usage of DCF techniques- the differences in the percentage usage is less than 20 per cent (100 per cent versus 80 per cent for Bahraini companies).

3. Risk analysis- based on adoption of formal risk analysis methods-the difference in the percentage usage is less than 20 per cent (64 per cent for British companies versus 60 per cent for Bahraini companies).

4. Capital budgeting manual- regarding the existence of a capital budgeting manual, both groups of companies are similar in this aspect since the percentage difference is less than 20 per cent (61 per cent for British companies versus 80 per cent for Bahraini companies.

5. Existence of at least one full-time capital budgeting staff- the difference in the percentage usage is less than 20 percent (61.1 per cent for British companies versus 60 per cent for Bahraini companies).

6. Preparation of a long-term capital budget-the difference in the percentage usage is less than twenty per cent (British companies 69 per cent versus 80 per cent for Baharini companies).

Chapter Summary

This chapter presents the second phase of the analysis and is directly related to phase one presented in Chapter six. The chapter is divided into seven sections. Section one is an introduction. Sections two and three provide a profile of the Bahraini companies and key issues influencing the capital investment process in these companies. Bahraini companies' responses to the study questionnaire and the computation of capital budgeting indicies for the same companies are presented in sections four and five. Section six presents the overall evaluation of the study objectives. Section seven provides an overall comparison between the capital budgeting practices of Bahraini companies and their British counterparts. The interview approach via a structured questionnaire was used to collect data from Bahraini companies to study their capital budgeting practices.

There is enough supporting evidence to indicate that most Bahraini companies in the sample presently use various aspects of administrative procedures, selection techniques and expenditure control in their capital expenditure decision-making process. The study also indicates that the use of management science techniques is almost non-existent, with the exception of one company (Bahraini National Oil Company, Banoco). The use of management science techniques by Bahraini companies has not received wide acceptance. Since these techniques are relatively new to Bahraini companies, it was anticipated that not many companies used them. These techniques are new tools and should be handled by specialists. The lack of executives familiar with them is a major factor contributing to their low acceptance by Bahraini companies.

The chapter also provides an overview of the investment process in Bahraini companies and the main activities involved. The investment process is divided into three phases. The first phase covers the administrative aspects which include project

identification, and screening and reviewing of activities. The second phase covers the economic analysis and project viability, in terms of meeting the acceptance criteria dictated by the company. The final phase covers the project approval and subsequent implementation of the project. Phase One is normally conducted in compliance with the company's policy and objectives. The second phase (economic analysis) in most cases is supported by an outside consultant for the purpose of providing an independent and objective appraisal. The third phase requires the final approval of the stockholders in order to go ahead with the project.

A comparison between the capital budgeting practices of Bahraini companies and their British counterparts reveals that both groups of companies share common methods and procedures in their practices. These similarities are observed in the following areas: the preparation of a long-range capital budget, existence of a formal screening and reviewing body, use of sophisticated evaluation techniques and adoption of formal risk analysis.

One important aspect of the findings is the determination of the degree of sophistication of the capital budgeting system of Bahraini companies and their British counterparts. Bahraini companies were found to have a lower sophistication index than their British counterparts. The absence of some elements or low usage of others comprising the sophistication index, were cited as reasons for those differences.

Based on the findings of this survey, it appears that there is a considerable degree of compliance by British and Bahraini companies with the capital budgeting system adopted in this study. There appears to be sufficient common ground to draw the following comparisons and conclusions:

A. The British and Bahraini companies in this study appear to be as structured in their approach to capital budgeting as the larger companies as reported by McIntyre and Coulthurst (1985) and Pike (1996).

B. The systematic search for ideas and the post-audit were the two areas which have been found to be absent in Bahraini companies as compared with British companies.

C. Both groups of companies indicated that they apply multiple criteria in evaluating their investment projects with the internal rate of return (IRR) being the most popular DCF technique among the two groups and net present value (NPV) being the least popular technique.

D. Capital rationing was found to be internally, rather than externally imposed on the capital investment programme of the two groups of companies.

E. Management science techniques were found to be of limited application by the two groups of companies, with British companies having a higher percentage of usage.

PART FOUR

CHAPTER EIGHT

SUMMARY AND CONCLUSIONS

This final chapter of the thesis is divided into eleven sections. These sections are presented in the following order:

1. Overview of the Study.
2. Outline of the Research Process.
3. Summary of the Main Findings.
4. Comparison between the Findings of this Study and the Findings of Similar Capital Budgeting Studies in the Gulf Region
5. The Context in which Capital Budgeting Techniques are used
6. Do the Capital Budgeting Practices of the Bahraini and the British Companies Conform to the Capital Budgeting Theory?.
7. Implications of the Study.
8. Study Conclusions.
9. Contributions of the Study.

   Concluding Comments.

8.1 Overview of the Study:

The primary purpose of this study has been to conduct a comprehensive investigation of the capital budgeting investment process adopted by major Bahraini industrial companies as well as a sample of British companies with comparable characteristics. The lack of empirical research on this issue was the prime motive for undertaking this study. Specifically, this study was designed to achieve the following objectives:

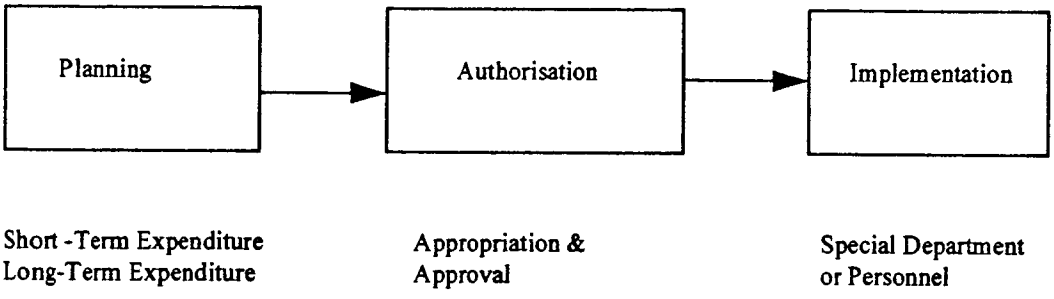
1. To identify the capital budgeting practices workable in the Bahraini culture and economy so that, over time, knowledge of these practices could be disseminated widely throughout Bahraini enterprises,
2. To determine the extent of usage of discounted cash flow (DCF) techniques in the evaluation process of capital investment projects among the Bahraini companies,
3. To investigate the capital budgeting practices of comparable British companies carefully selected for this purpose, and

4. To conduct a comparison of capital budgeting practices followed by Bahraini companies and their British counterparts.

The study provides enough supporting evidence to show that Bahraini companies have well-defined capital budgeting policies, and are well organised to conduct various activities related to their capital budgeting process.

The capital budgeting process of the Bahraini companies is usually guided by a formal procedure instituted by the company's top management. This procedure sets out detailed guidelines which need to be followed by all officials responsible for the process. From the five Bahraini companies, four of them were found to have a capital budgeting manual, while the fifth one has written procedures in the form of management circulars, issued by the top management from time to time in order to guide the capital budgeting process. Based on the review of these manuals, the approval of expenditures can be broadly described in a three-stage framework (Figure 8.1): planning stage, authorisation stage, and implementation stage.

Figure 8.1 : Expenditure Approval Process



It is important to point out that these manuals are not equally comprehensive. Some of them explain in considerable detail every stage of the expenditure approval process, while others emphasise a particular aspect of the process, mentioning other stages only in passing.

With reference to the British companies, this study suggests that although some deficiencies were observed in the capital budgeting system in a minority of them, the overall results show that small and medium-sized companies are using adequate procedures and methods in their investment decisions.

The comparison of capital budgeting practices between Bahraini companies and their British counterparts indicates that: (1) Both the Bahraini companies and the British companies follow a structured approach to their capital investment decisions (systematically well defined steps or activities), (2) The two groups of companies exhibit a great similarity in certain key areas of their capital budgeting system. These areas include: existence of a formal screening body, evaluation techniques, existence of at least one capital budgeting staff, and risk analysis and (3) Dissimilarities were observed in other areas. These areas include: the systematic search for investment opportunities, post-audits of capital investment projects, application of management science techniques, expenditure control, and preparation of a long-term capital budget. These similarities and dissimilarities are reflected in the capital budgeting sophistication index for Bahraini companies and their British counterparts that was specifically developed for this study. The British companies appeared to be relatively more sophisticated than Bahraini companies, as indicated by the sophistication score.

8.2 Outline of the Research Process:

The research process was undertaken in six phases (Figure 8.2). The first phase (the environment) provides an overview of Bahrain's economic environment. This review is essential for understanding the current nature of the capital investment process and the factors that influence this process. Bahrain, being a small developing country with limited economic resources, is keen to use these available resources in the most efficient manner.

The second phase provides a literature review on the capital investment process and the critical issues surrounding this process. Capital budgeting is regarded in theory as a decision-making process leading to investment in capital projects. Therefore, the review is important in providing a framework for the study and in serving the function of discovering findings from previous research on the general problem. It is also necessary for establishing what theories are relevant to the study being undertaken and assisting in establishing an appropriate research methodology and research procedures for study. Due to the lack of literature on capital budgeting theory in developing countries in general, and in Bahrain in particular, the review draws heavily on the body of literature originating in developed countries.

In the third phase, the study begins by integrating material obtained from the literature on capital budgeting into a conceptual framework applicable to capital budgeting practices. The nine components of capital budgeting practices prescribed in the literature were used to construct the capital budgeting system used in this study.

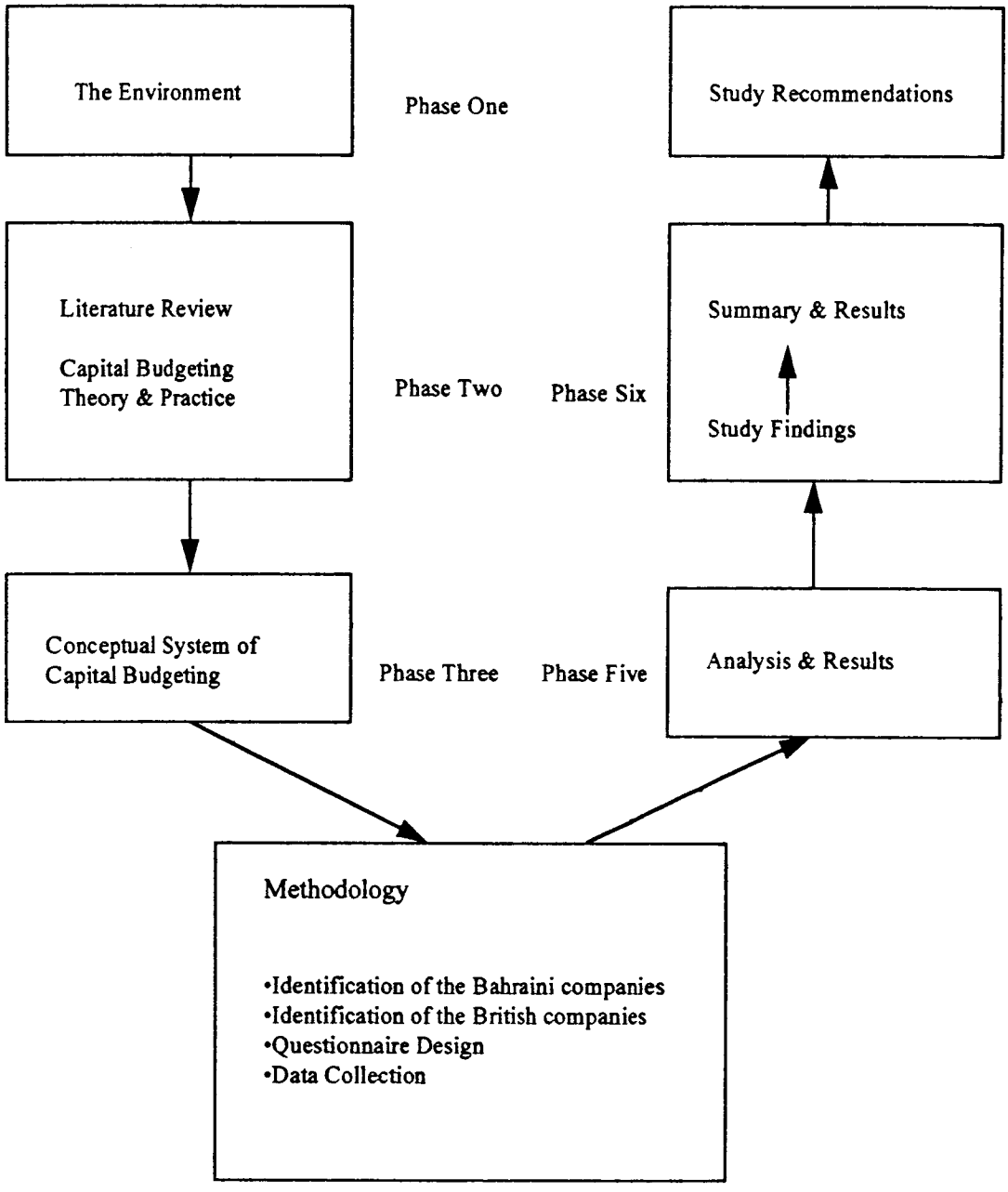
The fourth phase, focuses on the approach used to select the companies as candidates for the study and the methods and instruments utilised to collect the necessary information sought by this study. The comparative procedure followed in this study

involves comparing a selected sample of Bahraini companies with a comparable group of British companies in the area of capital budgeting practices.

The major criteria used to select the British companies were based on their being similar to the Bahraini companies in terms of a number of attributes, which were identified in the literature as influencing the nature and sophistication of the capital budgeting systems adopted. These attributes include size of company expressed in terms of total assets or turnover, capital intensity and type of industry. Sixty-seven British companies were selected to be included in the sample and received the questionnaire. Completed questionnaires were received from 36 companies-a response rate of 54 per cent which is more than average for this type of survey.

The fifth phase, consists of analysing the responsis to the study questionnaire, evaluating the study objectives and hypotheses. The study research hypothesis is" ***the capital budgeting practices of Bahraini companies differ from those adopted by their British counterparts***". In order to assess this relationship, the main hypothesis was broken down into nine variables representing the nine components of capital budgeting practices as identified in the literature. These variables (sub-hypotheses) are the basis for examining this relationship. In the final phase of this study, a summary and conclusion of the study are provided. The contributions, implications and recommendations for future research are highlighted.

Figure 8.2: Outline of the Research Process



8.3 Summary of the Main Findings:

The main findings of the study include:

- **British Companies**

1 Capital budgeting practices, as defined by this study, appear to be systematically applied by the British companies participating in this study. Preparation of a long-term capital budget, the search for alternatives to capital investment projects, existence of a screening and reviewing body and full-time capital budgeting staff, application of evaluation techniques, use of formal risk analysis, exercising control over capital expenditure and, conducting post-completion audits on capital projects have been found to be used by more than 50 per cent of the sampled companies.

2. In the area of capital evaluation techniques, the results indicate that both DCF techniques and less sophisticated techniques (payback and accounting rate of return) are used almost equally by the British companies regardless of their size. Among the companies using management evaluation techniques, roughly two-thirds of companies employ DCF techniques, and about the same proportion use the accounting rate of return (ARR) or the payback (PB) in combination with one DCF technique (either IRR or NPV). Furthermore, the most popular DCF technique is that which provides a rate of return measure- the internal rate of return (IRR). This is attributed to the appeal of percentage (Levy and Sarnat, 1978, and Evans and Forbes,1993), because it allows practitioners to use rates of return to judge investment projects, irrespective of their different time scales and cash outflow, without the use of a predetermined cut-off rate (Mills, 1988b and Carsberg & Hope, 1976). While 90 per cent of all companies indicate that more than one technique is employed, there is a tendency for the net present value to appear less often than other methods in those cases where multiple techniques are employed.

While payback period features very clearly and is found to be the most popular single evaluation technique in previous studies, the findings of this study indicate that companies are using DCF techniques more than payback with the internal rate of return (IRR) being the most favoured DCF technique (92 per cent).

3. Size and industry type appear to have no real influence upon the capital budgeting practices adopted by the British companies participating in this study. This indicates that companies, irrespective of their size and industry, approach their investment decisions in a similar manner. One explanation which can be offered to justify the absence of any major significant differences between the two groups of British companies, is the fact that most of the companies in each group are concentrated close to the border line that is used as a cut-off point for classification in terms of size of turnover. In the small group, most of the companies are concentrated in the upper part of the distribution, whereas in the medium group, most of the companies are concentrated in the lower part of the distribution. The absence of industry effect could be due to there being only three industries included in the survey. However, in contrast to the findings of this study, Pike and Wolfe (1988) found a significant relationship between size and application of certain capital budgeting practices. Pike (1996) confirmed this relationship. There are two reasons which can be offered to explain this variation. First, the British companies included in this study are small and medium-sized companies which do not differ significantly in size (Chapter 5). As a result, no significant differences are detected between the two groups regarding certain areas of capital budgeting practices. However, the absence of a significant relationship between size and investment practices does not constitute a claim that this relationship does not exist. Second, organisational change fuelled by the expansion of information technology, the growth in the availability of computer spreadsheet packages and

decisions-making aids, and managers becoming better educated, all contribute to the diminishing role of this relationship. The rapidly changing environment, surrounded by uncertainty, provides an incentive for companies regardless of their size to adopt more formal methods and procedures and invest in information technology in order to survive, remain competitive and stay abreast of evolving knowledge. In his most recent study, Pike, (1996) maintains the position that firm size is still significantly associated with the degree of use of DCF methods, but not for payback. Pike argues that *"size of firm influences the use of computer-based capital budgeting packages, which, in turn, influence the use of discounting methods, sensitivity analysis, and risk techniques"*(p.89).

4. Regarding the risk analysis of capital investment projects, results indicate that more than 60 per cent of British respondents have a formal method for appraising risk and uncertainty, while 37 per cent do not use such methods. This suggests that the majority of small-and medium-sized companies give explicit consideration to risk. The variety of techniques range from very simple to complex statistical analysis. It appears that the best method for accommodating risk in capital budgeting depends upon the nature of the project. The least sophisticated method of shortening the payback period is not regarded as a prime measure of risk, and sensitivity analysis is found to be among the most popular risk appraisal techniques among sampled companies. Previous research confirms the popularity of sensitivity analysis as a method for considering risk and uncertainty among UK companies (Mills, 1988b and Ho and Pike, 1991). It is most likely that the availability of sophisticated computer spreadsheet packages, capable of easily performing whatever data analysis the decision-maker may choose, has encouraged companies to conduct sensitivity analysis for the evaluation of their capital investment projects. Regarding the use of management science techniques, the

findings reveal that they are of very limited application among the sampled companies. The chi-square results indicate that size of firm has a significant influence on the usage of these techniques, whereas industry type does not have the same effect. However, the limited application of management science techniques does not come as a surprise. Pike and Sharp (1989) have reported a slow increase in the use of these techniques among large UK companies, from 11 per cent in 1975 up to 21 per cent in 1986. They predicted only a 29 per cent use of management science techniques by 1991.

One important aspect of this study has been its attempt to measure the degree of sophistication of the capital budgeting systems of the sampled companies. This has been done before but only for large companies in the UK and the US. The findings revealed that the importance of capital budgeting elements prescribed in financial literature are commonly shared between practitioners in both the UK and the US, regardless of size. That is clear from the comparison of the findings of this study and that of Kim (1982), which indicated a high degree of similarity in their perception of the relative importance of various elements of capital budgeting practices.

The findings suggest that although some deficiencies are observed in the capital budgeting systems of a minority of British companies participating in this survey, the overall study results show that small and medium-sized British industrial companies are using formal procedures and methods in their capital investment decisions.

- **Bahraini Companies**

1. Five issues were identified as having an impact on the investment decision-making process in Bahraini companies. These issues are: Government intervention, qualifications of Bahraini managers, operating environment, use of foreign consultancy for investment projects and the pressure of regional and international competitiveness. Due to its strong position in the ownership structure of the surveyed companies, the

Government of Bahrain has a powerful influence on their investment decisions. Selected investment projects, therefore, must be in line with Government economic plans. Furthermore, the bulk of project financing is provided either by the Government or through Governmental guarantees provided to private lenders.

In the area of personnel development, the companies are intensifying their programmes of training. Their primary aim is the creation of an efficient and qualified workforce capable of assuming responsibility for furthering the aims and objectives of these companies. As part of this programme, a considerable number of employees are sponsored to attend training courses, held in Bahrain and overseas, in order to familiarise themselves with the latest available technology and to develop their understanding of their chosen fields. Currently, key posts in the Bahraini companies are held by well-educated highly professional managers, who hold academic degrees from the US or the UK.

The operating environment in which companies operate is influential in shaping the capital budgeting decision process. Bahrain has long been considered the most open country of the GCC countries. The country's laws and regulations allow for free movement of capital and manpower in and out of the country. In most of the surveyed companies, Bahraini managers work alongside foreign managers - mostly from Western countries such as the US and the UK. Such interactions allow these companies to acquire managerial skills through interaction with their foreign counterparts.

Most Bahraini companies indicated that for large projects, especially those involving utilisation of advanced technology, foreign consultancy is normally requested to support the local managerial teams in evaluating those projects. In such cases, co-ordination between the foreign consultants and the local team is essential. The use of

foreign consultants also provides an opportunity for training local management on key aspects of capital budgeting decisions.

The Bahraini companies covered by this study are known to be export-oriented in nature. A large proportion of their products (for example, crude petroleum, refined petroleum products, petrochemicals, and aluminium) are intended for the export market. This export market is known to be subject to price fluctuations. In addition, competitive pressures from companies in the region, as well as from Europe and America, make these companies aware of the need to counteract and lessen these negative effects. Bahraini companies realise the importance of improving their entire investment system to achieve better utilisation of the economic resources at their disposal.

2. The investment process of Bahraini companies is divided into three phases. The first phase covers the administrative aspects which include project identification, screening and reviewing activities. The second phase covers the economic analysis, and in this phase project viability, in terms of its meeting the acceptance criteria dictated by the company, is determined. The final phase covers the project approval and subsequent implementation of the project. Phase one is normally conducted in compliance with the company's policy and objectives. In most cases, the second phase (economic analysis), was found to be supported by an outside consultant for the purpose of providing an independent and objective appraisal. The third phase is required to meet the final approval of the stockholders in order to go ahead with the project.

The only essential components lacking in all the Bahraini companies are the post-auditing procedures and the formal search for capital investment opportunities. However, informal assessment of project performance is done particularly if the project is large, complex or involves the use of new technology. Regarding sources of capital

investment ideas, the survey shows that Bahraini companies do not usually conduct a searching process to identify different investment opportunities. They actually consider investment requirements according to the particular need to be addressed. A project is considered if it arises out of a certain need or can produce a solution to a problem, provided that the project is a necessity and is compatible with the company's general strategy. Three of the companies obtained their ideas from the entire range of their employees.

3. One important finding of the study is that capital budgeting procedures and techniques used by British companies, and other various organisations in developed countries, are also being used by Bahraini companies, with the exception of an organised "search for investment ideas" and formal post-audit. The following explanations can be offered for the absence of these two activities:

a. Investment ideas are generated in an unorganised manner, or on an ad hoc basis. Investment ideas come from different sources within the company, be they the shareholders, managers, engineers or the staff members. A case in point is the Urea project when the board of directors of Gpic (Gulf Petrochemical Industries Co.), which represents the major shareholders, instructed the management to thoroughly study the project and report on its feasibility. The project department conducted the preliminary feasibility study of the project and reported back its findings, recommending the viability and profitability of the project. The project is expected to commence its operations by early 1998.

In the 1991 Annual Report of Banoco, there was reference to a production engineer who came up with an idea to reduce the amount of gas coming out from the oil separator. He considered that investment in a new technology would improve the efficiency of the operation, protect the oil from a continuous separation process and

improve the profitability of the company in the future. His idea was studied, its applicability was confirmed and was finally approved. According to a Bahraini official: "*This way of generating ideas is a means of motivating people to come up with new ideas and proposals, and then implement those found practical and viable.... they get financial rewards and sometimes get promoted, and hope of promotion is an incentive to hard work.*"

b. The lack of post-audit procedures among the Bahraini companies in this study is not surprising. Neal and Holmes (1988) also found in their studies that (post-audit) procedures are not widely adopted by firms in the UK. They also found that the adoption of such procedures cannot guarantee the success of all capital projects. The success of a project appears to be influenced by many exogenous and uncontrollable variables. A post-audit is also "*unlikely to yield insights which might enhance the quality of future expenditure decisions*" (Mills and Kennedy, 1988, p. 38). Gordon and Myres (1991) found from a survey of 213 large US firms that " *the post-audit stage is far from being a normal standard part of the capital budgeting process*"(p.42). They found that the number of companies that can be termed as having "adequate" post-audit procedures is very small.

4. Bahraini companies are applying multiple criteria in evaluating their investment projects with the internal rate of return being the most popular DCF technique.

5. Capital rationing is internally, rather than externally imposed on the capital investment programme.

6. Management science techniques are of limited application. Only one company uses PERT (Project evaluation and review technique).

7. The choice of cost of capital or hurdle rate varies among Bahrain companies, but the cost of borrowing funds is used by all companies as a benchmark against which their hurdle rates are set.

8.4 Comparison between the Findings of this study and the Findings of Similar Capital Budgeting Studies in the Gulf Region:

Al-Deehani, (1990) examined the corporate investment decision making process in Kuwait by applying King's six stage model. Wherever possible, the survey results of this study have been compared with the Al-Deehani's findings. However, it must be borne in mind that Al-Deehani's findings are not strictly comparable because of differences in the companies used as well as the structure and nature of the questions asked and the scope of the two studies.

The reported findings regarding some aspects of the capital budgeting process followed by Bahraini companies appear to be consistent with those findings reported by Al-Deehani (1990) in his study of corporate investment decisions in Kuwait. The two studies have found that both countries (Bahrain and Kuwait) share several similar practices regarding their capital budgeting decisions.

Regarding the search for investment projects, Al- Deehani found that the type of projects in the Kuwaiti environment are not initially realised in the form of an idea from within the organisation, but normally come up in the form of a proposition or an investment invitation from outside the organisation. In other words, Al-Deehani (p. 505) stated that:

"the project does not start as an idea, it is rather developed somewhere outside the organisation and then it is brought to it in the form of a proposition".

Regarding this stage of the investment process, Al-Deehani concluded that even when the initiator got the idea, he felt that there was a personal risk involved that might discourage the idea from being presented to the ultimate decision maker. In some other cases, initiators attempt to reduce personal risk by submitting informative reports to top management including their ideas of new investment opportunities and explaining their strategic importance to the organisation, with no recommendations for investment. As reported earlier, a project search in Bahraini companies was found to follow a similar pattern, as most investment projects are taken from the general government plan and not generated from within the company itself.

Regarding the screening stage, Al-Deehani has found that this stage depends on the project class and for certain projects (obligatory), the screening stage is completely absent because there is no need for such a process. However, with respect to new and growth projects the screening process is conducted in order to make sure of the perfect fitness of the projects with the strategy of the company. Both studies found that with obligatory projects it is obvious that funding decisions for a particular project is mandatory which logically means that there is no need or rather no choice to decide whether that project is worth further investigation or not. On the other hand, Bahraini companies were found to conduct a screening activity for most of their projects. This finding largely conforms to those reported by Al-Deehani (1990). The clear implication of the finding of this stage is that no screening stage for obligatory projects is necessary since the decision maker is not in a position to judge its viability for the organisation. This, in turn, falls short of King' (1975) and Pike & Dobbin's (1986) implicit argument that all projects face a screening process.

With respect to the evaluation stage, environmental factors appear to influence the type and scope of the capital budgeting evaluation process to be undertaken. Al-Deehani found that the evaluation process was described as exhaustive in growth projects, and simple/deficient in most of the obligatory projects. He argued that the evaluation process was found to be targeted to satisfy certain requirements rather than to be used as just an economic evaluation tool. He implied that evaluation techniques such as payback period and accounting rate of return were more important as they are simple and easy to understand and pose no implementation problem. One commonality between the Al-Deehani study and this study regarding this stage of the capital investment process is the emphasis put on non-DCF techniques by companies in both countries. While this study attempted to establish the link between the type of techniques used and environmental uncertainties as indicated earlier, Al-Deehani associated the widespread use of non-DCF techniques with specific factors such as the education level of managers and their experience.

In the area of post-audit, the two studies share similar findings, that is the absence of this stage in the investment process of both groups of companies. However, Al-Deehani found that even when some of the Kuwaiti companies indicated that they use post-audit for some of their projects, the actual practice is far from being considered a standard practice adopted in theory. He found that the mix of environmental uncertainties, strategic choice and project classification are factors which determine the level of sophistication of the post-audit process.

One common aspect of the findings of this study and that of Al-Deehani's is that the investment practices are characterised by a strong government presence as it represents the major stockholder in these companies and, as such, their practices are largely influenced by the government's economic policy and priorities. Furthermore, greater

centralisation of decision making is observed in both groups of companies and this reflects the bureaucratic nature of some key decisions, including capital budgeting decisions.

In conclusion, it can be stated that a comparison between capital budgeting practices followed by companies operating in developed, well structured business environments, and those of other companies operating in a less developed, less structured business environment has revealed several areas of dissimilarities with far reaching implications for capital budgeting theory. The degree of government involvement in business activities, along with the level of education of the managers, have influences on the scope and depth of the capital budgeting process. Both this study and Al-Deehani's have confirmed the visible influence of those factors on capital budgeting practices both in Bahrain and Kuwait. These factors, along with other factors with potential impact on the capital budgeting process, can be further explored in future capital budgeting studies.

8.5 The Context in which Capital Budgeting Techniques are used

The study results indicate that the context in which capital budgeting techniques are applied appears to play a major role in the type of techniques selected. Based on interviews with the Bahraini managers responsible for approving capital expenditures, it was indicated that while multiple criteria-sophisticated (DCF techniques) and non-sophisticated techniques (PBP and ARR), are used to evaluate investment projects, these managers tend to prefer payback period to other discounted cash flow techniques. They indicated that payback period allows them to cope with the environmental uncertainties which can cause managers to be more cautious by

adopting less sophisticated techniques in approaching their capital budgeting decisions. The Gulf region has witnessed two major wars over the past two decades. Those wars and their economic and political aftermath have added more uncertainty to the investment environment. Bahrain is a small economy, both in terms of size and in the sense that the prices of its imports and exports are exogenously determined. It is an open economy which relies on exports (particularly oil exports) for its earnings of foreign exchange and depends on imports for almost all of its supplies of goods. This export-import market is known to be subjected to seasonal price fluctuations which adds an additional element of uncertainty. This appears to be in line with Hofstede's (1984) theorem on "uncertainty avoidance" in which he concludes that the Arab countries, including Bahrain, score high on this dimension of national culture, i.e. Arab managers in general tend to avoid risk. Thus, the payback period appears to be the preferable method for dealing with environmental uncertainties (Bjerke and Al-Meer, 1993).

This conclusion is supported by a number of previous studies in this area including Christy (1966), Schall and Sundem (1980), Pike (1988a) and Bennett et. al. (1988). Christy, and Schall and Sundem found that the uncertain environment within which firms operate impede the successful use of discounted cash flow techniques in the capital budgeting process. Blatt (1979) provides a more convincing argument in favour of payback on the ground that it serves as a risk-screening tool in the uncertain world faced by practitioners. Pike (1988a), states that "*payback period is seen as a successful tool in times of high levels of uncertainty and inflation,..payback period assumes that risk is time related, the longer the period, the greater the chance of failure*"(p.29). This conclusion also supports the findings of Bennett et. al (1988). Bennett, Reed and Robertson (1988) conducted a survey of 450 firms of the Fortune

500 firms. The survey attempts to investigate the evaluation methods used by the firms in arriving at a decision to invest in computer technology. On the basis of 67 responses (15 per cent response rate) from the firms executives, it was found that *"more than two-thirds of the respondents calculate the payback period and return on investment to rank investment projects"* (Bennett et. al , p. 45). Intuition is also mentioned by the executives as a useful determinant in justifying investment in computers. The reasons given for using the less sophisticated techniques include difficulties encountered in quantifying intangible benefits and cost savings from the use of computers. According to the executives of the surveyed firms, the benefits from the computer information systems are highly uncertain.

8.6 Do the Capital Budgeting Practices of the Bahraini and the British Companies Conform to the Capital Budgeting Theory?:

This section identifies the similarities and differences between theoretically prescribed capital budgeting techniques and actual practices used in the analysis of capital investment proposals by companies participating in this study.

1. **Capital Budgeting Techniques:** Most respondents use discounted cash flow methods, traditional methods, or both methods to analyse project cash flows. Therefore, capital budgeting practices of the respondents conform to a large extent to what is prescribed in the theory of capital budgeting. However, despite the advanced superiority of the NPV over the IRR method in the financial literature, respondents favour IRR. Several ideas present themselves as possible answers to the question of why practitioners favour IRR over NPV. (For more details see Mukherjee and Henderson, 1987).

2. **Multiple use of Capital Budgeting Techniques:** The results clearly indicate that a majority of respondents use more than one capital budgeting technique in the analysis

of capital investment projects. It also appears that traditional methods are still used as secondary indicators of risk and/or profitability. Therefore, theory and practice appear to be aligned in this area.

3. **Determination of the Discount Rate Used in Capital Budgeting Decisions:** The results for British companies again indicate no substantial differences between theory and practice in this area. Theory prescribes the use of weighted average cost of capital (WACC) as the discount rate, and the majority of the British respondents report that they determine the discount rate using a weighted average cost of capital. This finding seems to be consistent with the significantly increased adoption of DCF techniques reported in earlier studies. However, it is highly probable that British companies which use WACC interpret the term differently from what is actually specified in the textbooks. Gitman and Mercurio (1982), who observed that a vast majority of US firms applied the recommended textbook procedure for calculating the WACC, argue that while some firms understand and are able to implement the cost of capital techniques as prescribed in the financial literature, there is still a significant gulf between financial theory and practice. With reference to respondents' actions in their studies, they go on to say that *"many of them seem to be clinging to established procedure rather than drawing from the growing body of financial literature"* (p.29). However, given the enormous difficulties, both theoretical and practical, in applying the cost of capital techniques, it is of interest to know how firms actually compute the WACC in spite of these difficulties[1].

[1] Two major problems in implementing cost of capital are the determination of the optimal capital structure, and the estimation of the cost of each component, especially the cost of equity capital. These points have been extensively discussed in the finance literature and will not be elaborated here.

Regarding the Bahraini companies, the cost of borrowing is used as a proxy for the cost of capital. The gap between theory and practice in this situation is due to the difficulty associated with WACC computation. The Bahrain stock market is still in its early stages, and as such the variable inputs necessary for calculating the cost of equity , which is a major component of WACC, are as yet underdeveloped.

4. **Adjusting for Project Risk:** The majority of the respondents explicitly consider risk in the analysis of their capital investment proposals. This practice concurs with the theory. However, how firms adjust for risk differs. The majority of the respondents use sensitivity analysis, while others adjust for risk subjectively by raising the required rate of return, shortening the payback period, or raising the discount rate. Such practices can distort the project's cash flows because such adjustments are made arbitrarily and the time pattern of the risk variable is not considered, Bavishi (1979). For example, if there is more risk associated with cash flows expected at the end of year five, using the higher discount rate for all cash flows penalises cash flows for years one through four. To overcome this subjectivity, quantitative techniques to assess risk and assign risk premiums must be applied (Bavishi, 1979). Such an approach provides quantitative input to the judgmental analysis.

5. **Use of Management Science Techniques:** The findings of the study indicate that application of management science techniques is limited. Lack of adequate data and staff, difficulty of quantification of parameters, time constraints and the cost effectiveness of the value of such techniques, were cited as being the main reasons for not adopting these techniques in practice. Ho and Pike (1991) have noted that "*large-sized UK organisations prefer relatively simple risk adjustment and sensitivity analysis technique*" (p.236). The authors note that these techniques are still "*in an experimental stage in practice*", and are unlikely to be replaced by the more advanced

ones, but are instead used to supplement analysis. This suggests that there is a considerable gap between theory (and theoretical application of the management science techniques) and practice in this area.

6. **Use of Post-audit Analysis:** Theory implies that post-audit analysis should support the capital budgeting process and help improve management's ability to make sound decisions concerning their future capital investment proposals (Neal and Holmes, 1990). The results of this study regarding British companies are in alignment with the theoretically prescribed techniques regarding the application of formal post-audit analysis. However, exactly what procedures are used by companies for such purposes and the exact role of post-audit in capital budgeting decisions are not known. In contrast, none of the Bahraini companies indicate the use of a post-audit system in any form, which constitutes an area for future improvement in their capital budgeting system.

8.7 Implications of the Study:

Having evaluated the study hypotheses and having assessed the results of the empirical knowledge gained thereby, the question arises of the implications of these findings. The implications of the research are discussed according to four major areas:

1. The theoretical implications of the study findings for the theory of capital budgeting.
2. The practical implications of the findings and extent of the applicability of the research results for various parties responsible for capital budgeting investment decisions.
3. A number of managerial guidelines designed to improve investment decisions in Bahraini companies.

4. Future research in topical areas addressed by this research.

These are discussed in the following paragraphs

8.7.1: Theoretical Implications of the Study Findings for the Theory of Capital Budgeting:

The environment in which capital budgeting decisions are made is likely to influence the various activities conducted in each of the stages of the capital budgeting process. Stages of economic development, educational system, degree of government involvement in economic activities, and level of bureaucracy in the decision making process, all represent key elements of the general environment that shape the structure and depth of the investment process (Schermerhorn, 1996).

In this section, the theoretical implications of the differences between capital budgeting practices of Bahraini companies and their British counterparts with regard to the capital budgeting theory will be presented. In order to maintain the same style used throughout this thesis, the capital budgeting process as depicted in the capital budgeting system adopted in this study will be presented in sequence.

Long-term planning:

According to Pike (1988a), capital budgeting is an integral part of the wider processes of strategic planning and budgetary control. However, investment proposals should be viewed within the context of underlying objectives and policies. According to this line of argument, longer-term capital budgets can be prepared giving an indication of the spending requirements over the next few years, thus enabling the acquisition of long-term finance.

Assessing this stage of capital budgeting process, it is observed that about 80 per cent of Bahraini companies prepare long-range capital budgets, while the percentage for

British companies is 67 per cent. This difference can be attributed to the sizeable share of government ownership in the Bahrain companies which leads to more emphasis on long-term planning for those companies as part of the national plan. Furthermore, the heavy reliance on government financing for the investment projects undertaken by Bahraini companies makes it necessary for those companies to comply with government requirements for preparing long-term plans on a regular basis.

On the other hand, British companies appear to conduct long-range planning as part of their corporate activities with no visible government intervention in those plans (Lapsley, 1986).

The implication of those observed differences in this aspect of capital budgeting practices for the theory of capital budgeting is that the presence of government ownership leads to more emphasis on long-range planning as an essential element of the capital budgeting process.

Systematic Search and Screening of Investment Alternatives:

Each investment proposal is subject to a preliminary search and screening process where alternatives are generated, screened and reviewed to identify those which are sufficiently attractive to warrant further analysis (Northcott, 1992). Investigation of this phase of the capital budgeting process has shown that Bahraini companies do not conduct any formal search for investment projects. Generation of investment ideas is carried out on an ad hoc basis and Bahraini managers consider investment requirements according to the particular need to be addressed. On the other hand, 64 per cent of British companies undertake this activity as part of their capital budgeting process. Environmental factors play a decisive role in explaining these differences. Firstly, the Bahraini companies enjoy monopolistic power, relatively speaking, in their

respective industries inside Bahrain. This leads to the absence of competition to motivate these companies to actively search for investment projects to improve performance. Secondly, strong government intervention in these companies and the long period that government officials take to approve an investment project , may contribute to apathetic behaviour on the part of employees and discourage them from coming up with new capital investment ideas and proposals. The search by British companies for investment ideas appears to be an integral part of their competitive strategy as they strive to improve their performance through the introduction of new investment projects (Pike and Wolfe, 1988). The implication of this observed difference for the capital budgeting theory is that environmental factors - internal and external- have far reaching effects on the company's search for new investment ideas. The bureaucratic nature of the managerial settings in the Bahraini companies as well as the higher degree of centralisation in the decision making process appear to discourage corporate managers and other employees in these companies from conducting a formal search for investment projects.

Regarding the screening stage, the study results indicate that about 80 per cent of Bahraini companies conduct formal screening of investment ideas , while the percentage for British companies is 61 per cent. This observed difference can be attributed to the fact that corporate/ government committees are formed within the Bahrain companies to screen the various investment alternatives. Such practice appears to be in line with governmental policies employed to ensure efficient allocation of national resources, since government financing is the main source for funding investment projects. For the British companies, project screening is normally considered a key element of the overall capital budgeting process. The percentage of

British companies which engage in this activity is comparable to those reported by McIntyre and Coulthurst (1985) and Pike (1996). The implication of this observed difference for capital budgeting theory is that the presence of government ownership- as indicated earlier-leads to more emphasis on project screening as a means of controlling the flow of government funds to investment projects conducted by those companies.

Project Evaluation and Selection:

The quantitative financial analysis of proposals has been the focus of much of the respective capital investment literature. The capital budgeting model suggests that it is at this stage that a decision is made about whether to invest in a proposed capital idea, based on the outcome of the financial evaluation. In this regard, inquiries have primarily centred on the question of whether sample companies adopted theoretically sound discounted cash flow (DCF) techniques.

The study findings show that all British companies use discounted cash flow techniques as the primary tools for evaluating their investment projects. On the other hand, the payback period is considered the main evaluation criteria used by Bahraini managers. The main justification for such disparity is that the managers in British companies are relatively more educated than their Bahraini counterparts and more familiar with advanced cash flow estimation and analysis, and its use as a basis for capital budgeting techniques. Therefore, they are more likely to adopt those sophisticated techniques in their capital budgeting decisions. Surveys suggest that the use of DCF techniques among UK companies has indeed increased significantly over the years (Pike, 1996 and Sangster, 1993). This upward trend in the use of DCF techniques seems to be in keeping with the theoretical prescription (Brealy and Myers, 1991).

In addition, the availability of active financial markets allows British managers to get relevant information necessary for applying these sophisticated techniques. Examples of this type of information include required rates of return, market risk factor (beta) and other market indices. Reliance on payback period by Bahraini mangers is due to its simplicity and its suitability to their risk avoidance attitude, as indicated earlier. Furthermore, the less developed financial market in Bahrain makes it difficult to collect relevant information to be used in DCF techniques.

The implication of these differences for capital budgeting theory is that well-educated managers, availability of financial market indicators, and sophistication of cash flow estimation techniques all contribute to the widespread use of DCF techniques, while the unavailability of this information contributes to more emphasis on payback period and other naive techniques (Mukherjee and Henderson, 1987).

Expenditure Control:

Expenditure control is normally designed to monitor project performance. This will presumably involve an on-going analysis of the costs and revenues of projects as they develop. Some Bahraini companies believe this process to be sufficient to control project costs and revenues as the following anonymous comments taken from interviews illustrate:

"Monitoring of project performance provides us with the data we need"

"Project performance is considered more important than post completion audits"

The study results indicate that all Bahraini companies exercise expenditure control, while only 66 per cent of British companies exercise such activity. Emphasis on the importance of expenditure control by Bahraini companies is due to the governmental policy regarding such activity as a means of ensuring efficient allocation of the

country's limited resources and providing feedback for future project financing. With depressed oil prices biting into government revenues, the challenge facing the government is to secure necessary funding for new investment projects, which in turn puts more emphasis on expenditure control. The implication of this finding for capital budgeting theory is that those companies that rely heavily on government financing and face budgetary constraints are more likely to stress the importance of exercising externally imposed expenditure control as an important facet of the capital budgeting process, than those companies operating in countries with a developed financial market and less or no government intervention, that normally conduct an internally imposed expenditure control (Mukherjee, 1987, and Pike, 1996).

Post-Audit:

The primary objective of post-audits is the in-depth examination of the basis for evaluating the project in relation to its actual outcome. This stage of the capital budgeting process is closely related to the expenditure control phase.

This study attempts to assess to what extent post-audits are used by participating companies; the findings indicate that 56 per cent of British companies conduct post-audits for their investment projects while no Bahraini companies conduct such activity. The absence of post- audits in Bahraini companies may be attributed to:

1. The high administrative cost associated with the post-audit.
2. Economic uncertainty which may lead to discrepancy between predicted and actual cash flows
3. Control over spending at the outset is perceived to be more effective in ensuring the success of the capital project
4. A capital budgeting decision is a group decision and it is difficult to trace it to a particular staff member

The implication of this finding for capital budgeting theory is that post-audits of investment projects are likely to be found in those environments that are characterised by a system of accountability and the existence of a punishment/ reward system, (Isham et. al.,1997). Such a system is more likely to be found in developed industrialised countries which have achieved more accumulation of managerial knowledge (Schermerhorn, 1996). The absence of post-audits in Bahraini companies could be partially attributed to the lack of those characteristics in the Bahrain business environment (Abdulla, 1991). The implication of this finding is that the presence of all elements of the capital budgeting system, i.e careful evaluation of projects, planning and controlling during implementation, would allow any problems to be anticipated, minimised and dealt with rapidly.

8.7.2 The Practical Implications of the Findings and Extent of the Applicability of the Research Results for Various Parties Responsible for Capital Budgeting Investment Decisions:

The findings of this study can have far-reaching implications for the three parties that have a vested interest in corporate capital budgeting systems. These parties are: Government, management, and accountants.

Government: The Government in the State of Bahrain may attain several benefits from the findings of this study. For example, the government may undertake a national programme to train managers on the advanced techniques and tools which can be utilised in improving the effectiveness of their decisions in general, and their capital budgeting investment decisions in particular. Furthermore, a national post-audit system can be developed which can be used by different companies for evaluating-.ex post facto- the soundness of the investment decisions made by corporate managers. This programme, if properly implemented, could help to upgrade skills, knowledge, and

performance of managers of these companies. Subsequently, this upgrade would lead to improvements in the companies' financial positions. Furthermore, the Government, through the Ministry of Commerce, will be required to implement policies aimed at the modernisation of the Bahraini stock market. A well-developed stock market can provide capital investment decision-makers with valuable information for computing the company's cost of capital, which has normally been used as a criterion in capital investment decisions.

Managers: Managers must pay greater attention to the necessity of improving their management skills and practices by means which include training programmes, seminars and counselling. These improved skills and practices represent prerequisites for improved decision-making and ensure that all economic resources and opportunities are efficiently utilised to the advantage of the companies in particular, and the national economy in general. One particular concern in this respect is the low level of use of management science techniques by Bahraini companies. The function of these techniques is to assist management in the search for increased profits and reduction in costs. This is most usually achieved by calling in management science techniques to assist in determining ways of cutting costs and/or increasing revenues.

Cash flow predictions have been reported in the literature and surveys of capital budgeting practices, to be the most critical problem in capital budgeting (Lilleyman, 1984 ; Van Horne, 1995 and Mukherjee, 1987). Bahraini companies in this study are experiencing some difficulties in this regard. Thus, an urgent need for improving the reliability of cash flow predictions should be noted. The role of management in this direction is very crucial. To tackle this problem, firstly, management will be required to put emphasis on implementing more advanced estimation techniques in forecasting project cash flows. These techniques must be continuously updated to reflect the ever-

changing information technology. Secondly, only well-qualified and experienced people should be selected and assigned to prepare and compile cash flow predictions. Unreliable cash flow figures could lead to incorrect investment decisions, which could in turn lead to the waste of economic resources. However, this study suggests that the managers of the Bahraini companies must endeavour to establish more systematic and formal administrative procedures. This would ensure that all investment opportunities are sought and the proposed investment alternatives are carefully identified, reviewed, screened, controlled, and implemented within the framework of the total capital budgeting system. This systematic approach to capital budgeting should enable companies to eliminate unnecessary duplication, omissions, and differences in their investment decision process.

Accountants: Accountants must be prepared to accept more managerial responsibilities and be willing to take a more active role in corporate affairs, including educating the management about the important role of accounting information and techniques, and their role in managerial decision-making. The crucial role of accountants lies in providing accurate and reliable financial information, on which correct decisions can be made, and in this regard the assumptions based on the financial figures arrived at must be realistic, and attainable. Various accounting training centres throughout the country could play an important role in conducting intensive accounting programmes geared towards expanding accounting knowledge and improving available accounting techniques. Such programmes are expected to lead to a wider understanding of capital budgeting procedures and techniques among managers. It is hoped that this understanding will also lead managers to the judicious use of these techniques and procedures.

8.7.3 Recommendations For Improving the Capital Budgeting Process of Bahraini Companies- General Practical Management Guidelines:

The main objective of this thesis is to identify current management practices in the formulation and implementation of a capital budgeting programme in Bahraini companies. Based on the findings, this section aims at establishing good practice principles in this area in the form of practical management guidelines.

The study indicates that Bahraini companies are well-organised to conduct various activities related to their capital investment process. However, room exists for reviewing these activities and implementing potential improvements. The two areas missing in the investment process of Bahraini companies are: the systematic search for investment opportunities and post-audits of capital projects. In the following paragraphs, guidelines are provided to encourage the Bahraini companies to tackle these issues.

- **Search for Investment Opportunities:**

Recognition of a potential investment is the starting point of the capital investment process. King (1975) noted that, "*in practice each opportunity for investment must be identified and exploited*"(p.73). Pike and Dobbins (1986), consider this stage of the investment process as influential in securing successful outcomes, stating that, "*prosperity of a business depends more on its ability to create profitable investment opportunities than on its ability to appraise them*"(p.3). The previous quotes indicate that no matter how elaborate and sophisticated an organisation's attention to capital investment is, without good capital investment ideas, little can be achieved. This is especially true as we move further into an age where innovation is crucial to the success of many organisations. Ideas for capital investment often come from people who work in technical positions, or who occupy relatively low positions in the

organisational hierarchy (Mukherjee and Henderson, 1987). These people have hands-on experience at the operating level, and they can envisage potential for improvement in current practices. Therefore, these people must be encouraged to come forward with their ideas which can then be communicated to the appropriate people.

Interviews with Bahraini officials reveal that the generation of ideas for investment projects is the weakest part of the investment process of those companies. A number of problems were cited as constituting barriers to the generation of ideas. Organisational personnel may often feel reluctant to present their ideas in the capital investment arena. The risk of trying and failing may be perceived as greater than potential reward from hitting uopn a successful capital investment suggestion. Also, there are not always adequate communication channels which permit ideas to emerge from all levels of the organisation. Another reason is the lack of comprehensive information about the project on the part of the proposer. Similarly, the financial implications of investment proposals are not fully comprehended by proposers.

Hertenstein (1990) has suggested ways in which organisational personnel can be encouraged to contribute to the generation of capital investment ideas. Hertenstein suggests the following:

1. It is important to recognise non-financial information as being equally important as financial information. This will encourage project proposers to develop projects which provide strategic benefits, even if the proposers lack the skills or data necessary to express the projects in financial terms.

2. Project proposals need to be subjected to interfunctional and interdisciplinary review. This will encourage people to put forward ideas even when they do not feel comfortable with all aspects of the project. The knowledge that a proposal will be reviewed by people with an appropriate expertise relieves the proposer of the

responsibility of knowing all potential aspects of the project. People are then free to suggest ideas which they consider to have potential merit, even if they cannot fully capture all the strategic and financial implications.

3. Finally, Hertenstein suggests that early reviews of investment proposals can encourage broad, comprehensive evaluation of all types of projects. The use of effective pre-screening programmes makes it possible to identify valuable opportunities before they are subjected to rigorous financial analysis. Project proposers are therefore encouraged to present ideas, knowing that they will not be wasting large amounts of organisational time and resources if their ideas turn out to be unfruitful. Similarly, inappropriate capital ideas can be eliminated before the proposer has had any need to accumulate a wider commitment to the project, thus risking public humiliation if the idea is not pursued.

From the foregoing discussion, it should be realised that organisational employees must be encouraged to put forward ideas for the promotion of effective capital investment decision-making. Attitudes to ideas, suggestions, pre-screening procedures, performance appraisal and reward systems are all important factors in gaining the most benefit from the expertise and innovation of organisational employees.

- **Establishing a Post-Audit System:**

The post-audit appears to be one of the most neglected areas of capital investment. It is realised that investment post-auditing is both difficult and expensive, and many organisations do not have formal systems for post-auditing projects. Those organisations which have such a system, post-audit only selected projects. Reasons given by Bahraini companies for not conducting a post-audit include: the high cost of implementing a post-audit system does not justify the benefits expected from it and it

is believed that exercising control at the outset is a more effective tool to deal with the project. However, managerial learning is always cited as the most widely discussed benefit of post-auditing, since it provides performance evaluation information that, in turn, may improve the budgeting process applied to future projects (Brealy and Myers, 1991).

Neal and Holmes (1990), recommend ways in which post-audits can be effectively implemented. They suggest that:

1. A post audit system must be accepted by organisational employees. Neal and Holmes (p. 92) noted that the system must be "*skilfully presented, perhaps as an expression of interests rather than as an inquisition into particular activities.*" This encourages the people in the organisation to feel positive about an opportunity to display their competence, rather than feeling threatened about being "checked up on".

2. Information systems need to be designed to provide appropriate detailed information about a project's performance.

3. It may be better, to declare the post-audit of new projects and to carefully specify beforehand the anticipated costs and benefits from the project in a form compatible with their subsequent investigation.

4. Strategic factors need to be considered as an important aspect of effective post-audit. In this case, post-audits need to be balanced between numerical analysis and consideration of strategic factors. Neal and Holmes (p,.93), note that "*excessive concern with numerical data deters staff at the divisional level and damages their enthusiasm and co-operation for the whole procedure.*"

5. Neal and Holmes note that post-audit information, together with board of directors comments, should be incorporated into a system of feedback to the original investment

analysts in a non-inquisitorial manner in order to recognise deficiencies in initial evaluation and consequently to improve investment procedures on future projects.

The incorporation of these issues into the design and use of post-audit systems provides a means for improving the capital investment decision-making process which has yet has to be capitalised on by Bahraini companies.

- **Raising Levels of Education and Knowledge about Capital Budgeting Techniques and Procedures:**

The comprehensive review of the capital budgeting system as described in the financial theory, as well as the detailed review of previous capital budgeting studies, is expected to increase the level of education about capital budgeting techniques and approaches, and as such, will help close the gap between theory and practice. The increased number of educated practitioners, and the widespread availability of computers, are expected to contribute significantly to the achievement of that goal.

8.7.4 Directions for Future Research:

The conclusions and assessment of this study are significant for the direction of future research in the general topic area. More research could be done in order to have a much wider view of the situation, not only in the area of capital budgeting but also in related areas in the field of accounting. The following are several possible research topics which could be pursued:

1. A broader sample of GCC countries could be used in future capital budgeting studies. Such a sample would be large enough to allow the application of statistical tests. Furthermore, the similarities among GCC countries will make the results of such a study useful to all GCC countries.

2. Comparison with other developing countries may prove to be useful. Since it is well known that developing countries share certain common attributes, such an investigation is expected to shed some light on the similarities and dissimilarities among developing countries in the vital area of the capital investment decision- making process. However, to conduct a similar but more sophisticated capital budgeting study, there are a number of problems that have to be solved. This study assumed that the entire capital budgeting process is a function of nine factors. This nine factor classification was suggested by Kim (1982). The major question is "what other variables should be included in the capital budgeting process and which ones should be excluded?". There are many factors and elements that could have an impact on the investment decision process. Because of this complexity, it is impractical, if not impossible, to incorporate every factor that might conceivably be part of the capital budgeting process.
3. Future studies can be conducted to investigate in detail the practices followed by companies in GCC countries for computing their cost of capital. The increasing role of the stock markets in Kuwait and Saudi Arabia makes it possible to arrive at market-based cost(s), which in turn can be used for calculating the overall cost of capital.
4. The capital budgeting sophistication index used in this study was only limited to nine elements as suggested by Kim (1982). However, researchers can further explore this area and discover other variables that could potentially affect the entire capital budgeting process.
5. Since the current study is limited only to large Bahraini companies, it will be worthwhile to investigate the capital budgeting practices of small and medium-sized Bahraini companies and compare these practices with those of large companies, i.e to test the effect of the size factor in capital budgeting studies.

6. In the current study, no attempt is made to relate capital budgeting practices to company performance. However, in future capital budgeting studies, the relationship between capital budgeting practices and corporate performance can be investigated. Such investigations may be conducted following the path of early scholars like Christy(1966), Klammer (1973) and Kim (1982). The new dimension to be added to this kind of investigation is its application to the companies operating in developing countries.
7. The same framework, applied in the current study, can be followed in a similar study utilising the same sample. This will help in evaluating the changes in capital budgeting practices over time. Since external and internal factors affecting capital budgeting decisions change , it will be essential to assess the potential impact of those changes on capital budgeting practices.
8. In 1989, the Minister of Finance and National Economy expressed concern over the increased resources allocated to non-profit organisations, such as hospitals, municipalities and other Government agencies. These enterprises were reported to have spent BD 35 million, or 15 per cent of the total Government expenditure in 1985. These expenditures were expected to reach a peak of BD 75 million in 1988. The Minister of Finance indicated that the methods of control and financial management of public enterprises should not differ from methods used by other segments of Government. Inefficient use of Government resources would have an adverse effect on the balance of payments and the overall financial position of the country. It is therefore recommended to study the capital budgeting practices of organisations such as hospitals, municipal authorities, and utility companies in Bahrain following a framework similar to the one followed in the current study. These organisations have certain unique characteristics that are likely to influence their capital budgeting decisions. Furthermore, comparison can be conducted to assess the similarities and

dissimilarities between capital budgeting practices in profit-seeking organisations and non-profit seeking organisations.

9. Another potential study involves the role of management accounting in capital budgeting. Capital budgeting decisions normally involve some kind of interaction with the management accounting of the company. Such interaction may have certain effects on the scope and procedures of the capital budgeting decisions. The budgetary relationship among the various levels in the company and their role in the capital budgeting decisions-making can also be investigated.
10. The present study is limited to a sample of manufacturing companies. However, in future studies, a sample of service producing companies, such as banks, hotels, real estate, and insurance companies can be used. The unique characteristics of these companies are expected to have certain influences on the capital budgeting practices followed.
11. As discussed in this study, the capital investment decision can be viewed as an integral part of the company's strategic planning. The company's long-term objectives can only be met if long-term investments in productive capital, technology, and marketing are directed toward these objectives. As a result, future studies can be conducted on the relationship between the capital investment decisions and corporate strategies in Bahraini companies.

8.8 Study Conclusions:

Several conclusions are drawn from the study. These conclusions include:

1. It is surprising to find that most Bahraini companies appear to have formal and sophisticated capital budgeting systems to guide the investment process. Generally, one might expect that the Government companies, due to their unique ownership

structure would be less oriented to the adoption of sophisticated capital budgeting systems. However, this intuitive expectation is not borne out in this case. One explanation for this finding is that the Government-owned companies, with their relatively large amount of resources, are less cost-conscious and, as such, quick to adopt methods and procedures, and hire experts to improve their capital budgeting systems. This is evident from an interview during which one manager of a Bahraini company indicated that, despite less favourable business conditions in 1990, the company did not curtail its capital expenditure programme. Lapsley (1986), who conducted a study on investment practices of public enterprise organisations in the UK, found "high standard of sophistication" of their capital budgeting systems. According to Lapsley, the use of high standards of sophistication is influenced by the difficulties of evaluating investment projects. These problems include estimating the costs and benefits for a proposed project in view of the continued inflation and capital rationing facing these organisations. The use of sophisticated capital budgeting methods requires the managers to consider all relevant factors and possibilities associated with the proposal before making the final decision.

2. Interviews with Bahraini managers reveal that, in the past seven years, their companies started to use multiple evaluation criteria techniques such as IRR and NPV in the evaluation of their investment projects, along with the traditional payback period which was previously the only evaluation tool applied by managers. This finding is in line with the conclusion reported by Velez and Nieto (1986), Mukherjee (1987), and Pike (1989). Velez and Nieto found that 50 per cent of the large firms in Colombia use discounted methods for investment. Pike (1989) examined the changes in capital budgeting practices of large firms in the UK over a period of 11 years. Two major

findings were reported in that study. These are: (1) *"there has been a significant increase in the use of investment selection techniques, particularly in the use of discounted cash flow and sensitivity analysis techniques over the period"* and, (2) *"the increase in use of sophisticated capital investment methods is significantly associated with greater capital budgeting efficiency as perceived by senior managers"* (Pike, 1989, p. 158-159). In his most recent study, Pike (1996) reported the findings from a longitudinal survey of large UK firms conducted at five-year intervals between 1975 and 1992. Pike noted that *"the usage of discounted cash flow techniques has increased with each survey, as has the tendency to employ a combination of appraisal methods rather than relying upon a single technique* (p. 89)." These findings are consistent with those found by Sangster (1993).

Mukherjee (1987) examined 22 studies on capital budgeting practices of large corporations in the US. The findings from these studies indicate that the use of discounted cash flow (DCF) techniques as a primary evaluation tool has increased significantly over a period of 20 years. Only 10 per cent of US firms were reported using the discounted cash flow (DCF) techniques in 1959 (Istvan, 1961). This percentage increased to 70 per cent by 1979 (Mukherjee, 1987).

The major conclusions of this study include: (1) Both the Bahraini and the British companies follow a relatively structured approach to their capital investment decisions (systematically, well defined steps or activities), (2) The two groups of companies exhibit a great similarity in certain key areas of their capital budgeting systems. These areas include: existence of a formal screening body, evaluation techniques, preparation of a long-term capital budget, existence of at least one capital budgeting staff, and risk analysis, and (3) Dissimilarities are observed in other areas. These areas include: the systematic search for investment opportunities, post-audits of capital investment

projects, application of management science techniques and expenditure control . These similarities and dissimilarities are reflected in the capital budgeting sophistication index for Bahraini companies and their British counterparts that was specifically developed for this study. The British companies appear to be relatively more sophisticated than the Bahraini companies, as indicated by the sophistication scores.

An attempt to summarise the compliance of British companies and Bahraini companies with the capital budgeting system adopted in this study is shown in Table 8.1.

Table 8.1 Conformity of British and Bahraini Companies to the Capital Budgeting System Adopted in this Study*

Companies / Degree of conformity	British Companies	Bahraini Companies
System Phases widely observed	• Application of DFC techniques	• Application of DFC techniques • Long-range capital budget • Expenditure control • Capital budgeting manual
Partially observed	• Formal risk analysis • Long-range capital budget • Screening of ideas • Search for ideas • Full-time capital budgeting staff • Expenditure control • Capital budgeting manual • Project post audit	• Formal risk analysis • Full-time capital budgeting staff
Least observed	• Management science techniques	• Management science techniques • Project post audit

* The classification system used in this Table has been adopted from McIntyre and Coulthurst, 1987

8.9 The Contributions of the Study:

1. This study represents the first attempt to conduct a comprehensive study of capital budgeting investment decisions in large Bahraini companies. Lack of information or the difficulty of obtaining available information made it difficult for researchers to pursue a thorough study and investigation of this area which is of the utmost importance for the viability of the national economy.
2. The findings from this study should provide information on the state of capital budgeting in Bahrain. This information can help accounting professionals and academics to evaluate their present roles to accommodate the needs of managers and other decision makers. The findings can also help Government economic planners formulate special training programmes for managers of public enterprises with the idea of upgrading their professional managerial skills, knowledge and performance. Such improved performance may, in turn, promote faster economic progress in the country.
3. An important contribution of this study is the introduction of a system's concept to the investment decision making process. This concept provides a means for companies to measure their entire investment decision process on a scale of values ranging from zero to 100, thus making it possible to measure the relationship between their capital budgeting system and other sub-systems. The careful study of the interrelationships between these sub-systems is significant because the capital budgeting system cannot stand alone and the process will have significance only when it makes some contribution to the economic improvement of the firm.
4. This study adopts a comparative approach through which a group of British companies, that possess the same attributes as those of a group of Bahraini companies, have been investigated in order to test the conformity of the two groups to the

theoretical model of the capital budgeting system adopted in this study. This comparison highlights the similarities and dissimilarities, and attempts to evaluate the application of capital budgeting practices in two completely different environments.

5. The study reveals that Bahraini public enterprises are organised enough to perform capital budgeting activities, despite lacking certain components. These companies should serve as a model for other private enterprises in the area of capital budgeting. With an ambitious government programme to give the private sector an expanding role in the economy, those companies must prepare to upgrade their performance and make use of tools and methods of capital budgeting theory in their decision making process.
6. A synthesis of the literature and a current assessment of capital budgeting theory-as presented in this study, should encourage managers to consider the implications of capital budgeting theory on capital investment decisions to make sure that they complement strategy. In addition, it can guide academic researchers on future capital budgeting studies.
7. The collection of data on the use of post-audit analysis in capital budgeting procedures for capital investment projects is of utmost importance. Because capital budgeting is based on a set of assumptions regarding rapidly changing technological and financial conditions, it is important to conduct a post-audit review to determine the validity of these assumptions and to establish the credibility of the capital budgeting process.
8. This study should be considered a point of departure into pursuing more comparative researches in key areas of investment decisions across national and international boundaries, in order to fully examine the impact of environmental and cultural factors delineating the capital investment process.

Concluding Comments:

In conclusion, Government-owned companies in the State of Bahrain were established with the main objectives of accelerating the country's economic development process and diversifying the country's sources of income to reduce the heavy reliance on oil. In order to attain these objectives, the relevant Government officials and departments should ensure that Government-owned enterprises have the essential qualities to promote economic growth. These qualities include having the appropriate organisation structure to facilitate capital investment activities. This structure should be supported by qualified and experienced accounting personnel and managers capable of performing the capital budgeting function.

Understanding and using capital budgeting concepts and techniques is essential for the managers and decision-makers of these enterprises. Comprehensive courses on capital budgeting techniques and procedures, conducted on a regular basis, should be organised by relevant agencies for the benefit of these personnel. Managers from large companies, as well as those from small and medium organisations, should be encouraged to participate. It is hoped that their participation in such courses will lead to a wider understanding and usage of capital budgeting concepts and techniques by the managers and decision makers in the country. Such understanding and usage will lead to a more efficient utilisation of economic resources. As a result, the country's productivity will increase, resulting in faster economic growth and prosperity. Finally, this study has shed some light on the capital investment process of the Bahraini companies involved. The study identified the strengths and weaknesses of the investment process currently followed by those companies. It is hoped that Government officials, managers, and various groups with an interest in those companies, will have the opportunity to review their decision-making activity in the

area of capital investment and act upon the recommendations suggested by this study, when and where appropriate.

Before concluding, it is important to highlight the academic and practical contributions of this study. Academically, the study contributes to the literature on capital budgeting in a small, developing country and , hopefully, will encourage researchers to conduct in-depth research into this vital area of the decision -making process in other countries with similar characteristics. Practically, the study contributes by offering a number of recommendations in the form of managerial guidelines to improve the capital budgeting process of the major Bahraini companies. These recommendations are likely to make these companies more efficient and effective in utilising the country's scarce economic resources.

Bibliography

Abdulla, M. K. (1991)., *The Evolution of and Prospects for Rentier Economy in a Small, Open and Oil-based Society: the Case of Bahrain*, Unpublished Ph.D. thesis, University of Exeter.

Abdul Rahman, A. F. B. (1980), *Relationship Between Profitability and Capital Budgeting: The Case of Malaysian Firms in the Manufacturing Sector*, Unpublished Ph.D. dissertation, Renssalaer Polytechnic Institute.

Ackerman, R.W. (1970), "Influence of Integration and Diversity on the Investment Process," *Administrative Science Quarterly*, September, pp. 341-351.

Adler, P.S., McDonald, D.W., and McDonald F. L. (1992), " Strategic Management of Technical Functions", *Sloan Management Review*, Winter, pp. 19-37.

Aharoni, Y. (1966), *The Foreign Investment Decision Process*, Division of Research, Harvard Business School.

Al-Deehani, T. M. F. (1990), *Understanding Corporate Capital Investment Decisions in Kuwait*, Unpublished Ph.D. thesis, University of Bath.

Alfred, A. M. (1964), *Discounted Cash Flow and Corporate Planning*. Lecture Delivered to the Woolwich Polytechnic, UK, 8 May, as part of Symposium on Economic Planning, *Woolwich Economic Papers*, No.5.

Alhashim, D. D. (1984), "International Dimensions in Accounting and Implications for Developing Nations." *Management International Review*, Vol. 22, pp.4-11.

Al Khalifa, K. K. (1995), "The Trade of Bahrain Since the Utoobi Conquest and Until the Emergence of Oil", *Al Watheeqa*, 7th Edition, pp. 28-56.

Al-Shamlan, A. (1993), *Pearls of Bahrain*, Bahrain Centre for Studies and Research, Manama, Bahrain.

Anderson, R.H.(1982), "Capital Budgeting Practices of Australian Companies," *Journal of Professional Administrator*, Oct/ Nov., pp. 159-161.

Anyane-Ntow, K. (1982), *The Use Of Accounting Information in Structuring Decision Making and the Management of State-Controlled Business Enterprises in Ghana*: Accounting and Economic Development Revisited. Unpublished Ph.D. dissertation, University of Georgia, Athens.

Arab Banking Corporation (ABC) (1994), *The Arab Economics: Structure and Outlook*, 2nd Revised Edition, ABC, Manama, Bahrain.

Bahrain Centre for Studies and Research (1986), " *Problems Facing Bahraini Industry: Suggested Solutions, Procedures and Policies to Support and Develop the Industrial Sector in Bahrain,*" (Abstract), Bahrain Centre for Studies and Research, Manama, Bahrain.

Bahrain Monetary Agency (1987), "*Bahrainian International Financial Centre,*" 3rd Edition, Manama, Bahrain.

Bahrain Statistical Abstract (1992), Central Statistics Organisation, Manama, Bahrain.

Bahrain Statistical Abstract, (1995), Central Statistics Organisation, Manama, Bahrain.

Baker, J. C. (1981), "Capital Budgeting in West European Companies," *Management Accounting*, Vol. 19 (1), pp. 59-71.

Barton, H. , Brown, J. , March, P., and Willey, K. (1992), "Does Top Management Add Value to Investment Decisions?" *Long-Range Planning*, Vol. 25 (5), pp.43-58.

Bavishi, V. D. (1979), *Capital Budgeting for the US-Based Multinational Corporations: An Assessment of Theory and Practice.* Ann Arbor, MI: UMI Research Press.

Bennett, E. D. , Reed, S. A., and Robertson, D. (1988), " A Survey: How Do You Justify An Investment in Technology?" *Financial Executive*, September/ October, pp. 44-48.

Berry, A. J. (1984), "The Control of Capital Investment," *Journal of Management Studies.* January, pp. 61-81.

Bjerk, B. And Al-Meer, A. (1993), "Culture's Consequences: Management in Saudi Arabia", *Leadership & Organisation Development Journal*, Vol. 14 (2), pp. 30-35.

Blatt, J. M. (1979), "Investment Evaluation Under Uncertainty," *Financial Management*, Summer, pp. 66-76.

Blazouske, J. D., Carlin, I., and Kim, S. H. (1988), " Current Capital Budgeting Practices in Canada," *CMA Magazine* (Canada), March, pp. 51-54.

Blumberg, H. H., Fuller C. and Hare A.P. (1974), " Response Rates in Postal Surveys," *Public Opinion Quarterly*, xxxviii, Spring, pp. 113-124.

Bower, J. L. (1970), *Managing the Resource Allocation Process: A Study of Corporate Planning and Investment,* Richard D. Irwin Inc., Homewood, Illinois.

Bower R. S. and Lessard D. R. (1973), "An Operational Approach to Risk Screening,", *Journal of Finance*, May, pp. 321-337.

Braybrook, D., and Lindblom C. (1968), *A Strategy of Decision,* The Free Press Glencoe, UK.

Brealy, R. A., and Myers, S.C. (1991), *Principles of Corporate Finance*, 4th Edition, New York: McGraw-Hill.

Brigham, E F. (1975), " Hurdle Rates for Screening Capital Expenditure Proposals," *Financial Management*, Vol. 4 (3), Autumn, pp. 17-26.

Brigham, E. F., and Gapenski, L. C. (1990), *Intermediate Financial Management* , The Dryden Press International, 3rd Edition,

Brigham, E. F. and Pappas, J. L. (1976), *Managerial Economics,* Hindsdale, IL, The Dryden Press International.

Briston, R. J. (1978), "The Evolution of Accounting in Developing Countries." *The International Journal of Accounting* , Fall , pp. 105-120.

Bromwich, M. (1976), *The Economics of Capital Budgeting,* Harmondsworth, England, Penguin Book Ltd.

Butler, R., Davis, L., Pike, R. and Sharp, J. (1991), "Strategic Investment Decision-Making: Complexities, Politics and Processes," *Journal of Management Studies*, Vol. 28, July, pp. 395-415.

Carsberg, B. and Hope, A. (1976), *Business Investment Decisions Under Inflation.* The Institute of Chartered Accountants in England and Wales, London.

Chandler, A. D. (1962), Strategy and Structure: Chapters in the History of the Industrial Enterprise, MIT press, p.13.

Chandler, J. S. and Holzer, H. P. (1984), "Accounting in the Third World." *Journal of International Accounting* . New York: Harper & Row, Publisher, Chapter 19, pp. 453-481.

Chase, R.B. and Aquilano, N. J. (1977), *Production and Operation Management,* Homewood, Richard D. Irwin, Inc., p.31.

Christy, G. A. (1966), *Capital Budgeting : Current Practices and Their Efficiency.* Eugene: University of Oregon.

Churchill, G. A. (1995), *Marketing Research: Methodological Foundations.* Hilsdale, IL, The Dryden Press.

Cleverley, W. O. and Felkner, J. G. (1984), "The Association of Capital Budgeting Techniques with Hospital Financial Performance," *Healthcare Management Review*, Summer, pp. 45-58.

Contractor, F. J. and Sagafi N. T. (1981) " International Technology Transfer: Major Issues and Policy Responses." *Journal of International Business Studies*, Fall, pp. 113-131.

Cook, T. J. and Rizzuto, R. J. (1989), "Capital Budgeting Practices for R&D: A Survey and Analysis of Business Week's R&D Scoreboard," *The Engineering Economist*, Vol. 4 (34) , pp. 291-303.

Cooper, W. D. , Cornick, M. F. and Redman, A. (1992), "Capital Budgeting: A 1990 Study of Fortune 500 Company Practices," *Journal of Applied Business Research*, Vol. 8 (3), Summer, pp. 20-23.

Darvish, T. and Eckstein, S. (1988), "A Model for Simulation Sensitivity Analysis of Projects", *Applied Economics (UK)*, Vol.20 (1) , January, pp. 113-123.

Daniel, W. W. (1990), Applied Nonparametreic Statistics, PWS-Kent Publishing Co., Massachusetts, US.

Davis, G. B. (1974), *Management Information Systems : Conceptual Foundations, Structure, and Development*, New York: McGraw-Hill Book Company, p. 81.

Dean, J. (1951a), *Capital Budgeting* , New York: Columbia University Press.

Dean, J. (1951b), *Managerial Economics*, Prentice-Hall.

Doss, C. B. (1987), "The Use of Capital Budgeting Procedures in U. S. Cities." *Public Budgeting and Finance*, Autumn , pp.57-69.

Downs, A. (1967), *Inside Bureaucracy* , Little, Brown, and Co.

Emory, C. W. and Cooper, D.R. (1991), *Business Research Methods*, Homewood Richard D. Irwin, Inc., 4th Edition.

Enthoven, A. J. (1980), " Accounting in the Third World." *The Journal of Accounting*, March, pp. 76-78.

EIU (The Economic Intelligence Unit), (1996-97) ,UK. Country Profile, p.8.

EIU (The Economic Intelligence Unit), (1997), UK. Country Report, 1st quarter, p.8.

Ernst & Young (1992), *Doing Business in Bahrain*, International Business Series.

Evans, A. D. and Forbes, M. S. (1993), "Decision-Making and Display Methods: The Case of Prescription and Practice in Capital Budgeting," *The Engineering Economist*, Fall, Vol. 39 (1, pp. 45-56.

Fabbozi, R. J. (1978), "The Use of Operation Research Techniques for Capital Budgeting Decisions: A Sample Survey," *Journal of the Operational Research Society*, Vol .29 (1), January, pp. 39-42.

Farragher, E. J. (1986), "Capital Budgeting Practices of Non-Industrial Firms," *The Engineering Economist*, Vol. 33 (4), Summer , pp. 293-302.

Freeman, M. and Hobbes G. (1991), "Capital Budgeting: Theory Versus Practice," *Australian Accountant*, September, pp. 36-40.

Fremgen, J.A. (1973), "Capital Budgeting Practices: A Survey," *Management Accounting (US)*, May, pp.19-25.

Gadella, J. W. (1992), " Post-Project Appraisal: A Chance to Invest in Better Capital Projects," *Management Accounting*, March, pp. 52 & 58.

GDN , Gulf Daily News (1996), Vol. XIX, NO. 172.

Gitman, L. J. (1986), *Principles of Management Finance*, 4th Edition, Harper & Row.

Gitman, L. J. and Forrester, J. R. (1977), "A Survey of Capital Budgeting Techniques Used by Major US Firms," *Financial Management* , Fall , pp. 66-71.

Gitman, L. J. and Mercurio, V. A. (1982), " Cost of Capital Techniques Used by Major US Firms: Survey and Analysis of Fortune's 1000," *Financial Management*, Winter, pp. 21-29.

Gold, B. (1976), "The Shaky Foundations of Capital Budgeting," *California Management Review*, Winter, pp. 51-59.

Gordon, A. S. (1986), "A Certainty-Equivalent Approach to Capital Budgeting," *Financial Management, Winter*, pp. 35-46.

Gordon, L. A. and Myers, M. D. (1991) , " Post-auditing Capital Projects: Are You in Step with the Competition?, *Management Accounting*, January, pp. 39-42.

Gordon, L. A. and Pinches, G. E. (1984), *Improving Capital Budgeting: A Decision Support System Approach*, Reading, MA, Addison-Wesley.

Gordon, L.A. and Schick, A. (1990), "Designing Flexible Management Decisions Support Systems," *Journal of Accounting and EDP*, Spring, pp. 128-132.

Gordon, L.A. and Smith K.J. (1992), "Postauditing Capital Expenditures and Firm Performance: The Role of Asymmetric information," *Accounting Organisations and Society*, Vol. 17 (7), pp. 741-759.

Grossman, S. D. and Lindhe, R. (1984), "The Relationship Between Long-Term Strategy and Capital Budgeting," *Journal of Business Strategy*, pp. 103-105.

Gueciouer, A. (1984), *The Problem of Industrial Development and Integration in the Arab world*, Proceedings of a Symposium held at Yarmouk University, Jordan, November 4 and 5, 1981, West Press/ Boulder, Colorado.

Gullick, J. (1981), *Malaysia: Economic Expansion and National Unity*. Boulder, Colorado, Westview Press.

Gurnani, C. (1984), "Capital Budgeting: Theory and Practice", *The Engineering Economist*, Vol. 30 (1), Fall, pp. 19-46.

Habra, M. A. (1994), "The Industrial Sector in Bahrain", *Journal of Industrial Cooperation, Riyadh,* Issue 3, April, pp.38 42.

Haka, S. F. (1983), *An Investigation of the Relationship Between Sophisticated Capital Budgeting Techniques and Firm Performance.* Unpublished Ph.D. dissertation, University of Kansas.

Haka, S. F. , Gorden, L. A. and Pinches, G. E. (1985), " Sophisticated Capital Budgeting Selection Techniques and Firm Performance," *The Accounting Review,* October , pp. 651-669.

Hanson, A. H. (1965), *Public Enterprises and Economic Development.* London, Routledge & Kegan Paul, 2nd Edition.

Harrison, E. F. (1975), *The Managerial Decision-Making Process,* Houghton Mifflin.

Hastie, K. L. (1974), "One Businessman's View of Capital Budgeting," *Financial Management*, Winter, pp.99-122.

Hendricks, H. A., Bastian, R. C. and Sexton, T.L. (1992),"Bundle Monitoring of Strategic Projects," *Management Accounting*, February, pp. 31-35.

Hendricks, J.A. (1983),"Capital Budgeting Practices Including Inflation Adjustments: A Survey," *Managerial Planning,* January/February, pp. 22-28.

Hertenstein, J. H. (1990), *Behavior in Capital Budgeting: Capital Budgeting Procedures and the Process of Initiating Capital Investment Proposals*, Paper Presented at the American Accounting Association Conference, Toronto, August.

Ho, S.S.M. and Pike, R.H. (1991), " Risk Analysis in Capital Budgeting Contexts: Simple or Sophisticated?", *Accounting & Business Research*, Vol. 21 (83), pp. 227-238.

Ho, S.S.M. and Pike, R.H. (1992), "Adoption of Probabilistic Risk Analysis in Capital Budgeting and Corporate Investment", *Journal of Business Finance & Accounting*, Vol. 19 (3), April, pp. 387-405.

Hofstede, G. (1984), *Culture's Consequences*, Saga, London

Hollis, M. and Nell, E.J. (1975), *Rational Economic Man: A Philosophical Critique of Neo-Classical Economics,* Cambridge University Press, London.

Hollstein, B. R. (1995), " An Outline for Effective Benchmarking", *Security Management* (SEM), Vol. 39 (1), pp. 23-25.

Hoskins, C. G. and Dunn, M. J. (1974), "The Economic Evaluation of Capital Expenditure Proposals Under Uncertainty: The Practices of Large Corporations in Canada," *Journal of Business Administration,* Fall , pp. 45-55.

Isham, J. , Daniel, K. and Pritchett, L. H. (1997), "Civil Liberties, Democracy, and Performance of Government Projects", *The World Bank Economic Review,* Vol.11 (2), pp. 219-242

Istvan, D.F. (1961), *Capital Expenditure Decisions: How They Are Made in Large Corporations,* Indiana Business Report No. 33, Bureau of Business Research, Indiana University, Bloomington.

Jaggi, B. L. (1973), "Accounting Studies of Developing Countries: An Assessment." *The International Journal of Accounting,* Fall, pp. 159-169.

Jansen, H. P. (1977), *Project Evaluation and Discounted Cash Flows: A Reassessment and an Alternative Suggestion,* Amsterdam: North Holland Publishing.

Johnson, R. W. (1976), *Financial Management,* Boston, MA: Allyn and Bacon, Inc.

Jones, C. J. (1980), *Financial Planning and Control*: A Survey of Practices by UK Companies, Occasional Paper Series: Institute of Cost and Management Accountants.

Jones, C. J. (1986), "Financial Planning and Control Practices in UK Companies: A Longitudinal study", *Journal of Business and Accounting,* Vol. 13 (2), Summer, pp.161-184.

Kamath, R. and Oberst, E. R. (1992), " Capital Budgeting Practices of Large Hospitals," *The Engineering Economist,* Vol. 37 (3), Spring, pp. 203-232.

Keane, S., (1978), "The Cost of Capital As a Financial Decision Tools," *Journal Of Business Finance and Accounting,* Fall , pp. 339-353.

Kee, R., Robbins, W. and Apostolou, N. (1987), "Capital Budgeting Practices of US Cities: A Survey," *Government Accountants Journal,* Summer, pp. 16-22.

Ken, L. K. and Cherukuri, U. R. (1991), " Current Practices in Capital Budgeting: Cost of Capital and Risk Adjustment", *ASGI Journal of Management,* Vol.21 (1) , pp.26-44.

Kennedy, J. A. and Mills, R.W. (1992), "Post Completion Auditing: A Source of Strategic Direction?," *Management Accounting,* Vol.70 (5), pp.26-28.

Kennedy, J. A. and Mills, R.W. (1993), "Post Completion Auditing In Practice," *Management Accounting,* October, pp. 22-25.

Kerlinger, F. N. (1986), *Foundations of Behavioural Research,* New York: Holt, 3rd Edition, Rinehart and Winston, Inc, p.377.

Khan, A. (1987), "Capital Budgeting Practices in Large US Cities," *The Engineering Economist*, Vol. 55(4), Fall, pp.1-12.

Kim, S. H. (1975), *Capital Budgeting by Machinery Industry and its Impact on Overall Profitability,* Unpublished Ph.D. dissertation, Saint Louis University.

Kim, S. H. (1982), " An Empirical Study on the Relationship Between Capital Budgeting Practices and Earnings Performance', *The Engineering Economist*, Spring, Vol. 27 (3), pp. 185-195.

Kim, S. H. and Farragher, E.J. (1981), "Capital Budgeting Practices," *Management Accounting (US),* June, pp. 26-30.

King, P. (1975), "Is the Emphasis of Capital Budgeting Theory Misplaced", *Journal of Business Finance and Accounting.* Vol. 2 (1), Spring, pp 69-82.

Kira, D.S. and Kusy, M. I. (1990), "A Stochastic Capital Rationing Model," *Journal of the Operational Research Society (UK),* Vol. 41 (9), September, pp. 387-97.

Klammer, T. P. (1972), "Empirical Evidence of the Adoption of Sophisticated Capital Budgeting Techniques." *The Journal of Business,* July , pp. 387-397.

Klammer, T. P. (1973), "The Association of Capital Budgeting Techniques with Firm Performance," *The Accounting Review,* April , PP.353-364.

Klammer, T. P. and Walker, M. C. (1984), "The Continuing Increase in the Use of Sophisticated Capital Budgeting Techniques," *California Management Review,* Fall , pp. 137-148.

Klammer, T. P. and Walker, M. C. (1987), "Capital Budgeting Questionnaires: A New Perspective," *Quarterly Journal of Business & Economics*, Summer, pp.87-95.

Lamfalussy, A. (1981), *Investment & Growth in Mature Economy: The Case of Belgium*, London, MacMillan & Co. Ltd.

Lansing, J. B and Morgan, J. N. (1971), *Economic Survey Methods,* Ann Arbor: the University of Michigan Press, p. 160

Lapsley, I. (1986), "Investment Appraisal in UK Non-Trading Organisations," *Financial Accountability & Management*, Vol. 64 (6), Summer, pp. 135-151.

Lee, C.F. (1993), *Statistics for Business and Financial Economics*, D.C.Heath Company. Lexington, MA.

Levary, R. R. (1988), "A Sequential Solution Procedures to Stochastic Capital Budgeting Models," *Computers and Industrial Engineering*, Vol. 14 (4) pp. 371-80.

Levy, H. and Sarnat M. (1978), *Capital Investment and Financial Decision*, Prentice-Hall, Englewwod Cliffs, NJ. p. 57

Lilleyman, P. G. (1984), "Capital Budgeting: Current Practices of Australian Organisation." *The Australian Accountants*, March ,pp. 130-133.

Lindblom, C.E (1968), *The Policy-Making Process*, Prentice-Hall, New York.

Mao, J.C.T. (1970), " Survey of Capital Budgeting: Theory and Practices." *Journal of Finance*, March, , pp. 349-360.

March, J. G. and Simon, H. A. (1958), *Organisations*, New York: Wiley.

Marsh, P., Barwise, P., Thomas, K. and Wensley, R. (1988), *Managing Strategic Investment Decisions in Large Diversified Companies*, Centre for Business Strategy London Business School, London

McGuire, J. W. (1964), *Theories of Business Behaviour*, Englewood Cliffs, N.J: Prentice-Hall .

McIntyre, A. and Coulthurst, N. (1985), *Capital Budgeting Practices in Medium-sized Businesses-A Survey* , Chartered Institute of Management Accountants.

McIntyre, A. and Coulthurst, N. (1987) "Planning and Control of Capital Investment in Medium-Sized UK Companies", *Management Accounting*, March,Vol.65(3), pp.39-40.

McMahon, R. G. P. (1981), " The Determination and Use of Investment Hurdle Rates in Capital Budgeting: A Survey of Australian Practice," *Accounting and Finance*, Vol. 21 (1), May, pp. 15-25.

Meed (Middle East Economic Digest,1994), Vol. 38 (July 14), pp. 4-8, London.

Meed (Middle East Economic Digest ,1995), Vol. 52 (October 14), London.

Merrett, A.J. and Sykes, A. (1963), *The Finance and Analysis of Capital Projects*, Longmans Green & Co. Ltd.

Miller, A. J. (1988), "Selecting Capital Investment Projects for Local Government," *Public Budgeting and Finance*- Autumn, pp. 63-77.

Miller, J. H. (1960), *Glimpse at Practice in Calculating and Using Return on Investment*, National Association of Accountants Bulletin, June , pp. 65-76.

Miller, P. (1988), *Managing Economic Growth Through Knowledge: The Invention, Promotion and Development of Discounted Cash Flow Techniques*, unpublished, London School of Economics and Political Science, London.

Mills, R.W. (1988a), " Capital Budgeting Techniques Used in the UK and the USA," *Management Accounting*, Vol.66 (1) January, pp. 26-27.

Mills, R. W. (1988b), "Capital Budgeting-The State-of-the-Art," *Long Range Planning*, Vol. 21 (4), August, pp.76-81.

Mills, R.W. (1994), *Strategic Value Analysis*. Great Britain, Butler and Tanner Ltd.

Mills, R. W. and Herbert, P. J. A. (1987), *Corporate and Divisional influence in Capital Budgeting: A Study of Corporate and Divisional Practices in Large UK Companies*. The Chartered Institute of Management Accountants.

Mills, R. W. and John, R. (1993), *Fundamentals of Managerial Accounting and Finance*, 3rd Edition, Mars Business Associates Ltd., Glos., UK.

Mills, R. W. and Kennedy, J. (1988), " Post Completion Audit: Luxury or Necessary?", *Management Accounting*, Vol. 66(7), July/August, pp. 38-39.

Mills, R.W.and Kennedy, J. A. (1990), *Post- Completion Audit of Capital Expenditure Projects*. The Chartered Institute of Management Accountants, London.

Mills, R.W.and Kennedy, A. (1993), "Experiences in Operating a Post-Audit System", *Management Accounting*, Vol. 71 (10), November pp.26-28.

Ministry of Finance and National Economy (1994), Quarterly Economic Report, April, p.5., Bahrain

Ministry of Finance and National Economy (1994), National Accounts, Bahrain.

Ministry of Finance and National Economy (1995), National Accounts, Bahrain.

Mintzberg, H. (1994), *The Rise and fall of Strategic Planning*, Prentice Hall International, (UK) Limited, 1994.

Mintzberg, H., Raisinghani, D. and Theoret, A. (1976), "The Structure of Unstructured Decision Processes," *Administrative Science Quarterly*, June, pp. 246-275

Mirghani, M. A. (1979), *The Role of Accounting in the Economic Development of Developing Countries: The Case of the Sudan*. Unpublished D.B.A. dissertation, Indiana University, Bloomington.

Moore, J. S. and Reichert, A. K. (1989), " A Multivariate Study of Firm Performance and the Use of Modern Analytical Tools and Financial Techniques," *Interfaces*, May/June, Vol. 19(3), pp.79-87.

Mukherjee, T. K (1987), "Capital Budgeting Surveys: The Past and the Future." *Review of Business and Economics Research*, University of New Orleans, Spring, pp. 37-56.

Mukherjee, T.K. (1988), "The Capital Budgeting Process of Large US Firms, An Analysis of Capital Budgeting Manuals," *Managerial Finance*, Vol. 14 (2/3), pp.28-35.

Mukherjee, T. K. and Henderson, G. V. (1987), " The Capital Budgeting Process: Theory and Practice," *Interfaces*, Vol. 17 (2), March-April, pp. 78-90.

Myers, M.D., Gordon, L. A. and Hamer, M. L. (1991), "Postauditing Capital Assets and Firm Performance: An Empirical Investigation," *Management and Decision Economics*, August, pp. 317-327.

Neal, B. (1991), "A Revolution in Post-Completion Audit Adoption", *Management Accounting*, Vol. 66 (6), November, pp.44-46.

Neal, B. and Holmes, D.E. (1988), "Post Completion Audits: The Costs and Benefits," *Management Accounting*, Vol. 56 (6), March, pp.27-30.

Neal, C.W. (1991), " Investment Post-Auditing Practices: A Comparison of Manufacturing and Service Sector Companies," *Service Industries Journal (SIJ)*, Vo.11 (1), pp.75-92.

Neal, C. W. and Holmes, D.E. (1990), " Post-Auditing Capital Projects", *Long -Range Planning*, Vol.23 (4) pp.88-96.

Northcott, D.N. (1992), *Capital Investment Decision-Making*, The Chartered Institute of Management Accountants, Academic Press Ltd., London.

Nuckols, R. C. (1964), "Personal Interview Versus Mail Panel Survey," *Journal of Marketing Research, XXVI*, February, pp. 11-16.

Oblak, D. J. and Helm, R.J. (1980), " Survey and Analysis of Capital Budgeting Methods Used by Multinationals," *Financial Management*, Vol. 9, Winter, pp. 37-41.

OECD, (1994) Organisation for Economic Co-operation and Development, Development Assistance Committee- DAC.

Oppenheim, A.N. (1966), *Questionnaire Design and Attitude Measurement*, Basis Books.

Patterson, C.S. (1989), "Investment Decision Criteria Used by Listed New Zealand Companies," *Accounting and Finance*, November, pp. 73-89.

Pattillo, D. M. (1976), *Capital Investment Practices of Small Manufacturers in the United States: A Comparative Study of British-Owned and US-Owned Firms in the Scientific Equipment and Nonelectrical Machinery Industry Groups*, Ph.D. dissertation, School of Business Administration, Georgia State University.

Petry, G. H. (1975), "The Effective Use of Capital Budgeting Tools", *Business Horizons*, Vol.18(5), October, pp. 57-65

Petty, J.W. and Bowlin, O.B. (1978), "Financial Manager and Quantitative Decision Methods", *Financial Management*, Vol. 45 (9),Winter, pp. 32-41.

Petty, J. W., Scott, D. F. and Bird, M. M. (1975), "The Capital Expenditure Decision Making Process of Large Corporations," *The Engineering Economist,* Spring , Vol. 20 (3), pp. 159-171.

Pike, R. H. (1982), *Capital Budgeting in the 1980s: A Major Survey of the Investment Practices in Large Companies,* The Chartered Institute of Management Accountants.

Pike, R. H. (1983a), "A Review Of Recent Trends in Formal Capital Budgeting Processes," *Accounting and Business Research*, Summer, Vol. 5, pp. 201-208.

Pike, R., H. (1983b), " The Capital Budgeting Behaviour and Corporate Characteristics of Capital-Constrained Firms, *Journal of Business Finance & Accounting*, Vol.10 (4), pp. 663-671.

Pike, R. H. (1984), " Sophisticated Capital Budgeting Systems and Their Association with Corporate Performance" *Managerial and Decision Economics*, Vol. 5 (2), pp. 91-97.

Pike, R. H. (1988a), " The Capital Budgeting Revolution." *Management Accounting*, October, Vol. 18 (72), pp.28-30.

Pike, R.H. (1988b) "An Empirical Study of The Adoption of Sophisticated Capital Budgeting Practices and Decision-making Effectiveness," *Accounting and Business Research*, Autumn, Vol. 18 (74) pp. 341-351.

Pike, R. H. (1989), " Do Sophisticated Capital Budgeting Approaches Improve Decision- Making Effectiveness," *The Engineering Economist*, Vol. 65 (6), Winter, pp. 149-161.

Pike, R. H. (1996), " A Longitudinal Survey on Capital Budgeting Practices," *Journal of Business Finance & Accounting*, Vol. 23 (1), pp. 79-92.

Pike, R. H. and Dobbins, R. (1986), *Investment Decisions and Financial Strategy.* Oxford, Phillip Allen.

Pike, R.H. and Neal, C.W. (1992), *Capital Budgeting in Dury*, C. (ed) Management Accounting Handbook. Butterworth-Heinneman, in Associaton with CIMA, London.

Pike, R. H. and Sharp, J. (1989), "Trends in the Use of Management Science Techniques in Capital Budgeting," *Managerial and Decision Economics,* Vol. 10, pp. 135-40.

Pike, R.H. and Wolfe, M.B. (1988), *Capital Budgeting for the 1990: A Review of Capital Investment Trends in Larger Companies,* The Chartered Institute of Management Accountants , Occasional Paper Series, London.

Pinches, G. E. (1982), " Myopia, Capital Budgeting and Decision making," *Financial Management,* Autumn , pp. 6-19.

Piper, J. (1980), "Classifying Capital Projects for Top Management Decision Making", *Long Range Planning,* June, pp.45-55.

Pope, R. (1987), " Current Capital Budgeting Practices: A Comparison of Small and Large Firms," *Southwest Journal of Business and Economics,* Winter, pp. 16-24.

Ramadan, S. (1991), "The Association Between Capital Budgeting Practices and Firm Performance: An Empirical Investigation," *Journal of King Saud University, Administrative Science,* Vol.3 (5), pp.187-212.

Reimann, C. B. (1990), "Why Bother with Risk Adjusted Hurdle Rates?," *Long - Range Planning,* Vol.23 (3), pp. 57- 65.

Rockley, L. E. (1973), *Investment for Profitability,* London: Business Books Ltd.

Ross A. S. (1976), "The Arbitrage Theory of Capital Pricing", *Journal of Economic Theory,* December, pp. 343-362.

Rosenblatt, M. J. (1980), "A Survey and Analysis of Capital Budgeting Decision Processes in Multi-Division Firms",*The Engineering Economist, Summer,* Vol. 35 (10), pp. 259-273.

Runyon, L.R. (1983), " Capital Expenditure Decision Making in Small Firms," *Journal of Business Research,* Vol. 11 (3), September, pp. 389-397.

Samidi, J.B. (1989), *An Empirical Investigation of the Capital Budgeting Decision Process of Government-Controlled as Compared to Investor-Owned Enterprises.* The Case of Malaysia, Unpublished Ph.D. dissertation, University of Arkansas.

Sangster, A. (1993), " Capital Investment Appraisal Techniques: A Survey of Current Usage", *Journal of Business Finance & Accounting,* Vol.20 (3), pp. 307-333.

Scapens, R.W. and Sale, J. T. (1981), "Performance Measurement and Formal Capital Expenditure Controls in Divisionalised Companies," *Journal of Business Finance and Accounting,* Autumn , Vol. 8 (3), pp. 389-419.

Scapens, R.W., Sale, J. T. and Tikkas, P.A. (1982), *Financial Control of Divisional Capital Investment,* The Institute of Cost and Management Accountants, UK.

Schall, L. D. and Sundem, G. L. (1980), "Capital Budgeting Methods and Risk: A Further analysis," *Financial Management,* Vol. 35 (10), Spring, pp. 7-11.

Schall, L. D. , Sundem, G. L. and Geijsbeck, W. R. (1978), " Survey and Analysis of Capital Budgeting Methods," *Journal of Finance,* March , Vol. 33 (1), pp. 281-287.

Schermerhorn, J. R. (1996), *Management and Organisational Behavior,* Chapter 3, p.38, John Wiley & Sons.

Selltiz, C. Wrightsman, L. S. and Cook, S. W. (1976), *Research Methods in Social Relations,* 3rd Edition., New York: Holt, Rinehart and Winston.

Shao L. P. (1994), " Capital Investment Evaluation Procedures Utilised by North and Latin American Affiliates", *Multinational Business Review,* Spring, Vol. 2 (1), pp. 11-18.

Sharpe, W F. (1964), "A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance,* September, pp.425-442.

Simon, H. A. (1957), *Models of Man,* New York: Wiley, p p. 198.

Simon, H. A. (1960), *The New Science of Management Decisions,* Harper and Row.

Smith, K. J. (1993), "Investment Monitoring System, Abandonment of Capital Assets, and Firm Performance: An Empirical Investigation," *Journal of Management Accounting Research,* Fall, pp.7-15.

Soelberg, P, (1967), "Unprogrammed Decision Making," *Industrial Management Review,* Spring, pp.19-29.

Todaro, M. P. (1994), *Economic Development,* New York University, 5th Edition, Longman Group UK Limited.

Tomkins, C. R. (1991), *Corporate Resource Allocation, Financial, Strategic and Organisational Perspective,* Basil, Blackwell.

Tomkins, C. R., Edwards J. P., Nicholls J. R. and Thomas R. E. (1978), *Investment Lead Times in British Manufacturing Industry,* CBI.

Tull, D. S. and Hawkins, D. I. (1976), *Marketing Research: Meaning, Measurement, and Methods* , New York: Macmillan Publishing Co., p.106, p.391

UNIDO (1986), "*Industrial Development Review Series: Bahrain*", United Nations, Vienna.

Van Horne, J. C. (1995), *Financial Management and Policy,* Englewood Cliffs, New Jersey, 10th Edition, Prentice-Hall International, Inc.

Velez, I. and Nieto, C. (1986), " Investment Decision-Making Practices in Columbia: A Survey," *Interfaces,* Vol. 56 (12), July-August, pp. 60-65.

Venugopal, V. and Narendran, T. T. (1990), " An Interactive Procedure for Multiobjective Optimisation Using Nash Bargaining Principles," *Decision Support Systems*, Vol. 6(3), August, pp. 261-268.

Vijay A. L. and Ashwani, K. D. (1994), "Capital Budgeting Practices of Large Canadian Firms", *Journal of Business Administration*, Spring, pp. 55-62.

Weaver, J. B. (1974), "Organising and Maintaining a Capital Expenditure Program", *The Engineering Economist*, Vol. Spring, pp. 1-35.

Weston, J. F. and Brigham, E. F. (1979), *Managerial Finance*, Hinsdale, IL: The Dryden Press.

Westwick, C. A. and Shohet, P.S.D. (1976), *Investment Appraisal and Inflation*, Research Committee Occasional Paper No. 7. The Institute of Chartered Accountants in England and Wales.

Williams, B. R. and Scott, W. P. (1965), *Investment Appraisal and Inflation*. London. Institute of Chartered Accountants in England and Wales.

Williams, R. W. (1970), "Industry Practice in Allocating Capital Resources," *Managerial Planning* , May/June , pp. 15-22.

Wilson, R. M. and Chua, W. F. (1988), *Managerial Accounting: Method and Meaning*, Van Nostrand Reinhold (International) Co. Ltd., London.

Witte, E. (1972), " Field Research on Complex Decision-Making Processes - The Phase Theorem,"*International Studies of Management and Organisation*, Summer, pp. 156-182.

Yavitz, B. and Newman, W. H. (1982), *Strategy in Action: The Execution, Politics, and Payoff of Business Planning* , New York: Free Press.

Zikmund, W. G. (1991), *Business Research Methods*, 3rd Edition, the Dryden Press,

Appendices

Appendix A

Questionnaire Pretesting

Date:

To: MP21

One of my PhD students, Nadhem Saleh Al-Saleh, needs to pilot a questionnaire that he has put together as part of his research on capital budgeting practices. He now needs to pilot this questionnaire, a situation with which I am sure many of you have some sympathy. His initial concern as regards piloting is whether the questionnaire makes sense, contains any ambiguities and to this end I would welcome your assistance.

I emphasize that the purpose is to identify any significant weaknesses in the questionnaire design and your assistance would be greatly appreciated.

Thank you.

Roger

Appendix B

Covering Letter to Companies

Dear Sir,

As part of our ongoing commitment to practical management research here at Henley, we are currently conducting a study to assess the "state of the art" in capital budgeting, as practised by specific British companies. Your company has been selected to be included in this study and therefore your inputs to this research are critical.

The importance of this study is two-fold:(1) it will assist in the dissemination of information relating to actual capital budgeting practices, and (2) it should allow the business community to better direct its attention toward a sound and efficient allocation of economic resources under its control.

We have enclosed a short questionnaire which simply requires you to indicate your choice from the given alternatives. It does not require you to write any comments or undertake laborious searching in files! A reply paid envelope is enclosed for your convenience.

Your response will be treated in the strictest confidence. Within the questionnaire we have provided a mechanism through which you can obtain a summary of the results of this study.

Thank you in anticipation of your co-operation.
Yours sincerely,

Roger W. Mills
Professor of Accounting & Finance

Nadhem Al-Saleh
Research Associate

Date:

Dear Sir:

This is to certify that Mr. Nadhem Al-Saleh is currently working towards his PhD in financial management at Brunel University in the UK on scholarship from University of Bahrain, as part of a staff development plan.

Mr. Al-Saleh is currently conducting a pilot survey of capital budgeting practices used by major Bahraini industrial firms in analysing the capital investment.

To this end, Mr. Al-Saleh is circulating a questionnaire seeking data from your firm which will be handled with strictest confidence. Any assistance you can render to him will be deeply appreciated.

Thank you kindly for your cooperation.

George K. Najar, PhD
Dean

Date:----------

Mr.----------

Dear Sir,

I would like to express my gratitude for the assistance and cooperation, that Mr. Nadhem Al-Saleh received from the officials in your company during his earlier visit, to collect information on the: " Capital Investment Process" as part of his research sponsored by the University of Bahrain.

He is currently conducting the final phase of his doctoral research at the University of Brunel-UK, and I would be grateful if you could kindly arrange for him to meet with officials in your company who wish to be able to assist him.

I wish to assure you that data collected from your company will receive the highest level of strict confidentiality, and will only be used for research purposes.

Looking forward to hearing from you.

Sincerely yours

George. Najar
VP for Planning & Community Service

Encl.: questionnaire

UNIVERSITY OF BAHRAIN
Office of the Vice-President for Planning
& Community Service

جامعة البحرين
مكتب نائب الرئيس للتخطيط
وخدمة المجتمع

To: .....

Date: .....

الرقم: .....

التاريخ: 18 اكتوبر 1995

الأستاذ الفاضل / مصطفى السيد الموقر
المدير العام
شركة الخليج لصناعة البتروكيماويات (GPIC)
ص.ب : 26730

تحية طيبة وبعد ،

نود أن نعبر لكم عن شكرنا وتقديرنا على تعاونكم مع السيد ناظم صالح الصالح خلال زيارته السابقة بشأن جمع البيانات اللازمة لدراسة الدكتوراه التي يقوم بها حالياً في جامعة برونل ببريطانيا مبتعثاً من كلية ادارة الأعمال بجامعة البحرين، والمتعلقة بقرارات الاستثمار في الأصول الرأسمالية بالشركات البحرينية . فانني أتقدم لكم برجاء التكرم بتحديد موعد له لمقابلة من ترونه مناسباً من المسئولين بالشركة ، وذلك لاستكمال الحصول على اجابتهم بشأن الاستبانة المعدة لهذا الغرض والتي سوف تساهم اسهاماً كبيراً في اتمام الدراسة على الوجه المنشود.

وانني اذ أشكركم سلفاً على حسن تعاونكم في هذا الشأن لأود أن أكرر لكم الحرص التام على بقاء هذه المعلومات في سرية تامة ، ولن تستخدم الا لأغراض البحث العلمي.

آملين أن يلقى طلبنا هذا جلّ اهتمامكم،،

وتفضلوا بقبول فائق التحية والاحترام

جورج خليل نجار
نائب الرئيس للتخطيط وخدمة المجتمع

المرفقات : نسخة من الاستبيان

P.O. Box: 32038 - State of Bahrain
Telephone: 449210
Telex: 9552 JAMEA BN
Fax: 449900

صندوق بريد: ٣٢٠٣٨ - دولة البحرين
هاتف: ٤٤٩٢١٠
تلكس: ٩٥٥٢ جامعة - بحرين
فاكس: ٤٤٩٩٠٠

Appendix C

Questionnaire to Survey Capital Budgeting Practices of British and Bahraini Companies

Please give the following details so that the study results can be forwarded to you:

Name.....

Position.....

Company.....

Address.....

.....

.

Telephone Number.....

Would you like a summary of the results of this study? Yes☐ No☐

Please indicate your response by ticking the appropriate box. Feel free to make additional comments on your answers to any or all questions.

Section 1: This section seeks information on your company's capital budgeting practices. Questions in this section are related to administrative procedures, evaluation techniques, risk analysis methods, and post-completion-audits. Section 1 covers questions 1-17.

Q.	QUESTIONS
1	Which of the following criteria most closely determine whether or not an item is regarded as a capital expenditure? a. Size of expenditure ☐ b. Economic life of the acquired asset ☐ c. Both a & b ☐ d. Others; please specify

2	Does your company have various classes or categories of capital expenditure? Yes☐ No☐ If your answer is "**Yes**" could you please indicate what these classes or categories are ? For example a. Replacements to presently owned facilities ☐ b. Cost reduction for the purpose of achieving operating efficiencies ☐ c. Expansion: additions to productive facilities to increase capacity ☐ d. New Plant or Business: construction or acquisition of complete facilities or new business units ☐ e. Others; Improvement io working conditions, new research facilities, new office building, etc. please specify. ☐

3	Does your company: a. prepare a long-range capital budget? Yes☐ No☐ b. Require a specific search for alternatives to major investment projects before accepting projects? Yes☐ No☐ c. Have a formal body responsible for screening and reviewing investment proposal? Yes☐ No☐ d. Have at least one full-time staff member assigned to capital budgeting? Yes☐ No☐ e. Have an up-to-date capital budgeting manual or written procedures? Yes☐ No☐
4	If your answer to **3d** above is **"Yes,"** could you please indicate how many staff members are involved? a. One ☐ b. Two ☐ c. Three ☐ d. More than three ☐
5	If your answer to question **3e** above is **"Yes,"** could you please indicate when it was last reviewed? a. 1 to 2 years ago ☐ b. 3 to 5 years ago ☐ c. more than 5 years ago ☐

6	What kind of capital budgeting techniques does your company use in the evaluation of major capital expenditure proposals ? a. Payback method ☐ b. Average rate of return ☐ c. Discounting- Internal rate of return ☐ d. Discounting- Net present value ☐ e. Others; please specify Please state the most important method if different from that most used:
7	If your company utilises a discounted cash flow approach, please indicate the cost of capital approach (discount rate) used by your company? a. Cost of equity capital ☐ b. Cost of debt ☐ c. Weighted average cost of capital ☐ d. Return from a risk free asset plus a premium associated with your risk class ☐ e. A measure based upon past experience ☐ f. Others; please specify ☐

8	Does your company employ any of the following management science techniques ? a. Decision theory ☐ b. Computer simulation ☐ c. Mathematical programming ☐ d. Pert/ critical path method ☐ e. Game theory ☐ f. Regression Analysis ☐ g. Other; please specify
9	Does your company have a formal method for assessing the riskiness of capital projects ? Yes☐ No☐
10	If your answer to (9) is **"Yes,"** what methods are used in adjusting project estimates for risk? a. Shortened payback period for risky projects ☐ b. Risk adjusted discount rate ☐ c. Probability theory ☐ d. Certainty equivalent approach ☐ e. Sensitivity approach ☐ f. Capital Asset Pricing Model ☐ g.Other; please specify Please state the most important method from different to that most used:

11	Does your company: a. have a method of controlling the relationship between money actually spent in carrying out a major project and the money approved for it? Yes☐ No☐ b. compare the actual length of completion for major projects with the estimated completion period ? Yes☐ No☐
12	Does your company carry out post auditing of capital projects ? Yes☐ No☐ If your answer is **"No,"** please refer to question **15** If your answer is **"Yes,"** please refer to question **16**
13	Is post auditing carried out on all projects ? Yes☐ No☐

For questions 14-15 please indicate the relative importance of each of the following possible answers by ticking the appropriate box:

1= very important
2= important
3= average importance
4= slightly important
5= not important

14	What are the main constraints on the size of your company's investment programme ?	1	2	3	4	5
	• Lack of capital available from capital markets	☐	☐	☐	☐	☐
	• Unwillingness to increase level of borrowings	☐	☐	☐	☐	☐
	• Lack of profitable investment opportunities	☐	☐	☐	☐	☐
	• Lack of trained managers capable of implementing investment opportunities	☐	☐	☐	☐	☐
	• General economic uncertainty	☐	☐	☐	☐	☐
	• Others; please specify					

15	From Q. 12 If your company does not conduct formal post completion-audits, what are the main reasons for not doing so ? • Lack of suitable resources ☐ ☐ ☐ ☐ ☐ • Difficulty of separating the cost and benefits of a project from other company activities ☐ ☐ ☐ ☐ ☐ • Potential benefits do not justify cost ☐ ☐ ☐ ☐ ☐ • Changed environmental conditions make post-audit impossible ☐ ☐ ☐ ☐ ☐ • Others; please specify

16

From Q. 12

This question is related to post-completion audit. Please indicate your degree of agreement with each of the following statements by ticking the appropriate box on the scale:

Strongly Agree- SA
Agree-A
Neutral-N
Disagree-D
Strongly Disagree- SD

Post-auditing

	SA	A	N	D	SD
• Improves the quality of decision making	☐	☐	☐	☐	☐
• Encourages greater realism in project appraisal	☐	☐	☐	☐	☐
• Provides a means of improving control mechanism	☐	☐	☐	☐	☐
• Enables the speedy modifications of under-performance/over- performance projects	☐	☐	☐	☐	☐
• Increases the frequency of project termination for bad projects	☐	☐	☐	☐	☐
• Highlights reasons for successful projects which may be important in achieving greater benefits from future projects	☐	☐	☐	☐	☐
• Others; please specify					

17	Would you say that over the last five years your company's capital budgeting process and techniques have become: **A.** • More sophisticated ? ☐ • Less sophisticated ? ☐ **B.** • More effective in evaluating projects? ☐ • Less effective in evaluating projects? ☐ **C.** • More effective in controlling projects? ☐ • Less effective in controlling projects? ☐ **D.** • No change? ☐

Section 2: This section of the questionnaire seeks information on the relative importance of a number of capital budgeting elements as viewed by your company.

(Below are guidelines for completing this section)

Guidelines for Completing Section 2 of the Questionnaire:

Previous research into capital budgeting practices among companies in the UK and the US has shown that capital budgeting is viewed as a system comprising a number of investment criteria. The importance of these criteria varies from one company to another, depending largely on the company size, nature of its operation, and the types of investment projects it undertakes. To determine the importance of these factors as viewed by your company, we kindly request you to complete this section of the questionnaire following the instructions provided.

(On the following page, you will find the weights assigned to the various elements of capital investment criteria as reported in previous research. These weights are shown by percentage. For example, evaluation techniques have the highest score of 23%, whereas post-audits have the lowest score of 5%. Notice that there are only eight weights because both expenditure control and use of management science techniques have been assigned the same weights).

In order to determine the relative importance of these criteria as viewed by your company, we would be very grateful if you could answer the following question:

Do you agree with the weighting system given?

Yes ☐ **No** ☐

If your answer to the above question is **'No'**, could we ask you to assign a weight to each criterion reflecting the relative importance your company attaches to that criterion .

Note: the total weights must equal 100

Investment Criteria	**Present Weight**	**Company weight**
Preparation of a long-term capital budget	17%	
Systematic search for alternatives to major projects	11%	
Existence of a screening and reviewing body	14%	
Project evaluation techniques	23%	
Use of management science techniques	7%	
Risk analysis	10%	
Employment of full-time capital budgeting staff	6%	
Expenditure control	7%	
Post-audits	5%	
Total	100%	100%

Thank you for your time and help

Appendix D

An Example of Capital Expenditure Requisition Form

Investment Expenditure Authorisation Project Up to $ 50,000	Note: Approved original only to be Forwarded to Eng. Div. Who will Allocate Ex. & Er Nos. & Distribute	ER. EX No.
To. (Action Department)	Form (Originating Department)	2062 No.
Title of Proposal		

Estimated Cost $				Expend. Schedule $		Func. Code
Item	Orig. Cost $	Supplement $	Rev. Cost $	Year	Proposed	Dep. Code
Eng. & Supvn.				1995		
Material & Frt.				1996		Proj. Engr.
Labour/ Contracts				1997		
Other				%	Investment	Profit
Contingency						
Total				%	Expense	Non-Profit

A. Background and Present Situation

B. Proposal and Alternatives Considered

C. Justification

Requested By	Approved By	Title	Date Approved

ER2147. SAM

Source: Adapted from form used by Banoco

Appendix E

The Values of Capital Budgeting Attributes of the British Target Population

Appendix E. The Values of Capital Budgeting Attributes of the British Target Population

Attribute / Company No.	Turnover. £'M	Total Assets £'M	Capital Intensity Ratio
1	530	420	.75
2	520	210	.62
3	630	340	.55
4	250	360	.75
5	710	410	.57
6	340	560	.76
7	670	710	.75
8	255	150	.60
9	540	233	.72
10	310	150	.63
11	460	570	.72
12	322	110	.50
13	297	175	.55
14	410	221	.67
15	670	340	.75
16	412	120	.45
17	415	140	.56
18	265	190	.66
19	295	185	.71
20	340	260	.67
21	150	96	.58
22	311	210	.55
23	415	205	.60
24	329	187	.65
25	252	110	.55
26	285	148	.67
27	560	632	.80
28	401	510	.75
29	305	195	.68
30	415	458	.75
31	506	116	.45
32	255	175	.47
33	242	190	.67
34	340	205	.72

This Table is continued overleaf

Appendix E. Continued

Attribute. / Company No..	Turnover. £'M	Total Assets. £'M	Capital Intensity Ratio
35	212	110	.50
36	245	205	.42
37	245	139	.41
38	249	220	.42
39	305	96	.54
40	90	93	.45
41	110	120	.56
42	165	95	.46
43	195	92	.50
44	88	102	.55
45	97	97	.57
46	110	105	.60
47	112	98	.45
48	130	101	.54
49	401	144	.61
50	185	105	.65
51	78	100	.46
52	91	95	.48
53	134	92	.55
54	75	107	.41
55	290	110	.56
56	82	101	.42
57	101	98	.50
58	167	99	.58
59	99	112	.46
60	260	92	.66
61	313	118	.60
62	261	121	.72
63	252	94	.68
64	310	103	.56
65	427	110	.44
66	502	115	.51
67	590	220	.62
Maximum Value	670	632	.80
Minimum Value	75	92	.41

Figures rounded to one million
Source: The Financial Times, 1000 Top UK companies, 1993