

“ Capital Budgeting, The Decision Making Proposal at Maintenance Management Level”

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Declaration:

I Calvin Ramcharan (Student number: 203 516 989) hereby declare that the study presented is my own work. It has not been submitted to any other institution of higher education for academic qualification.

A handwritten signature in black ink, appearing to read 'Calvin Ramcharan', written over a horizontal line.

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Confidentiality Agreement:

To gather primary data for the study, Toyota South Africa was researched. To protect the image of the company it was agreed to uphold a 5-year confidentiality clause.

A handwritten signature in black ink, appearing to read 'Ramcharan', is written over a horizontal line.

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Dedication:

I quote from a letter received from my dad on 07 June 1990 that has been a source of inspiration and motivation during the difficulties in my life: "I believe in you and am assured that you will reach greater heights in life. A father who only saw far, but his children got there."

In memory of my dad, I dedicate this study to him.

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I wish to express my sincere appreciation and gratitude to the following individuals, without whose assistance, this study would not have been possible:

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- Last but certainly most importantly, I thank My God for sustaining me and giving me the mental stability and ability to complete this study.

Abstract:

In researching Capital Budgeting, special emphasis is employed to the Decision Making proposal presented by Maintenance Management. This study attempts to reveal the Capital Budgeting Techniques used by Toyota South Africa's Maintenance Departments. It interrogates if these techniques are correctly administered, and whether or not an appropriate decision is made.

An indepth study of Capital Budgeting theory is done where among others, the following topics are discussed: The Capital Budgeting Process; The Techniques used in Capital Budgeting; Types of Projects; Funding and Risk. The detail of the theory is intended to be as an educator to those oblivious to the standards set out by scholars on these relevant topics.

A questionnaire type survey was conducted, where the respondents answered pertinent questions, that adds value to this study. The unique feature of this study is that the sample size of thirty-five, is equivalent to the population of respondents within the company. A holistic picture of only the relevant information is gathered and interpreted, where both graphical and tabular representation is used to explain the findings.

What is evident from the survey is that there is a lack of knowledge in the Maintenance Departments with regards to the usage of Capital Budgeting Techniques. The results prove that much guesswork goes into the proposal, as Gut-Feel and Discretion are key components of the decision. This anomaly is due to the finding that the Maintenance Management has not received relevant type training for this facet of their jobs.

The recommendation to Management is that training and education be made available to these relevant people. Furthermore, it is proposed that the human resource department maps out the future career path opportunity and expectations that the employer has from the employee. In doing this type of succession planning, the company is assured of the best quality management at all times.

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CHAPTER ONE

The Study Overview

1.1 Introduction

According to Marx *et al* (1999), Capital Budgeting, also called capital investment analysis, is the process of evaluating and selecting long term investments that are consistent with the goal of increasing the firm's value. Financial management is largely concerned with financing and investment decisions of the firm with the goal of maximising the market value of the firm to its shareholders. The Financing decision deals with the firms capital structure in terms of debt and equity, while investment decision deals with the way funds raised are employed in productive activities to achieve the firms' overall goal.

Researchers have in the past constructed numerous capital budgeting models that attempt to attain consistent accuracy in validating investment decisions. With the knowledge that interest rates, inflation rates, and expansion and contraction of the economy have direct impact on the financial decision, this paper will examine financial appraisal techniques that could be adapted by Toyota as one of the critically important and complex stages in the capital budgeting process.

So too is the need to align the company's departmental targets and action plans to the corporate goals. In so doing, synergy is created between the various functional departments within a company.

This exact need for change is what many businesses need in this dynamic environment that it trades in, in the endeavor to stay ahead of the rest. This paper will deal with the need for Plant Maintenance departments, especially that of Toyota South Africa, to change the style or procedure of Capital budgeting that is being used in the acquisition of production related equipment for the plant. Senior, influential and knowledgeable

people are needed when making capital budgeting decisions in multinational companies, like Toyota, this due to the large sums of money involved and the irreversibility of the decision. The demanding challenge to the team that ultimately makes the financial decision is that of integrating the most critical elements into an organized structure for evaluation.

Investment assets are valued on the basis of cash flows produced by the asset during its useful life (holding period), and the final value of the investment on disposal. Bierman & Smidt (1993) noted that if the expected benefits are likely to accrue over a relatively long time, the solution becomes more complex and the chance of making incorrect decisions increases.

1.2 Company Background

Toyota South Africa holds the franchise for the import, assembly, manufacture and distribution of Toyota and Hino motor vehicles in South Africa. It is a leading manufacturer of motor vehicles in South Africa and holds the highest market share for over two decades in succession. It also services the global market where both passenger and commercial range vehicles are exported to foreign countries. In a speech at the Durban based operation on 27 October 1998, President Mandela echoed his interpretation of the confidence that this company has in the global arena. He stated that “When Toyota Motor Corporation (TMC – Japan) invested R484 million to buy a 27,8% share into Toyota South Africa in 1996, it was a sign of confidence in this company to produce, market and sell its product.”

The plant is relatively labour intensive though extremely automated in design and structure of Facilities and Equipment. Although very successful at this point in time, the plant is susceptible to changes in efficiency and productivity based on the actual output that is achieved by production related Equipment and Facilities. This strategy is certainly no guarantee that the current methods being employed in decision making in

the procurement of Plant and Equipment are by any means the best or most suitable for sustaining the company's positive trends.

1.3 Motivation for the research

Currently the procedure being carried out by the Maintenance Departments of Toyota SA is, at the nearing of the next financial year all managers are tasked to put together their requirements in terms of Capital Budget requirements for the next year. All managers then in their very limited knowledge or exposure of any financial bearing or decision making skill, rally around looking at what they see as necessities for the company in terms of equipment acquisition. This 'rather inflated' list is forwarded to the Senior Management team, who then evaluates this. They form a much-condensed list, which is then forwarded to the Executive Management Team, and Finance for approval.

Take time to note here that nothing is mentioned about following a specific technique or procedure to generate the list of equipment requirements at either manager or Senior Manager level. No attempt is made to perform any type of calculation to eliminate the items that did not reach the attention of the Executive Management Team.

The firm cannot afford to continually proceed in this unstructured method of Decision Making for procurement of Capital. A reasonable simple to understand solution to execute capital budgeting must be investigated to resolve the problem at hand.

The literature review is to provide an overview of the conventional techniques of investment appraisal, and then generate a backdrop against which to examine Toyota South Africa. The focus then is to investigate and evaluate the techniques and systems practiced in industry in making the decision to procure facilities and equipment.

For the purpose of this paper, only the avenue of Capital Budgeting of Equipment that fall under the jurisdiction of maintenance will be explored. Although definite in its

approach, these investments have a considerable impact on the firms' future cash flows, and thus a long-range effect on the performance and profitability.

According to Du Toit *et al* (1997), capital budgeting is the Identification, Evaluation and Selection of the long term or fixed assets that will increase shareholder value. In reviewing the literature related to the capital budgeting activity, several stages are noted:

- **Strategic Planning:** Which converts the firms' corporate goals into specific policies, sets priorities, specifies structural, strategic and tactical areas, and guides the planning process in pursuit of solid objectives.
- **Identification of investment opportunities:** These have to fit into the firms' corporate goals, vision, mission and long term strategic plans.
- **Preliminary Screening:** Must be carried out to identify and isolate the marginal and unsound proposals. Often this screening involves quantitative analysis and judgements based on intuition and experience.
- **Financial Appraisal:** The projects that pass through this stage automatically become candidates for in-depth scrutiny, as they are tested for value. This stage of the process analyses the expected future cash flows, analyses the risk associated with these cash flows, develops alternate cash flow forecasts, examine sensitivity, subject cash flows to simulation and prepare estimates of the investments net present value.

This critical stage involves the application of forecasting techniques, project evaluation techniques, risk analysis and mathematical calculation techniques. The feedback from this stage to strategic planning plays a crucial role in the Capital Budgeting Process.

- **Qualitative Factors:** These have an impact on the investment, but are difficult to evaluate accurately in terms of monetary value.
- **Accept / Reject Decision:** This is the outcome generated from both quantitative and qualitative findings combined with management's prior learning, experience, "gut feel" and judgement.
- **Implementation and Monitoring:** Various divisions within the firm carry out this stage. Deviations from the estimated cash flows are highlighted immediately and corrected if necessary.

- **Post Implementation Audit:** A crucial step in ascertaining how accurate the decision making process was.

Marx *et al* (1999) is similar in their approach to the Capital Budgeting Process Although they make the process more concise, their basic concepts are in line with other viewpoints on the subject matter. Their approach to the process is encapsulated in these five steps:

- Proposal Generation
- Review and Analysis
- Decision Making
- Implementation
- Control. Marx *et al* (1999), Gitman (2000).

The calculations that are executed in the appraisal decision forms a basis to the final decision. The categories of the appraisal that come to the fore are those that ignore the Time Value of Money, namely: Rate of Return and Payback Techniques. These are static in nature and thus generate many debates regarding shortcomings and disadvantages.

More appropriate is the Net Present Value, Internal Rate of Return, Terminal Value Rate of Return and the Discounted Payback, as these are dynamic in nature and thus offer a more holistic viewpoint. Although these are more appropriate, they also have restrictions, as many studies are carried out to ascertain alternate methods.

So what has this got to do with the Maintenance Department in Toyota?

Everything, as:

$$\text{Revenue} = \text{Price} \times \text{Volume}$$

$$\text{Volume} = \text{Maximum Capacity} \times \text{Equipment Effectiveness}$$

Therefore the choice and need to upgrade equipment, in simpler terms Capital Budgeting for equipment, becomes paramount in generating the required Revenue to stay profitable and leader in this segment of the market.

1.4 Objective of the Study

The objective of this study is that it will attempt to give an overview of the capital budgeting process. It is anticipated that it will be used as an educator, to those in the company that are not familiar with the procedures in decision making during the procurement of Equipment and Facilities, that are used and aid in the production of motor vehicles. The main objective of this study will be to reflect on what the company is currently practicing in terms of capital budgeting. Then offer recommendations that need to be adapted in the effort to rectify the anomaly that may be prevalent in our own corporate society.

Although there is no end to the level of sophistication and possibilities available for this topic, management needs a holistic picture of only the relevant information that is gathered and interpreted. This information needs to correlate into a concise, practical fashion to enable accurate appraisal techniques to be applied to it.

1.5 Problem Statement

Capital Budgeting decisions made by Toyota South Africa's Maintenance Departments is based solely on cost structure. Due to proper Capital Budgeting techniques not being implemented, inadequacies in the procurement of necessary Facilities and Equipment impact the effectiveness and efficiency of the plant. The plant inefficiency will lead to a direct inability to meet customer demands, therefore adversely affecting market share.

In attempting to resolve this problem, the techniques researched in the literature review will be used to formulate a possible solution. This solution is intended to positively impact the plant inefficiencies, and market share.

1.6 Research Methodology

A thorough literature review that focuses on appraisal methods and decision making will be undertaken. Empirical data will be collected by means of Questionnaire type survey within the boundary of the company. The findings of this will be used together with the extensive literature review in the effort of producing a solution that can be adopted by the firm's maintenance department.

Various dimensions will be investigated in order to justify the appraisal techniques, and demonstrate their usefulness. Finally, recommendations will be offered to the company in the view of improving their current situation.

1.7 Limitations of the project

Due to the extensive nature of this topic, limitations are unavoidable.

Certain information regarding the company's profitability will be withheld.

All information supplied regarding any facet of Toyota South Africa is regarded as confidential and must be treated as such.

The Survey will be restricted to Toyota South Africa only.

Only a limited number of appraisal methods will be used.

All Survey Questionnaires for information search will be carried out at Toyota South Africa, based at Prospecton in Durban.

The final model offered as a solution will only be tested in B Plant of Toyota South Africa. Other departments will still need to be tested.

1.8 Structure of the Study

1.8.1 Chapter Two

In this chapter the theory regarding investment appraisal and various appraisal techniques will be investigated. Numerous financial appraisal techniques will be introduced and the time value of money will be discussed in an attempt to understand its relationship to effective investment appraisal. Finally, a model will be offered as a recommended appraisal technique to be adopted by Toyota's plant maintenance department.

1.8.2 Chapter Three

The hypothesis is formulated in this chapter and is tested for validity. An interview type questionnaire will be formulated and the relevant data will be gathered from the selected sample of the population.

1.8.3 Chapter Four

In this chapter the findings of the survey is interpreted and measured up against the literature review carried out in chapter two. To substantiate the findings both graphical and tabular approaches will be undertaken in the anticipation of ease of understanding of the data collected.

1.8.4 Chapter Five

Finally in this chapter recommendations will be offered to the company on whether or not to adapt to using the model generated for capital budgeting for maintenance departments.

1.9 Summary

Capital budgeting models determine the companies' profitability in terms that productivity is directly related to profitability. In researching the concepts and structure of these models, many have not been popular in the recent past, as flaws in them render them inconsistent.

While using time value of money and opportunity costs as relevant factors, the various financial calculations are to be examined and executed to validate the appraisal decision. This paper attempts to provide a practical solution for the improvement and understanding of capital budgeting techniques for plant maintenance departments of Toyota South Africa.

The exercising of knowledge attained in research will then be tested, as an in-depth interview type survey will generate data that the chosen population will deliver. This on its own is by no means an easy task, as the interpretation of this together with the way forward from there is what decides how successful this paper is in attaining its goals.

CHAPTER TWO

Capital Budgeting

2.1 Introduction

This chapter starts with explaining why investments are made. The definition and importance of Capital Budgeting is then explained. Six fundamentals in the Process of Capital Budgeting are introduced and summarised.

The various techniques to perform Capital Budgeting are listed, and five of these techniques are investigated. Thereafter, the types of projects and investments that are funded by Capital Budgets are explained. Three projects are identified for discussion here.

Then the age-old question of how to fund these projects is brought to the fore. Details of the various options are taught. The cost of Capital is explained, encompassing the use of Debt, Preferred Stock and Common Equity.

Risk is identified, explained and analysed. Five types of risk analysis are discussed illuminating its impact on Capital Budgeting. Finally, the question on how to make the decision is dealt with. A model is used in explaining the correct procedure in the procurement of capital.

2.2 Explaining Capital Budgeting

Gitman (2000) explains that due to firms having to commit large sums of money in capital procurement, procedures to analyse and select investments are needed. These

procedures must then be able to measure cashflows and apply appropriate decision techniques.

2.2.1 Why make these Investments

Many reasons generate expenditure, however the more relevant for Capital Expenditure in industry is:

- **Expansion**

This is the most common motive. New assets in the form of Plant, Equipment and Facilities are acquired to support the growth of the company, (Marx *et al*, 1999), (Gitman, 2000).

- **Replacement**

When a company reaches maturity, most of its assets will be in a state of deterioration. It should not be necessary for a total breakdown or loss of equipment to occur before management considers replacing an asset. The benefit of replacement is essential when facilities and equipment become less able to achieve productivity targets set out. Therefore, to sustain productivity, decisions are made to replace or renew obsolete or worn-out assets, Marx *et al* (1999), Gitman (2000).

- **Renewal**

To improve operational efficiency, Rebuilding, Overhauling or Retrofitting on assets is done. This is an alternative to Replacement. The cost/ benefit assessment analyses this choice, Marx *et al* (1999), Gitman (2000).

- **Other**

Instead of investment in measurable tangible assets, sometimes investments are made in items that are difficult to measure. This could include advertising, research and development and consultation. Encapsulated in this division are also regulatory items. These become mandatory requests that are controlled by external governance. This type of investment tends to ignore shareholder wealth, but rather focuses on compliance with authority, Marx *et al* (1999), Gitman (2000).

2.2.2 The definition and importance of Capital Budgeting

Capital Budgeting is defined by Du Toit *et al* (1997) as the Identification, Evaluation and Selection of the long term or fixed assets that will increase shareholder value. Marx *et al* (1999), states that Capital Budgeting, also called Capital Investment Analysis, is the process of evaluating and selecting long-term investments that are consistent with the goal of increasing the firm's value

The **Financing** decision deals with the firms' capital structure in terms of debt and equity, while **Investment** decision deals with the way funds raised are employed in productive activities to achieve the firms' overall goal. Quite in alignment to this theory, Garrison (1988), defines this as a term that is "used to describe the action relating to the planning and financing of capital outlay" (Farazmand & Neill 1996: 428).

In today's competitive global environment it becomes essential that a company employ the best possible practices in terms of Capital Budgeting. Mather identifies the Maintenance Department as one of the ***greatest levers of profitability*** that any capital-intensive organisation has. He states that an average of 40-50% of a capital industries operating budget is consumed by maintenance expenditure (Mather, www.bigpond.com.au). Understanding the complexity of this statement brings to reality the thoughts echoed by Smith (1994), when he concluded that Capital Budgeting decisions are among the most important of all management decisions. They help to mould a firms' future opportunities by influencing its technology, processes, working practices and profitability, among other things (Smith 1994: 20). Gupta (1996) states that these decisions are hard to reverse without severely disturbing an organisation economically and otherwise. Therefore a Capital Budgeting decision needs systematic and careful analysis. (Gupta 1996: 385)

So, it becomes apparent that the effective use of Capital is an important strategic tool for any company operating in today's competitive global environment. Boquist *et al.* (1998) state: An important factor that distinguishes the winners from the losers, is the quality of investment decisions, which, in turn depends on the soundness of the firm's capital

system. Boquist *et al.* (1998) further states that in order to remain competitive, the firm needs to align its Capital Budgeting system with its overall strategy, adding that most companies have an well-articulated vision statement or corporate goal, followed by a description of the strategy for attaining that goal. The design of the Capital Budgeting system, however, is not integrated into the strategy (McAdam & McCarron 2002: 8). This causes concern of possible failure or retardation of the company's growth. It is here that a company takes heed of scholarly advice and make changes that suit long term benefits.

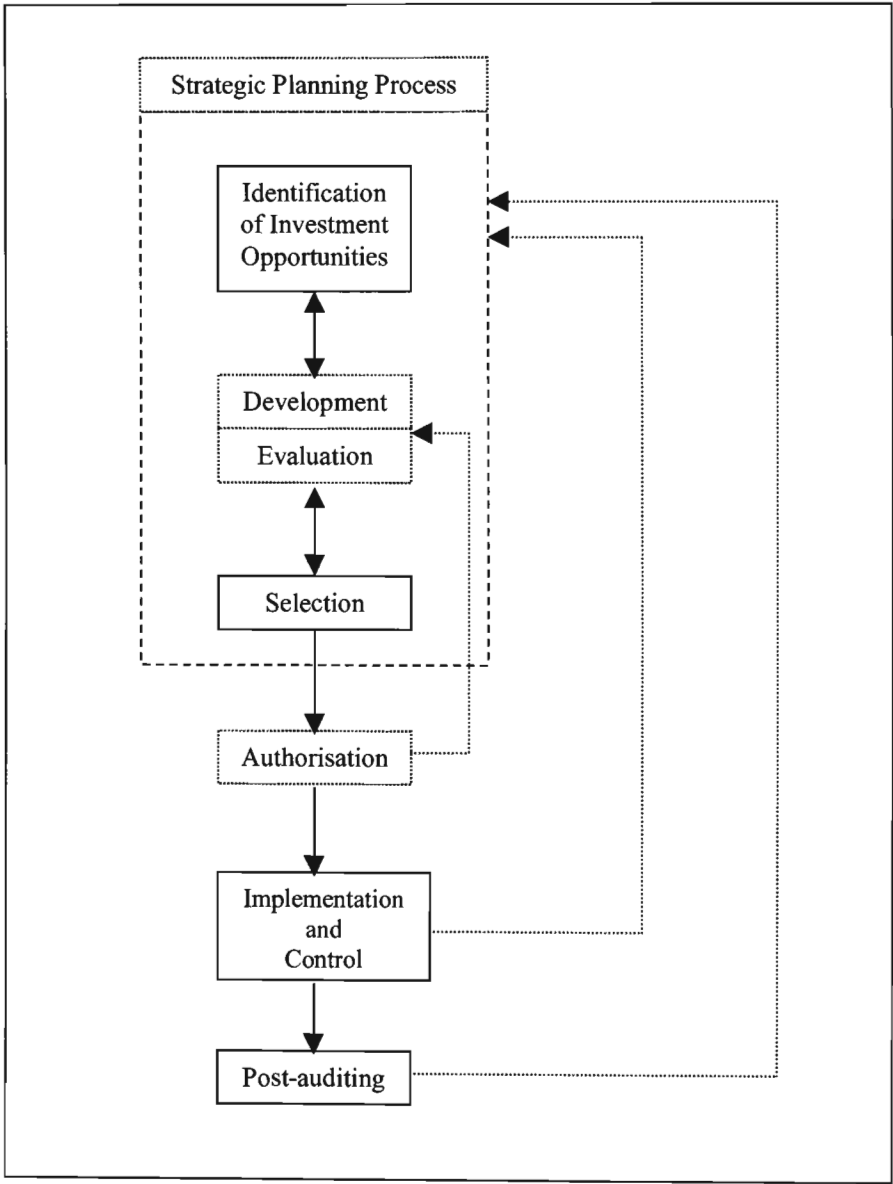
A prediction into the future views that: "New export opportunities will prompt manufacturers to expand capacity. At the same time, more countries will reach the advanced industrial ranks, producers will have to invest in efficient new machinery if they want to stay ahead" (McAdam & McCarron 2002: 7). Seemingly, the future is upon us, as the above is already the case at Toyota South Africa's Manufacturing Plant in Prospecton, Durban. Decisions are made to replace existing equipment with newer, faster, state of the art models. Similar decisions are also made to increase production capacity. These all to align to the Global Standard and Demands set out by the parent company, Toyota Motor Corporation Japan (TMC).

2.2.3 The Capital Budgeting Process:

According to Arya, Fellingham & Glover 1998: 499, in an individually owned firm, Capital Budgeting can be modelled as a decision problem, however in corporate companies, it is better modelled as a control problem. The key ingredients of control problems are identified as conflict of interest and information asymmetries among participants.

Therefore to eliminate such anomalies, studies show that certain fundamental steps are necessarily performed to achieve harmonious results. In Figure 2.1, Maccarrone (1996) illustrates the process for Capital Budgeting, exposing the sequencing of the different steps that should be followed. Six fundamental steps are identified in this process.

Figure 2.1 The structure of the Capital Budgeting Process



Source (Maccarrone, 1996, p.43).

According to Maccarrone (1996), the structure of the Capital Budgeting Process is made up of Six fundamental phases and these are identified as:

i. Identification of Investment Opportunities

This phase, although extremely important, has been often ignored, probably because it cannot be easily formalised (Maccarrone 1996: 43).

ii. Development and Evaluation

Once investment proposals have been identified, it is necessary to analyse them thoroughly, collecting relevant and detailed information for each alternative, and evaluating their profitability and global attractiveness (Maccarrone 1996: 43).

iii. Selection

A screening of investment proposals, which have passed through the previous phase, might be necessary because of financial or strategic factors. As a result, some projects might be cancelled or postponed to another planning period (Maccarrone 1996: 43).

iv. Authorisation

Almost all investment projects must be approved (either by line management or by appropriate investment committees) before their implementation (Maccarrone 1996: 43).

v. Implementation and Control

While the project is being carried out, follow-up procedures are indispensable in order to adhere to budgeted costs and deadlines (Maccarrone 1996: 43).

vi. Post-Auditing

In this phase the outcomes of each project are compared with the budget targets in order to assess forecast accuracy and identify error patterns with a feedback effect on the whole decision process (Maccarrone 1996: 43).

What becomes apparent from the adaptation is the involvement of Strategic Planning in the Capital Budgeting Process. This view is therefore in agreement with Boquist *et al.* (1998), as stated earlier, that in order to remain competitive; the firm needs to align its capital budgeting system with its overall strategy. He adds that most companies have an well-articulated vision statement or corporate goal, followed by a description of the strategy for attaining that goal. The design of the capital budgeting system, however, is not integrated into the strategy (McAdam & McCarron 2002: 8).

Marx *et al* (1999) are quite similar in their approach to the Capital Budgeting Process. Although they make the process more concise, the basic concept is in line with other viewpoints on the subject matter. Their approach to the process is encapsulated in these

five steps:

- **Proposal Generation**
- **Review and Analysis**
- **Decision Making**
- **Implementation**
- **Control.** (Marx *et al*, 1999), (Gitman, 2000).

According to Du Toit *et al.* (1997), the next critical stage involves the application of forecasting techniques, project evaluation techniques, risk analysis and mathematical calculation techniques. The feedback from this stage to strategic planning plays a crucial role in the Capital Budgeting Process.

2.2.4 The Techniques used in Capital Budgeting

Due to the fact that Capital Budgeting decisions are clearly critical to the health and prosperity of a business organisation, it becomes imperative that sound techniques be used in the appraisal of Capital Investments. According to Bromwich (1978), rapid technological advance has tended to increase the lag between decision making and the benefits of these decisions. It has also increased the necessary size of capital commitments and caused the rate of technical and product obsolescence to increase. Thus correct project appraisal decisions are increasingly crucial. These observations were made some twenty years ago, but if anything is even more pertinent in today's climate of rapid technological change, increasing competition and the globalisation of markets (Peel & Bridge 1999: 359).

Furthermore, although the Investment evaluation techniques are considered to be decision-making tools, they, more importantly are also opportunities to modify current organisations:

- Facilitating the spread of information about performance of new technologies, due to the adoption of cross-functional analysis processes.

- Allowing post-auditing and, consequently, supporting organisational learning (Maccarrone 1996: 43)

To this end, a variety of techniques are developed by scholars to assist in making viable Capital Budgeting decisions. Evidence of this lies in the study, that approaches used by firms to appraise Capital Budgeting proposals must be one of the most over-researched areas of the application of management techniques (Adams, Bourne & Neely 2004: 23).

Evidently, a variety of techniques are developed to assist in making Capital Budgeting decisions, and these include among others, Payback Method, Accounting Rate of Return and Discounted Cash Flow. Academics have, for a long time, made use of more sophisticated techniques such as Discounted Cash-Flow but, no matter what technique used, all rely on estimated future cash-flows, and these are almost invariably uncertain (Smith 1994: 20).

Taylor (1998: 306) is used in introducing the most frequently used techniques in Capital Budgeting. These techniques are not in order of any priority.

2.2.4.1 Pay Back Method (PB)

The Pay Back Method is simple to calculate and it is commonly used for evaluating proposed investments by determining the exact amount of payback time. The following equation can be expressed:

$$\begin{array}{ll} PB > N & REJECT \\ PB \leq N & ACCEPT \end{array}$$

If the project PB time is less than /equal to the time (N) required by the firm, the project is accepted (Brigham *et al.*, 1988).

2.2.4.2 Net Present Value (NPV)

An alternative to the Pay Back method is the NPV. NPV gives explicit consideration to the time value of money by discounting cash flows at a specific rate. This rate is often referred to as the discount rate or cost of capital.

The criterion, NPV, is used to make accept-reject decisions based on the following: If NPV is greater than or equal to R0, 00, the firm will earn a return greater than the cost of capital and their value will increase (Brigham *et al.*, 1988).

2.2.4.3 Internal Rate of Return (IRR)

IRR is defined as the discount rate that equates the present value of cashflows with the initial investment of a project.

The rationale used in this method is based on the assumption that if the IRR exceeds the cost of the funds used to finance a project, surplus funds remain after paying for the capital. Therefore, taking on a project whose IRR exceeds its cost of capital increases the value of the firm's stock (Brigham *et al.*, 1988).

2.2.4.4 Modified Internal Rate of Return (MIRR)

MIRR calculates a percentage. The modification results in an indicator of relative profitability and can be understood as follows:

The MIRR assumes that cash flows from the project are reinvested at the cost of capital (k), while regular IRR assumes that the cash flows from each project are reinvested at the projects own IRR. Since reinvestment at the value of (k) is generally the case, the MIRR is considered to be an accurate indicator of capital investments worth (Brigham *et al.*, 1988).

2.2.4.5 Profitability Index (PI)

PI also called the Benefit/Cost Ratio, is another method used to evaluate a project. It shows the relative profitability of a project, or the present value of the benefits per unit cost.

A project is considered to be acceptable if its PI is greater than/equal to 1. If the PI is greater than 1, then the ratio of the company's present value of benefits received from the investment exceeds the present value of the investments cost (Brigham *et al.*, 1988).

In a corresponding view, the emphasis on objectivity and scientific decision-making led to an orientation toward quantitative analysis. Cost-Benefit Analysis (CBA) is introduced as a systematic means of estimating the costs and benefits of a project over their life (Farazmand & Neill 1996: 430).

The primary tools of CBA are:

- NPV
- IRR
- PB
- CBA

These analytical approaches have common concepts in their formula: The cost of the project, the Rand benefit of the project, and the cost of money (interest rate). These values are then discounted or decreased so that future monies are reduced to their worth right now; that is, their present value (Farazmand & Neill 1996: 428).

As much as these techniques form the grounding on which decisions are made, they have often sparked debates on their usability and adaptability by various academics. The intangible issue of choice and preference is questioned recurrently. As already stated, the approaches used by firms to appraise capital budgeting proposals must be one of the most over-researched areas of the application of management techniques. Survey after survey conducted over the past thirty years has demonstrated the ascendancy of DCF

based methods, predominantly NPV and IRR (Adams, Bourne & Neely 2004: 23), (Collan & Liu 2003: 411).

Similarly, in a longitudinal survey of Capital Budgeting practices of large UK and USA firms between 1975 AND 1992, Pike (1996) reported a substantial increase in the use of Discounted Cash Flow (DCF) and appraisal techniques. In 1975, 32% and 44% of respondents used NPV and IRR respectively, whereas in 1992 75% and 81% were noted for the same techniques. Pike also reported that whereas 1975 most firms adopted one of two investment appraisals, (typically PB and ARR), by 1992 it became common to use four different methods, i.e. NPV, IRR, PB, ARR. Pike attributes this to the widespread adoption of computer-based spreadsheet models, which are easily programmed to generate different financial measures and the need to explore the many faceted aspects of investment performance (Drury & Tayles 1997: 86).

As much as NPV is argued to be the technique of choice by most researchers, Brookfield (1995) reveals that NPV itself can lead to erroneous conclusions in the face of uncertainty, even when the apparent range or distributions of uncertainty outcomes have been recognised. What is needed then is an Adjusted NPV technique which properly accounts for uncertainty. It is believed that NPV approach leads to some surprising, perhaps counter-intuitive results in which apparently unexpected variables in capital budgeting may turn out to be factors leading to competitive or strategic advantage (Brookfield 1995: 56).

Attention has been drawn to various techniques that bring about concern in respect to application. The persuasion on which technique to use then becomes a matter of choice. So, to aptly prepare oneself for the challenge of appraising correctly, it becomes imperative that sound understanding and skill is developed in utilising the tools available. Therefore, the success in achieving a comprehensive Capital Budget Proposal lies in the ability to apply the proper techniques.

2.3 Types of Projects

According to Gitman (2000), the investment into capital procurement takes the form of a project. Essentially, there are two common project types. It is also accepted that the type of project under scrutiny is likely to affect the decision-making.

i. Independent Project,

In this type, the project cash flows are unrelated or independent of one another. The acceptance of one project does not impact any other project from either starting or being considered, (Marx *et al*, 1999), (Gitman, 2000).

ii. Mutually Exclusive Project,

These are projects that compete with each other. In simple terms, the acceptance of one project eliminates another from consideration, (Marx *et al*, 1999), (Gitman, 2000).

iii. Interrelated Project,

The above two project types are the extreme of types, however interrelated projects are somewhere in-between. This type of project could tend to have a synergistic relationship, in that it may be necessary to run two projects concurrently with the goal that they compliment each other. The basis is that the project may have impact on other projects, but does not preclude their acceptance.

2.4 How to Fund Capital Budgeting

Investment assets are valued on the basis of cash flows produced by the asset during its useful life (holding period), and the final value of the investment on disposal. Bierman & Smidt (1993) noted that if the expected benefits are likely to accrue over a relatively long time, the solution becomes more complex, and the chance of making incorrect decisions increases.

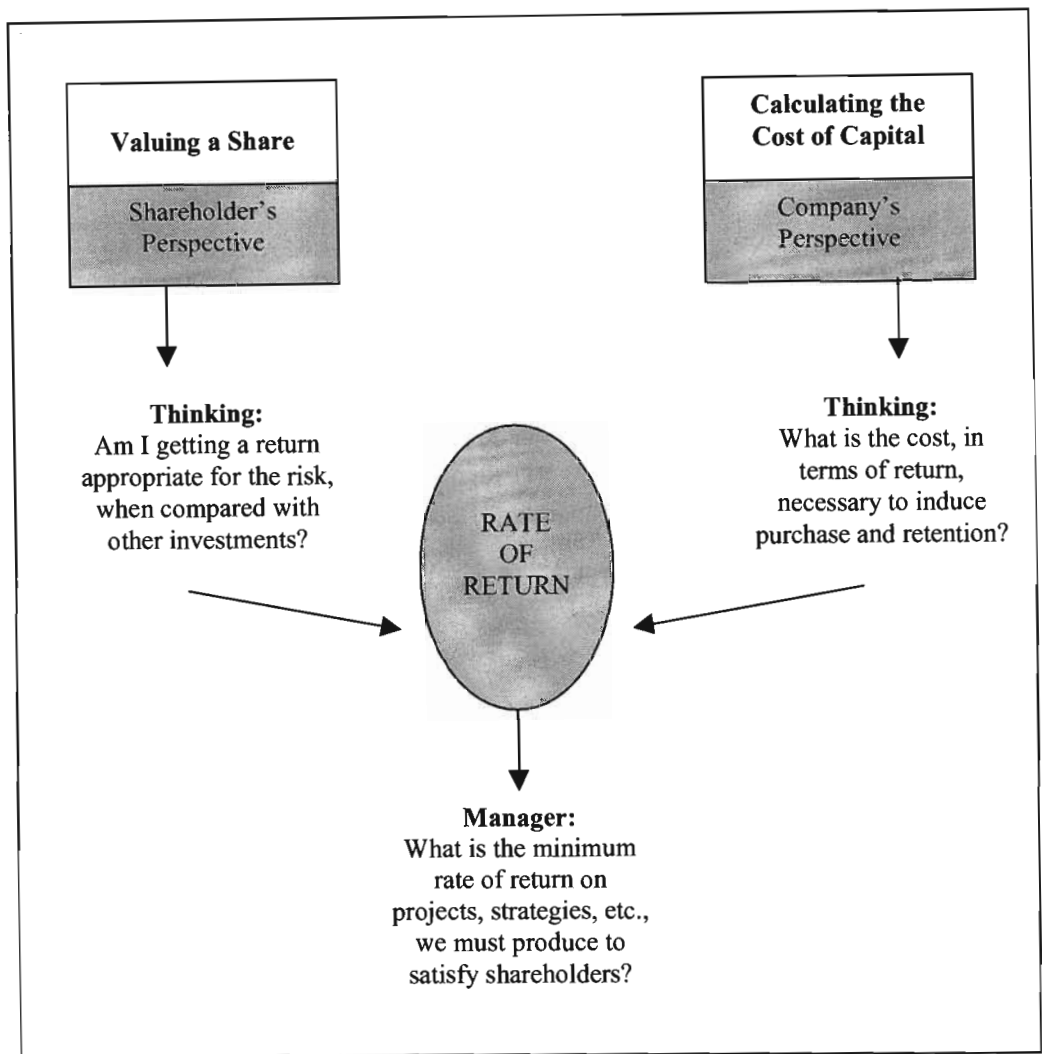
2.4.1 Cost of Capital

Essentially, the cost of capital is the rate of return that must be generated from investments to create attractiveness to investors. The chief purpose of the employment of capital is therefore to generate wealth to the shareholders. According to Marx *et al*, (1999), wealth is created by embarking on investment opportunities that realise returns that are at least equal to that required by investors. Opportunity costs are not forgone if capital is not utilised. These costs are assessed to ascertain correct judgement.

The fear that prevails in making the correct judgement is that firstly, one could ask for an unreasonably high rate of return. In doing this, market share could be lost and this would directly impact on the wealth maximising of shareholders. On the contrary, setting a low cost of capital generates low targets that become easily achievable, thus destroying wealth.

To further the merit of this discussion, in figure 2.2, Arnold (2001) creates a graphic illustration of the management issues related to cost of capital. He draws an analogy of this concept using a coin.

Figure 2.2 Two sides of the same coin



Source (Arnold, 2001, p.726).

In his analogy, Arnold (2001) sees the concerns from both parties as two sides of the same coin. From one point of view it is the Shareholder that is concerned about his return, but on the other it is the Company that is trying to make his offering attractive. In all this, the Manager controlling the investment is interrogating different strategies to suit both ends.

Debt, preferred stock and common equity are the three most frequently used capital components. In practice, the three components are weighted to establish a more realistic value. These components will now be discussed:

2.4.2 Cost of Debt

Debt in the context of Capital Budgeting refers to long term loans. The company, if using the strategy of long-term loans, will negotiate an acceptable interest rate with the financial institution. The explicit cost of debt is therefore relatively inexpensive. Benefits of using the cost of debt are that if the company is profitable, interest payments will reduce the company's tax liability. Furthermore, debt causes a legal claim on profits, resulting in greater security for creditors than shareholders, the knock on effect being creditors demanding a lower return rate than shareholders, (Marx *et al*, 1999), (Gitman, 2000). Arnold (2001) declares that there is consideration in attempting to reduce risk when a finance provider opts to supply funds in the form of debt finance.

2.4.3 Cost of Preferred Stock

The cost of preferred stock is the stated annual dividend of the net proceeds. This is normally represented as a percentage value. Gitman (2000) states that in this type of ownership the recipient or stockholder is allowed to receive their stated dividends prior to earnings being distributed to common stock holders. The relationship that exists between the cost of preferred stock and the funds provided by the preferred stock issue is calculated by dividing the annual dividend by the net proceeds from the sale of the preferred stock. The cost of preferred stock is more expensive than the cost of long term debt. This difference is due to the tax deductibility on the cost of long term debt (Gitman, 2000).

2.4.4 Cost of Common Equity

Gitman (2000) states that, the cost of common stock is the return required on that stock by investors in the marketplace. Two types of common equity are generally used, namely Retained Earnings and New Common Stock. Due to Common equity not being a fixed income security, it is more difficult to determine the cost of common equity as compared to Debt or Preferred stock. When new shares are issued, the company has to

earn on its reinvestment a rate that is higher than what the stockholder himself could earn on alternative investments (Marx *et al*, 1999).

2.4.4.1 Retained Earnings

Due to the theory that the shareholders are actually the owners of the company, it becomes natural that they are entitled to the company's earnings. But if all the earnings are paid out in the form of dividends, then the company is classified as a No Growth company. To counteract this, it is then possible for the company to retain some earnings for the purpose of undertaking new projects, etc.

Marx *et al*, (1999) state that these earnings are an immediate source of funds, however, not without cost. Nevertheless it is cheaper for the company to use retained earnings than to issue new common stock. This, however, means that the shareholders give up that money. In utilising their money, they will demand compensation from the company. Therefore simply put, the cost of retained earnings is the return that the shareholder expects from the company's common stock.

Arnold (2001) identifies three ways of estimating this cost.

- a. Capital Asset Pricing Model (CAPM)
- b. Dividend Growth Model, and
- c. Bond-yield-plus-risk-premium Approach.

a. Capital Asset Pricing Model (CAPM)

The most commonly advocated framework for specifying the relationship between risk and return is the Capital Asset Pricing Model (CAPM). 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 (Drury & Tayles 1997: 89).

The estimation of retained earnings is calculated using CAPM by simply using the following steps.

- i. Establishing a risk free rate. In reality there is no asset that is risk free. However government bonds are essentially free of default risk, but long term T-bonds suffer capital loss with rises in interest rates. Therefore it becomes acceptable to use the long-term government bond rates.
- ii. Calculating the risk premium. This is the difference between the expected current rate of return from the stock and the risk free rate discussed above.
- iii. The beta of the stock. This is a measure of its volatility in relation to that of an average stock (Marx *et al*, 1999).

b. Dividend Growth Model

The Dividend Growth Model is commonly called the Discount Cash Flow (DCF) approach. This approach assumes that the growth of the dividend is constant for an infinite time period. This method then uses the time value of money to determine the cost of retained earnings, which is made up of two components: dividend yield and growth rate. Of these two components, the dividend yield is uncomplicated to compute; however the difficulty arises with estimating the growth rate of the dividends. Historical data or current trends can be used to establish the growth rate; these depend on the current performance of the company (Marx *et al*, 1999).

c. Bond-Yield-Plus-Risk-Premium Model

Here the assumption is that the cost of retained earnings is the sum of the company's bond yield to maturity, plus a risk premium. This method is not commonly used by companies due to there being no stability in establishing the correct risk premium. If this method is used, the norm is that 4% be a good estimate for the risk premium (Marx *et al*, 1999).

2.4.4.2 Weighted Average Cost of Capital (WACC)

Now that the three components of the capital structure is explained, it is important to note that the company's WACC is a key factor in the investment decision-making process. In this process the weighted individual after-tax costs of each component of the capital structure are summed. According to Arnold (2001), WACC is the discount rate that is used in project appraisal. He classifies the company's capital structure into two definite types: all equity, and mixed; where debt and equity are held in varying proportions. It is thus encouraged that in all-equity firms the current cost of equity is used as the discount rate, and in a mixed capital structure, the discount rate be calculated by weighting the cost of debt and equity in accordance to the proportion they hold in the capital structure. Only the investments whose expected returns are greater than WACC should be considered.

Pike & Neale (2003) stipulate four major prerequisites before WACC can be justified.

- i. The project is deemed marginal, scalar addition to the company's existing activities. There should be no adverse impact on the current valuation relationships.
- ii. Project financing involves no deviation from the current capital structure employed.
- iii. Any new project to have the same systematic risk as the existing operations, and
- iv. All cash-flow streams are level perpetuities.

These are the required conditions for using WACC as a decision tool.

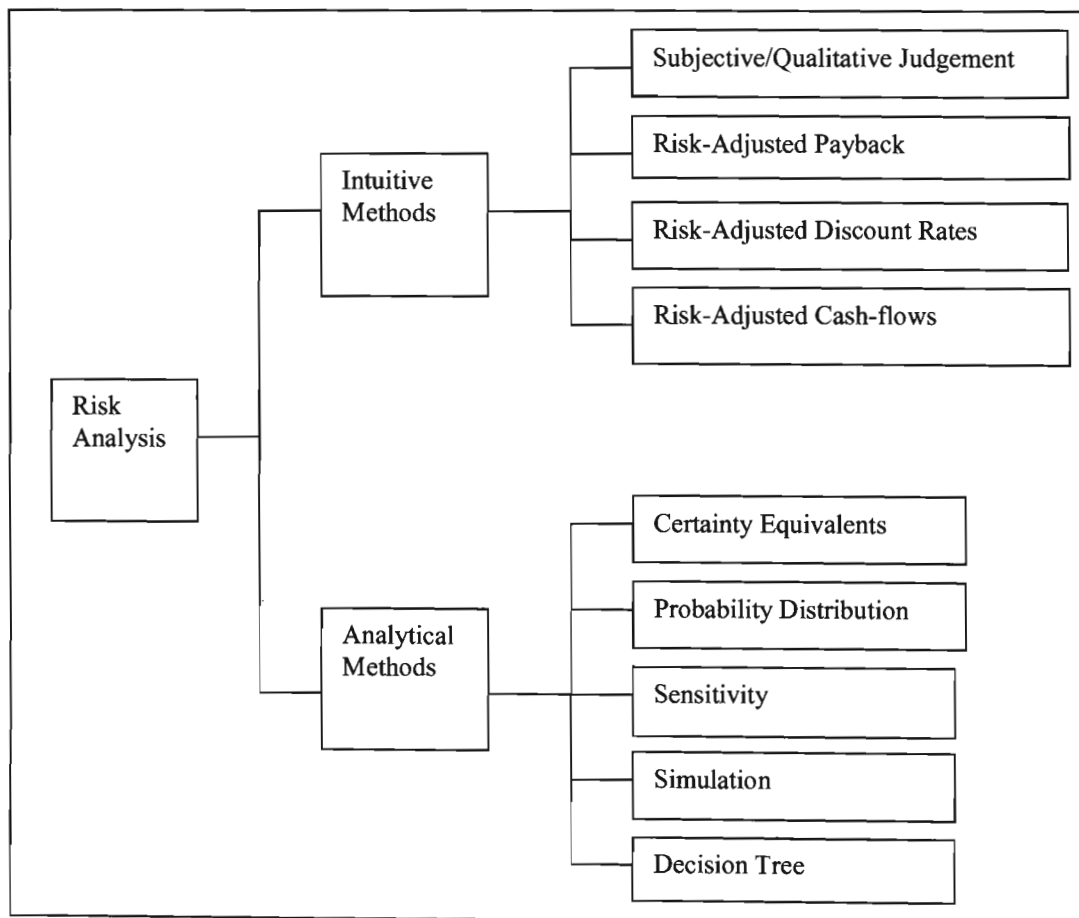
2.5 The influence of Risk Analysis in Capital Budgeting

Irrespective of the scaling of Risk, the mere mention of the word and the fact that it exists brings uneasiness to any decision relating to financing. Risk is therefore an element to be considered in virtually every Capital Budgeting decision. The recognition of risk as an important component has long been recognised. The future is uncertain and Investment Appraisal techniques that fail to recognise this fact will almost certainly lead

to incorrect conclusions and erroneous recommendations and decisions (Brookfield 1995: 56).

To conceptualise this, Smith (1994) Figure 2.3 identifies two categories for risk analysis.

Figure 2.3 Risk Analysis Techniques



Source (Smith, 1994, p.20).

According to Smith (1994), Risk analysis techniques can be classified into two categories: Intuitive and Analytical.

Intuitive techniques do not rely on detailed analysis, but rather on rule of thumb or heuristics. They are essentially judgmental in nature, relying on subjective rather than quantitative analysis. The Intuitive techniques consider factors like:

- Subjective Qualitative Judgement,
- Risk Adjusted Pay-Back,
- Risk Adjusted Discount Rates, and
- Risk Adjusted Cash-Flows Alternatively, whilst

Analytical techniques require quantification of uncertainties that a project may be faced with, and these include among others,

- Certainty Equivalents
- Probability Distribution
- Sensitivity Analysis
- Simulation, and
- Decision Tree (Smith 1994: 20).

Risk in the capital budgeting context includes financial risk associated with leverage, business risk associated with the type of activity engaged in, risk of technology change, obsolescence and risk due to errors in estimation.

Risk Assessment in practice is predominantly subjective. A subjective assessment of an opportunity's risk is one in which the decision maker uses deterministic measures that are adjusted, as deemed appropriate, based on the decision makers intuition, judgement, experience, etc. (Lohmann & Baksh 1994: 19). Due to the diversity in techniques, only a select number will be discussed.

2.5.1 Techniques of Risk Analysis

According to Marx *et al*, 1999, no one can predict the future with one hundred percent accuracy; therefore sound risk management principles are an essential component of the capital planning process. Adams, Bourne & Neely 2004: 23, introduces the different techniques of assessment that can be carried out on the proposal for investment. These are discussed below.

2.5.1.1 Sensitivity Analysis

This analysis uses a number of values for a given or single variable. Here the experimentation with the change in cash flow, cost of capital or the initial investment is done. The reasoning for this is to test what effect this fluctuation will have on the NPV or IRR of the project. It offers an almost realistic feel for the changes in the variability of cash flows, exposing the firm's vulnerability in response to this change. This approach normally uses an estimate of the NPV or IRR associated with the worst, the most likely and the best cash flow estimates.

To determine the range, the worst outcome NPV is subtracted from the best outcome NPV. The risk is proportional to the range between the variables. In simpler terms, the greater the variables discussed above, the greater the risk (Marx *et al*, 1999).

2.5.1.2 Scenario Analysis

Quite similar in structure to Sensitivity Analysis, this technique differs in that it interrogates not one, but several variables at the same time to assess how it affects the returns generated by the company. Here again, the experimentation is done with changes in net cash inflows, Cost of Capital and the initial investment simultaneously to establish the impact that these changes will have on the NPV.

The norm is to use a computerised spreadsheet to calculate the differences, as this tends to be a labour intensive task (Marx *et al*, 1999).

2.5.1.3 Certainty Equivalents (CE)

This is the established, constant cash inflow that the investor is prepared to receive as opposed to an unpredictable amount that he could receive. CEs are thus reflected in percentage form, and are an estimated value.

In CE the cash flows are converted to a particular amount, and then discounted to realise values at the risk free rate.

Alternatively, Risk Adjusted Discount Rates (RADR) could be used. The concept of this is that the investment earns a rate that adequately compensates the investor. RADR is directly proportional to the risk of that investment, however inversely proportional to the NPV. Whereas CE adjusts the cash flows, RADR adjust the discount rate (Marx *et al*, 1999).

2.5.1.4 Decision Tree Analysis

According to Drury (2000), the decision tree is a useful analytical tool that shows several possible causes of action and their outcomes. Each alternate action is represented by a branch, which leads to subsidiary branches for further causes of action or possible events. Decision Tree Analysis is designed to illustrate the full range of alternatives and events that can occur, under all envisaged conditions.

Most analysis for risk assumes that the decision made by the manager at the beginning of the project is irreversible. This however is not always the case, as decisions for a project are normally made in stages. A project manager can opt to abandon or re-strategise a project if it becomes undesirable along the way.

This is where Decision Tree Analysis comes to the fore. The best-suited decision is made at different stages of the project to ascertain success. This type of analysis allows an array of choices at each stage, which lead to the same number of options in scenarios. The manager of the project then manipulates this to ensure success.

2.5.1.5 Monte Carlo Simulation

In the early 1960s the Harvard Business Review introduced the Monte Carlo Simulation technique to its subscribers. This system uses probability distributions and random numbers to estimate a range of possible NPVs, rather than a single one. Instead of using the estimated net cash flows per year, it is replaced with the probability distribution for each factor affecting that specific net cash flow.

By doing this, the uncertainty of each factor is exposed, and the relationship to the cash flow is illuminated. This type of calculation is extremely difficult if not done by a computer, however once set up on a spreadsheet it is done with relative ease (Smith 1994: 20).

2.6 How to make the Decision

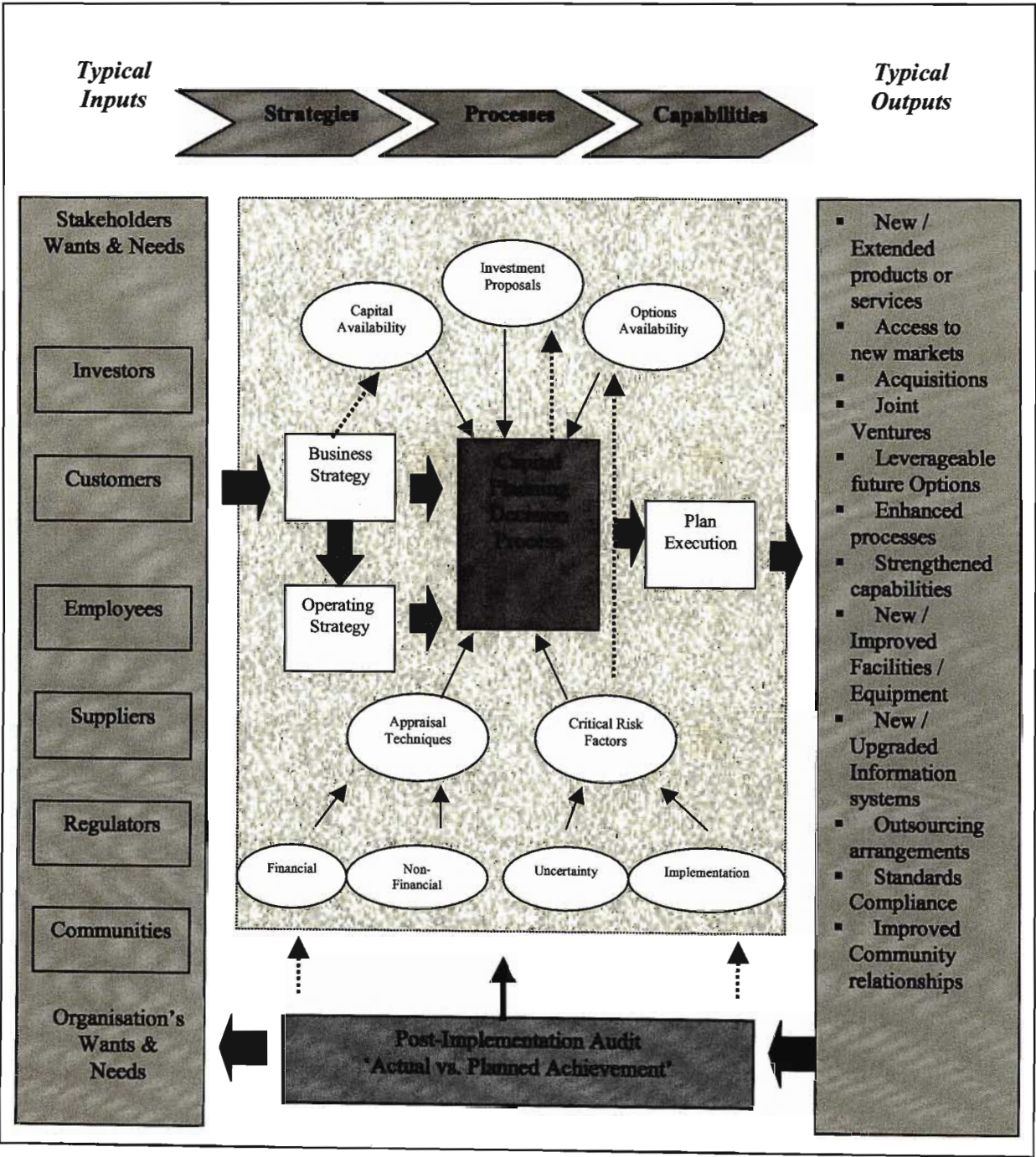
Finally, the ultimate question is then: HOW DO I MAKE THE CORRECT DECISION? As earlier stated, Capital Investments are sometimes irreversible, so committing large sums of money requires absolute clarity that this investment is the best suited to maximise the wealth generated by the company. A clear indication of strategy is essential in establishing the vision and goals of the company. A vehicle to achieve these goals is what rates the effectiveness of the manager. When making investment proposals or when identifying investment needs for the company it is imperative that this process is well engineered to fit into the corporate structure in terms of strategy.

In Figure 2.4 Adams, Bourne & Neely, (2004) focus on the decision-making process. An excellent flow of activities to generate this decision is mentioned.

The conceptual framework shown below depicts the best capital planning practices. The framework is intended to aid in understanding the whole capital planning process. The left-hand side highlights some of the most common stakeholders, and how to go about satisfying their needs. These are termed the typical inputs into the company. Conversely

on the right-hand side is a list of some of the most common outputs from capital investments. These are limited for discussion and example, however the options that can be found here are innumerable.

Figure 2.4 The Capital Planning Process Framework



Source (Adams, Bourne & Neely. 2004, p.26).

In-between is a schematic that illustrates the essential input and output components of the capital planning decision-making process. This crucial step puts into perspective all the role-players and segments that are in the balance of consideration for the correct decision to be made. The linkage of the business strategy to the outputs generated is the cornerstone of the decision process.

Finally, the post implementation audits should drive continuous improvements of this process, constantly monitoring the planned with the actual results. (Adams, Bourne & Neely 2004: 23)

As much as a controlled expenditure is targeted for in capital budgeting where only planned procurement is done, there also lies that a segment that imposes unplanned requirements that have to be adhered to. This type of investment causes distortion to the planning and availability of funds. Therefore there is the assertion that quantitative techniques are of lesser importance to certain capital budgeting decisions. Urgent reaction is required for some matters pertaining to capital budgeting and the initiating of them. These items may not add value to the company in terms of productivity and profitability, however failure to implement these may render the company unable to commence with normal business operation. The details of these segments are discussed by Shirey (1994), as:

i. Hazard elimination

This is the most important criterion for the decision. To eliminate or reduce definite and immediate health and safety hazards. This aspect affects man directly and is therefore the most critical, often not requiring debate and undue lengthy justification. Whether or not injury has occurred, the mere identification of potential injury is reason enough for action to be taken.

ii. Legal Mandates

This criterion is discussed in the narrow, legal sense of complying with a court order or other specific legal directive. The decision not to uphold this expenditure could mean temporary or permanent closure of the company. Apart from just the embarrassment generated from this, is the intangible image of the company. Not conforming to legal mandates could generate unwanted negative publicity that could adversely impact the company.

iii. Regulatory Compliance

These are defined as self-initiated improvement in compliance with a federal, state, or local rule or regulation affecting capital assets. The perfect example of this in the context of a manufacturing plant is the compliance to the environmental policy. If investment is required to improve or sustain any facility or equipment that could be a violation to this policy, then immediate measures of rectification are to be upheld to ensure compliance. There again, being a stalwart in the business community impacts the profitability of the company.

iv. Project Completion

Priority is given to finish phased projects with related, and already committed or expended funding. If the plant productivity is jeopardised by the completion of a project, it is irrational to cease construction or installation due to current funds being exhausted. Re-investment must be considered with the end goal in sight. It is short sighted in this case to be 'penny wise and pound foolish.'

v. Preserving Existing Assets

At first glance this looks like a Maintenance expense and not a capital expense item. However this follows the GAAP definition of capital costs. This category of

expenditure is to prevent failure, or to systematically according to a schedule, improve the asset. If this were not periodically improved it would fail. Furthermore, the aggressive restoration and improvement of facilities and equipment is an essential cost reduction in that it extends the useful life of the plant.

vi. Cost-Benefit Justified

To make a capital investment, which is supported by benefits equal to or greater than the cost of the investment. Sometimes, due to deterioration, the cost to maintain exceeds the cost to replace. A proper study of this phenomenon generates the benefits to the company in expending the funds at that given time. For a considerable relaxation of future cash flows, the company can opt to spend a once-off cost with recurring income to exceed the cost to implement.

vii. Service Betterment

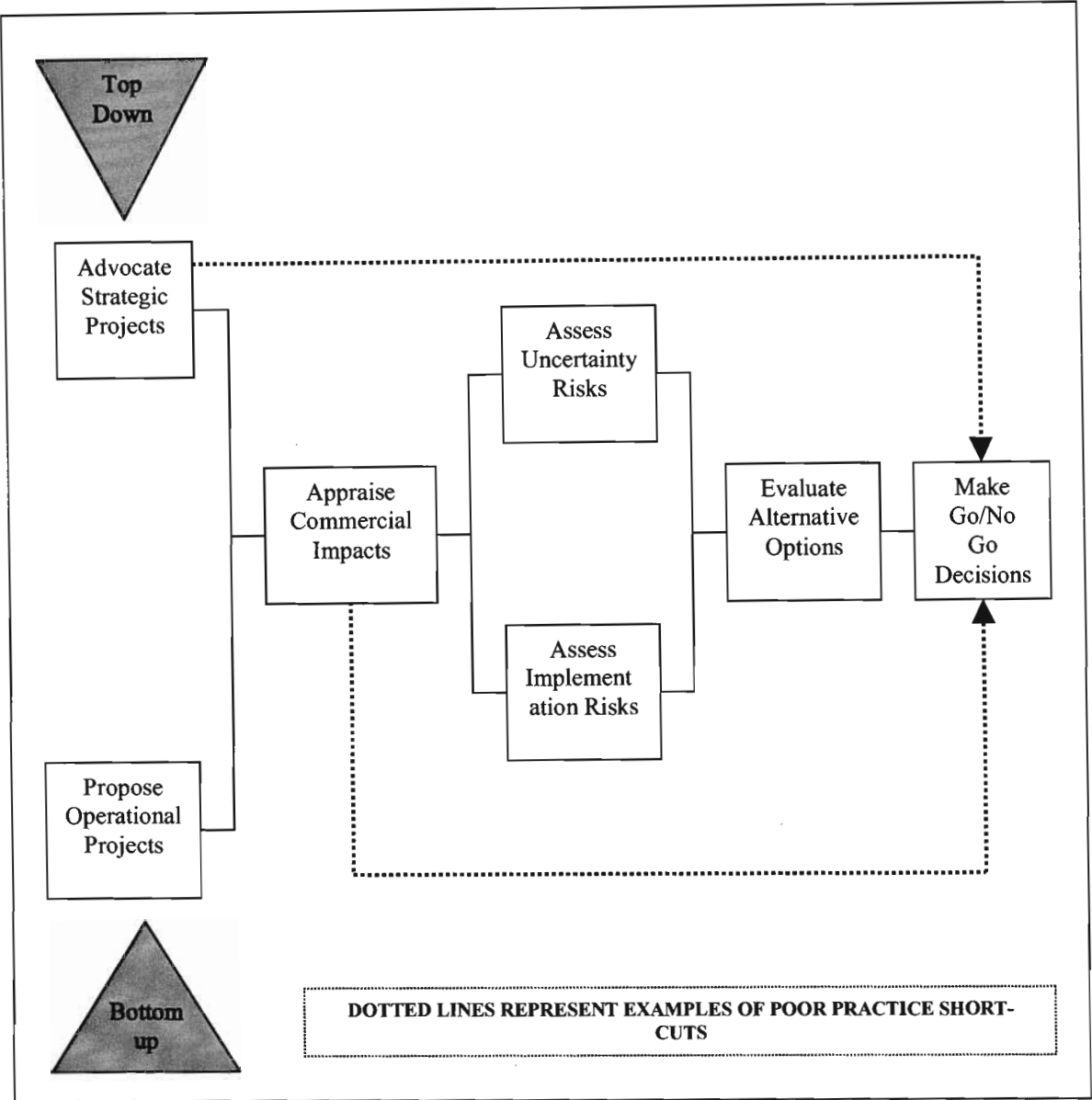
Projects designed to accommodate growth in demand, or otherwise increase the quality of service provided by the asset (Shirey, 1994).

In documenting a way forward, it becomes a mammoth task for the limited knowledge and/or uneducated person in capital budgeting to effectively produce a proposal that will not be slandered. In most companies there exists very limited resources that either teach or practice by book the correct stance in capital procurement.

Maccarrone (1996) stated that most of the capital budgeting process should be held in the wider context of strategic planning. This link between capital budgeting and strategic planning is one of the unclear aspects of capital budgeting, both in literature (where it is often ignored) and the companies P&P (Maccarrone 1996: 44).

Adams, Bourne & Neely, (2004) are precise when it comes to the decision process. In figure 2.5 they visualise a flowchart of the activities to do in achieving a GO/ NO GO decision.

Figure 2.5 The Capital Planning Decision Process



Source (Adams, Bourne & Neely. 2004, p.24).

From Figure 2.5 Adams, Bourne & Neely, (2004), there are two sources that generate investment ideas, top down (Senior Management) and bottom up (Floor Management). The investment thinking differs considerably between these two groups. The poor practice observed is that top down type investments often bypass the assessment process completely and head straight for the final decision. Although the bottom up approach appraises first, the critical stages of the decision process is still omitted.

Adams *et al*, (2004) create a model that is easily adaptable to any organisation. What is suggested is that ALL investment projects undergo appraisal, thereafter both implementation and uncertainty risks be evaluated and assessed. Alternate options for both the funds, and assets to be procured are to be evaluated. In this evaluation, it is understood how viable the investment really is. Finally, with all the cards on the table, a calculated decision is then made on whether or not to invest.

There has always been a difficulty for managers to start using decision support tools on a regular basis. There is also the tendency for managers to resist changes in their management style; they may well tend to resist this support tool. However the success of their Capital Budgeting may well depend on this.

2.7 Conclusion

The focus of this chapter was to firstly completely understand the terminology and processes in Capital Budgeting. Then it was to grasp the concepts and techniques used by industry in Capital Budget preparation. In doing this, a scholarly review exposed views about the subject matter that in some cases gelled with other writers, but also in other cases contradicted other writers.

Self-education on the various forms of financing was experienced. A model in the form of a flow diagram was researched, and found to be a very simplistic effective tool that is easily adaptable for the preparation of the Capital Budget Proposal. This model will be expanded on and introduced to the first line maintenance management of Toyota South Africa.

The view is that this chapter will create learning for the readers who are not from a financial field, but are responsible for decision making in Capital Budgeting. A survey to research the knowledge and skills of the company will follow. This will assist in identifying the gap.

CHAPTER THREE

Survey of the Company

3.1 Introduction

In surveying Toyota South Africa, Primary Research was done in determining the methods used by Maintenance Management in the proposal for Capital Budget requirements. An empirical study is done where a survey in the form of a questionnaire is undertaken on the entire population of Maintenance Management in the company.

The format of the survey is explained in this chapter. Participants in the research are referred to as respondents, and the target sample is established. The questionnaire pre-testing, validation and construction are discussed detailing the importance of them. A summary of pre-conditions to ensure validity of the survey is also discussed.

Finally, the administration of the questionnaire is explained, revealing some difficulties experienced during this process.

3.2. Objectives of the Study

In understanding that the underlying purpose of research is to answer questions in which to acquire new knowledge, it becomes apparent that research is the cornerstone of progression. Historically only a selected academic would venture in research, however according to Marczyk *et al.* (2005), no longer is researching the private domain of research professors and scientists wearing white lab coats. It is noted that research has become the norm in the society that we live in and is basically performed by any individual.

The intense study of literature in the preceding chapter led to the discovery of a model that was adapted from Adams, Bourne & Neely. (2004). The model captured the correct routing for the Capital Planning Decision Process, but also exposed the poor practice short cuts that are experienced in industry. The quantitative research and the nomothetic approach used in this study attempts to bring to light the Capital Budgeting practices adopted by the maintenance department managers employed at Toyota South Africa Manufacturing Plant based in Prospecton in eThekweni (Durban). The findings of this research will be critically analysed and measured against the norms set out by the scholars studied in the preceding chapter.

The format of the structure that this research follows is depicted in the schematic represented in figure 3.1.

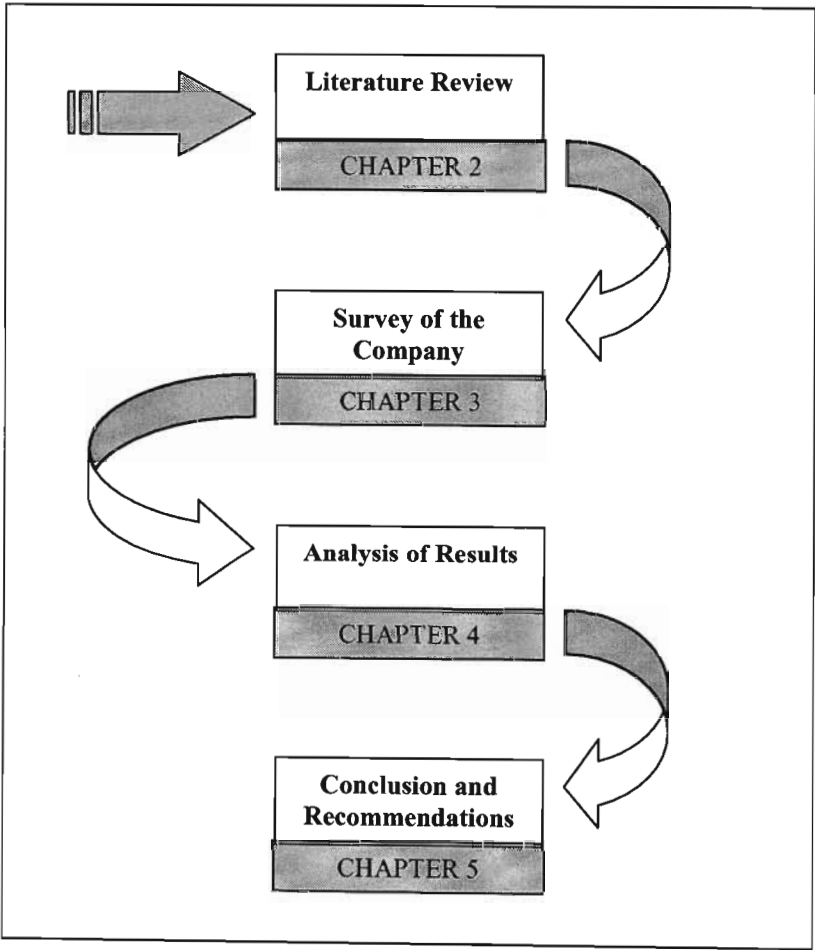


Figure 3.1 The Structure of this Study

Figure 3.1 is a simple road map used in navigating one through the structure of the research. Chapter 2, appropriately called the "Nuts and Bolts," concluded an in-depth study of literature on Capital Budgeting. Chapter 3 details the research methodology used in this study. In Chapter 4 a graphical representation and explanation of the findings of the survey are seen. Finally, Chapter 5 concludes the study with recommendations and possible future study opportunity.

3.3. The Respondents

The survey tried to establish the process and procedure used in preparing a proposal for Capital Budgeting, in the context of Maintenance Departments. Although Probability Sampling is one of the most commonly associated with survey type research, it is argued that for a population size of less than fifty, this should not be used. Instead of selecting a sample, the entire population should be considered, as the influence that a small number has converts to a significant percentage difference (Saunders *et al.* 2003).

From a sample size table, it is acknowledged that for a population of thirty-five, the propagated sample size is thirty-two (Krejcie & Morgan, 1970). When tallying up the population of the Maintenance Management at Toyota South Africa, it was established that this totalled Thirty-five. Therefore, a distinguishing feature of this survey is that the entire population from the company was included for responses for the survey.

3.4 The Questionnaire

After an intensive study on this topic, it was found that most research on Capital Budgeting was done targeting the financial manager. Little emphasis was placed on Maintenance Management, and their role in Capital Budget preparation. Therefore the research strategy chosen was to conduct a survey using a questionnaire that gathers data

from only the Maintenance environment. The findings from this paper are derived from the same questionnaire survey, (Appendix 1 and 2).

3.4.1 Purpose and Construction

Primary research was done to gather data from the Maintenance Management at Toyota South Africa. It is intended that the results will establish whether or not the practices used are acceptable for the continued success of the company. The most important part of the survey research was to design an instrument that was unambiguous and yet asked pertinent questions. Several attempts at question construction were made to realise this end.

The questionnaire was constructed into two sections, Section A – Personal Details, and Section B – Job Related. By doing this, it was intended to create a comfortable atmosphere for the respondent completing or attempting to complete the questionnaire. Finally, the survey questionnaire was consolidated into a six-page document that would take ten minutes on average to complete.

3.4.2 Pre-Testing and Validation

It was requested from the Senior Vice-President of Toyota South Africa to use the company's maintenance department as a subject of study. The clause of acceptance was that the company's image and credibility is upheld at all times during the study. The agreement and approval at that juncture led to the intense study that was carried out. Before the issuing of the questionnaire to the respondents, certain crucial steps had to be ensured:

- The questions were progressively tested to ensure that they were answerable, and that the accuracy and reliability of information received from the question could not be distorted.

- It was assessed that no ambiguity or confusion existed in any of the questions.
- The questions were investigated for either being open-ended or double-barrelled.
- Ethical clearance from the relevant authority was pursued. This was done to safeguard respondents from the invasion of privacy.

3.4.3 Administration of the Questionnaire

Due to the negligible population and the close proximity of respondents, it was initially envisaged to hand deliver the questionnaire in a sealed envelope, as this would create a trust relationship and remove any barriers. This, however, did not transpire, as being sent abroad on a business assignment allowed only e-mail access to the respondents.

Therefore, a pre-tested questionnaire was sent via e-mail to the entire chosen population. A covering letter explaining the research and advising the respondent on how to complete the questionnaire was attached to this document, (Appendix 2). Follow-up was done telephonically to confirm that the respondents received the correspondence and ensure that the urgency of the response was maintained.

3.5 Statistical Analysis of the Data

Due to being in a foreign land with language as a barrier, it was difficult to access statistical software easily. However, in waiting for the responses from the survey, a Microsoft Excel spreadsheet was developed that grouped the data received from each question. Tables were formed that grouped relevant information creating a harmonious workflow and understanding. The results were then analyzed and converted to graphical format to achieve easy interpretation and understanding. This is clearly evidenced in the next chapter.

3.6 Conclusion

A quantitative research was done in gathering primary data for the study. In developing a questionnaire suitable to establish the current condition of the company, many pertinent factors have been taken into account. The pre-testing and validation of the questionnaire was of vital importance, ensuring that no bias or ethical repercussions would emerge.

After consultation with a sample size table, it was established that thirty-two respondents were required for this study to be useful. The distinguishing feature of this study however is that the entire population of thirty-five was researched to arrive at a conclusion. Although the administration of the survey was done from abroad, it was always purposed to receive responses from the full compliment of respondents. Much effort went into achieving this goal.

Next, Chapter 4 exposes the results of the survey in both a graphical and tabular format. The results from the survey are treated as confidential; therefore the names of respondents do not appear on any captured data.

CHAPTER FOUR

The Silent Voice of the Respondents

4.1 Introduction

Appropriately termed the ‘Silent Voice of the Respondents’, this chapter maintains the anonymity promised to the respondents. A total of thirty-five usable responses were received, representing a total response rate of 100%. The results of the survey were reassuring in some respects and surprising in others.

The questionnaire type survey used is as the vehicle to gather primary research for this study. The results of the survey questionnaire are explained by means of graphs and tables. Comparisons are made to interrogate the authenticity of the data collected. Personal information about the respondents and Job Related answers are interpreted separately.

Statistics in the form of percentages add value in the various illustrations and comparisons. A wide variety of visualisation is used in the effort of conveying a true impression of the findings. Finally, a concise conclusion introduces the anticipated target of Chapter 5.

4.2 Findings of the Research

Research was done in the effort of gathering primary data for the study. Frequency statistics are used in interpreting and explaining the results of this primary data. The questionnaire that was issued to the respondents was divided into two definite sections, namely Personal Details and Job Related. The results of these are discussed in detail, illuminating the obvious and critically analysing the effects of these on the company.

A further search was done to gather secondary data to either support or refute this study. It was, however, found that the secondary data sources researched were targeted at the Financial Manager or the like in assessment of the more technical aspects of Capital Budgeting, (Block 2005: 55-65, Truong, Partington & Peat (2006), Drury & Tayles 1997: 86).

4.2.1 Personal Details

No reference is made to an individual or specific department in the company due to the anonymity promised to the respondents. A generic approach is therefore pursued in the visualisation and explanation of results.

The chief end of sectionalising the questionnaire was to create a trust relationship with the respondents. Asking personal questions first was done to promote the answering of the more appropriate questions that were found towards the latter part of the questionnaire.

4.2.1.1 The Respondents and their Domain

As stated in the preceding chapter, a distinguishing feature of this survey is that the entire population from the company was included for responses for the research. To this end much effort went into ensuring that a response rate of 100% was reached. Figure 4.1 shows the questionnaire completion ratio, and details the total responses received from each department within the company.

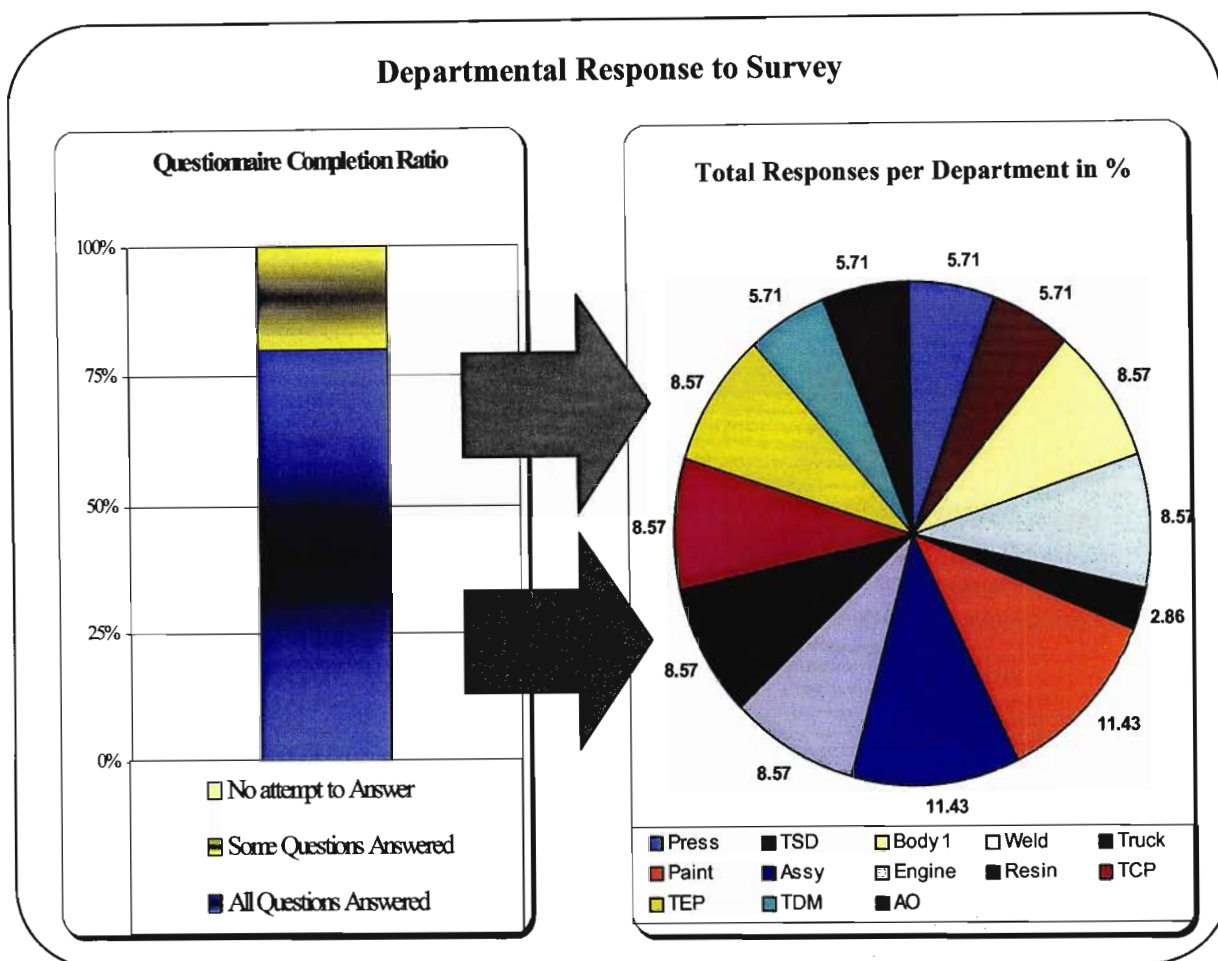


Figure 4.1 The Respondents and their Domain

Although the targeted 100% of responses were achieved, only 80% of the questionnaires were completely answered. The remaining 20% of responses that did not complete the survey did, however, complete Section A, but failed to answer some pertinent questions in Section B.

Due to its diversity and physical size, Toyota South Africa has thirteen maintenance departments that are spread throughout the company. The responses received from these departments are, in no order of priority; Press Shop (5.71%), Stamping Division TSD (5.71%), Body Plant 1 (8.57%), Weld Shop (8.57%), Truck Plant (2.86%), Paint Plant (11.43%), Assembly Plant (11.43%), Engine Plant and Trim Shop (8.57%), Resin Plant (8.57%), Chassis Plant TCP (8.57%), Exhaust Plant TEP (8.57%), Tool and Die Manufacturing TDM (5.71) and AO Press Plant (5.71).

4.2.1.2 The Respondents Structure

The plant operates on a two-shift productive system that demands effort and ownership from every department. It is thus reasonable to accept that the internal structure of each department is paramount in creating stability and continuous improvement. Figure 4.2 illustrates the organisational structure of the Maintenance Management team.

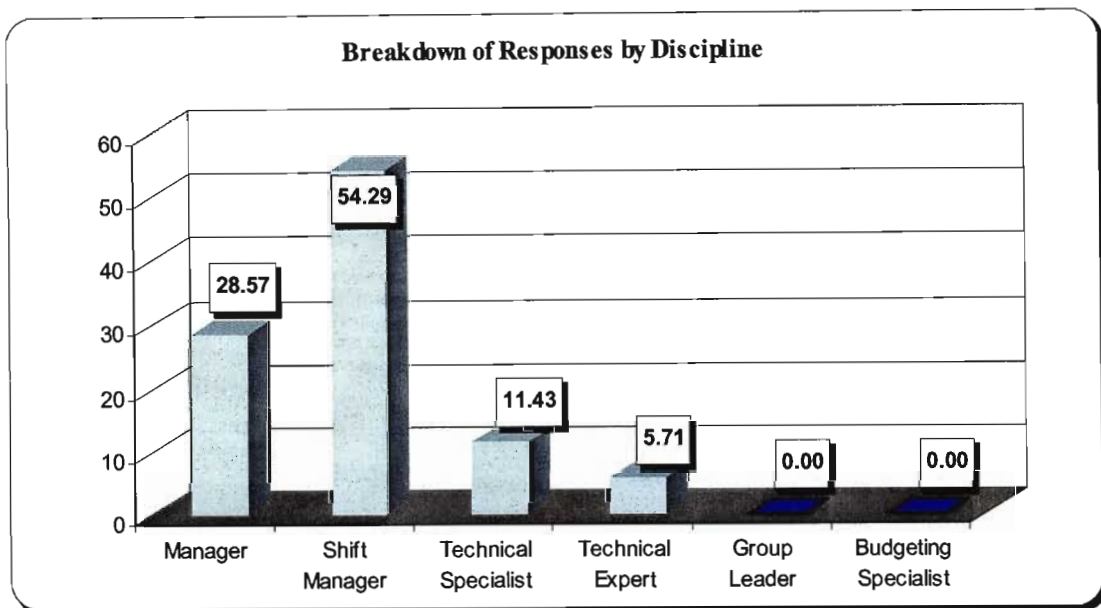


Figure 4.2 The Respondents Structure

The total summation of all the respondents from the thirteen plants within the company culminates in the knowledge that the various departments are structured with Managers, Shift Managers, Technical Specialists and Technical Experts. All these form part of the management team who contribute to the planning and proposal of Capital Budgeting for that department.

Of the thirty-five respondents, 28.57% are at Maintenance Manager status, while 54.29% have the responsibility of Shift Manager. A further 11.43% of respondents form part of the group that hold the title of Technical Specialist, while 5.71% are Technical Experts.

The concern is that none of the Maintenance Departments have indicated that they have on their payroll an individual or team of ‘Budgeting Specialists,’ or any other dedicated personnel to prepare or consolidate the financial aspects of the department.

4.2.1.3 Demographics of the Respondents

In conformance to National requirements, Management is made up of a diverse population. Table 4.1 displays the demographics of the Total Plant Maintenance Management Team.

Ethnicity	African	Coloured	Indian	White	Other	Total
	3.00	5.00	12.00	15.00		35.00
Total Responses in %	8.57	14.29	34.29	42.86	0.00	100.00

Table 4.1 Demographics of the Respondents

In representing the demographics of the respondents, special care has been undertaken not to disclose the level of management that they belong to. If further detail were added to this table, the respondent’s identity would become easily traceable, as the population that is researched is negligible.

4.2.1.4 The relationship between Managerial Experience and Service

If there exists a relationship between Managerial Experience to prepare Capital Budgeting and/or the Decision for the Proposal of Capital Budgets, and the number of Years Service that the respondent is employed at Toyota South Africa, then Figure 4.3 will be used in making that judgement.

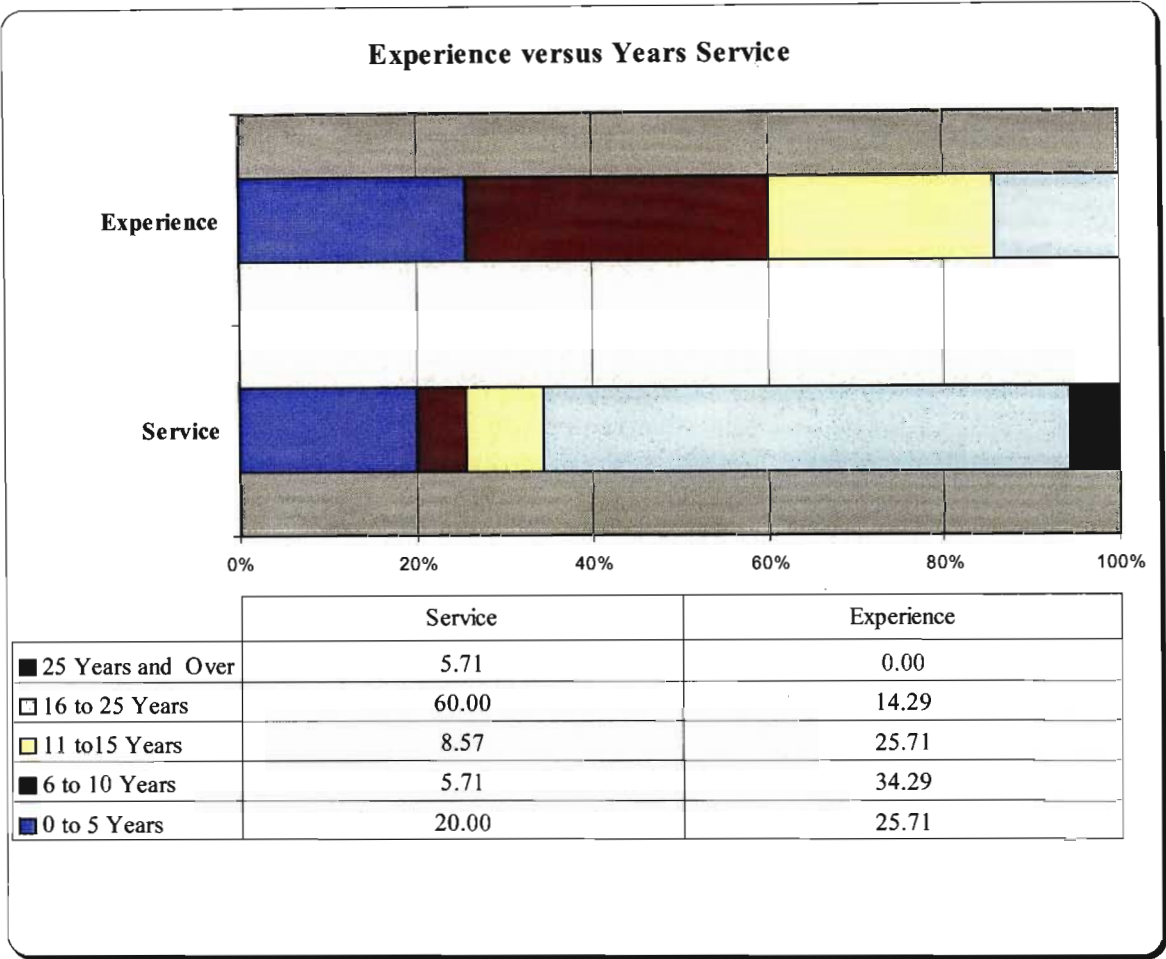


Figure 4.3 The relationship between Managerial Experience and Service

From the above comparison, a segregation is created to isolate the Managerial Experience in the Maintenance environment that an individual has in their career path, and the actual years of Service / Employment that the respondent has with Toyota South Africa.

In terms of Experience in Maintenance Management, 25.71% of the respondents had between zero and five years, 34.29% from six to ten years, 25.71% between eleven and fifteen years, 14.29% between sixteen and twenty five years and an astounding zero % is recorded at twenty five years and over.

Employment / Service in the company however does not necessarily mean in a Maintenance or Managerial environment. It simply measures the respondent's

employment in the company. Here, 20% of the respondents are fairly new, as they have been with the company between zero and five years, 5.71% from six to ten years, 8.57% between eleven and fifteen years, 60% between sixteen and twenty five years and 5.71% is recorded at twenty five years and over.

In the zero to five-year statistic it is evident that some of the recruitment into management level has occurred from outside the boundaries of Toyota South Africa. It is, however, reassuring to note that there is an almost even spread of management experience between zero and fifteen years, and that 60% of respondents that have been with the company between sixteen and twenty five years are in some sort of Management position. This is based on the results from Figure 4.2, as the disciplines of the respondents were revealed.

4.2.1.5 The Age of the Respondents

Figure 4.4 further emphasizes the experience due to age that the respondents possess.

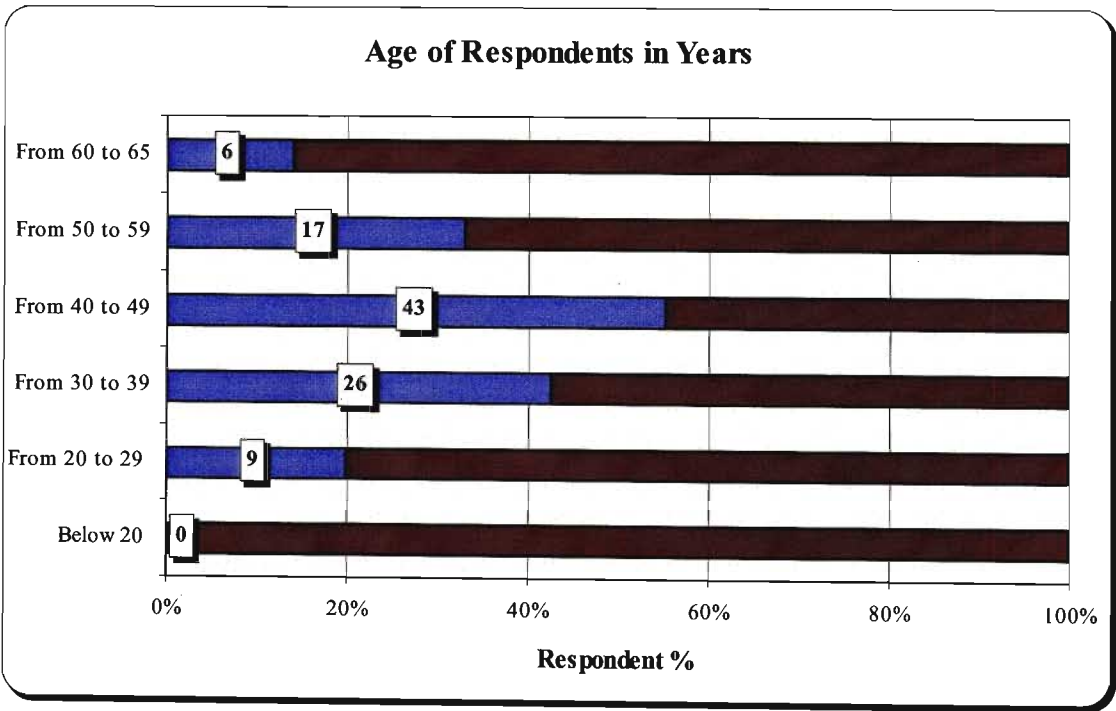


Figure 4.4 The Age of the Respondents

5.71% of the respondents aged in the sixty to sixty-five group, 17.14% in the fifty to fifty nine group, 42.86% between forty and forty nine, 25.71% in the thirty to thirty nine group and 8.57% between twenty and twenty nine.

Evidence shown is that for a managerial position in the Maintenance Department, the majority of respondents are in the above 40-year age group. Due to the lack of plant specific knowledge and experience, it is felt that more effort must be done to reduce the twenty to twenty nine age groups. With time comes good exposure in the plant and this, in turn, results in outstanding experience. Therefore the future concentration of management should be in the thirty to fifty parameter.

4.2.2 Job Related

During the phase of pre-testing the questionnaire, the Assembly Plant Maintenance Management was used in role-playing to assess if either ambiguity or misinterpretation of the survey questions could lead to distort results.

In acknowledgement that the data collected will answer the relevant questions, the Job Related section of the questionnaire therefore becomes the crux of the survey. An open-minded approach is used in the interpretation of the results, ensuring that personal preference and expectation does not impair the presentation of the results.

The target of Section B of the questionnaire was to establish the current practices prevalent in the Maintenance Departments across the plant. In this section pertinent questions pertaining to the Capital Budgeting for the procurement of production related facilities and equipment are posed at the Maintenance Management.

The results of these are now presented and interpreted. Based on the extensive review of literature in Chapter 2, certain findings are argued and criticised.

4.2.2.1 Current Methods used in Capital Budget Proposal

The Maintenance Management team rallies around in preparing the proposal of the annual Capital Budget. This is then compiled and forwarded to the senior management team. The preparation takes into account old facilities and / or equipment that are no longer economical to run, together with fairly new but problematic facilities and / or equipment that disrupts the Operational Production Ratio (OPR). Figure 4.5 illustrates the results of how the respondents assess the plant needs and then visualises the breakdown of the techniques used in Capital Budget Proposal.

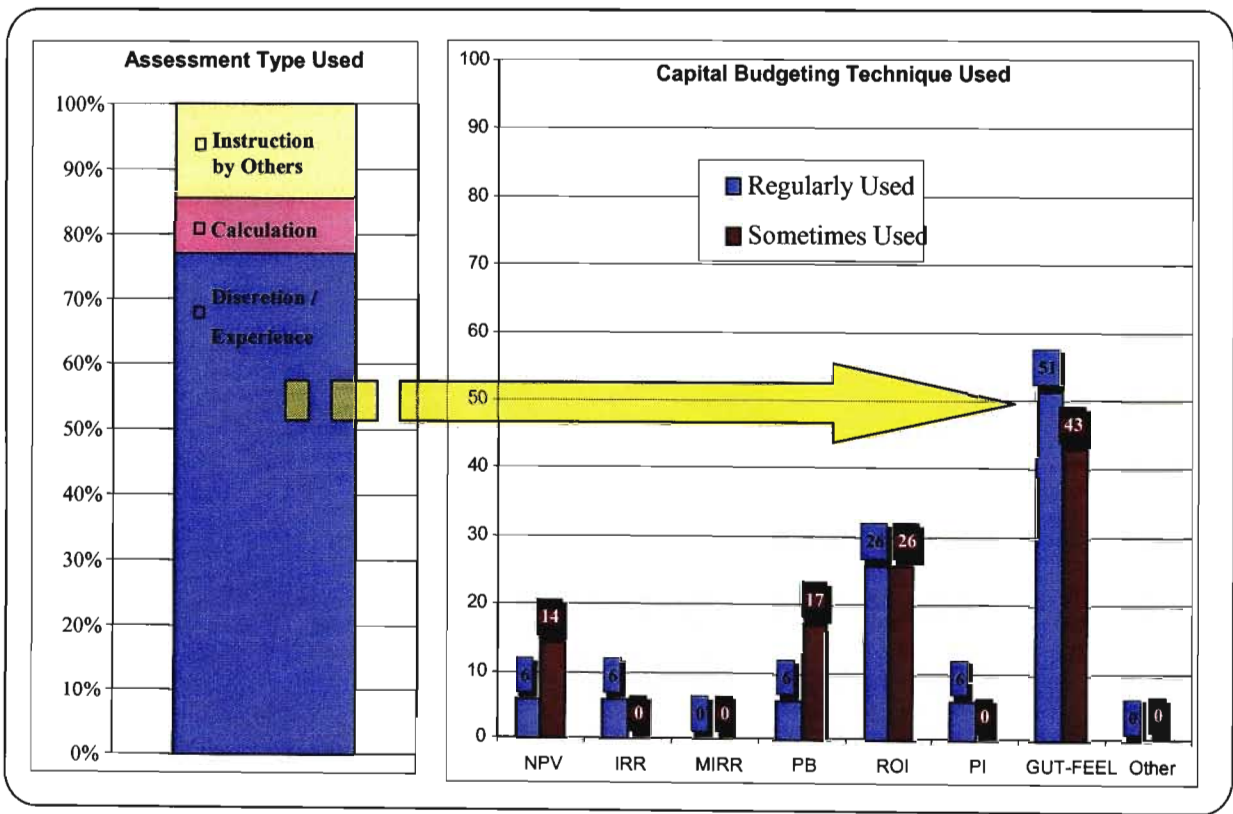


Figure 4.5 The Current Methods used in Capital Budget Proposal

The results show that 77.14% of the respondents use either their experience or discretion to make judgement on what input is made in the Capital Budget Proposal. A

mere 8.57% only are doing financial calculations, while another 14.29% admit to inputting requests in the proposal by being instructed by others.

As much as experience and discretion are important, it is envisaged that for a multi-million Rand organisation, even the proposal for Capital Budgets should have some financial backing in the form of justification. This is due to the fact that it is the Maintenance Management who actually know the status and condition of the plant. If they deem something to be important, an applicable justification is reasonable.

The techniques used by the various departments in the preparation of the Capital Budget are displayed explaining their use as either Regular or Sometimes. The most commonly used technique on a Regular basis is Gut-feel topping a massive 51.43% usage. Return On Investment (ROI) is used by 25.71% of the respondents and the Payback Period (PB) calculation by 5.71%. Surprisingly, the techniques used on a less frequent basis are the same as those used on a regular Basis, however the usages are 42.86%, 25.71% and 17.14% respectively.

On a total usage of technique, Gut-feel is used by 94.29% of the respondents, ROI by 51.43% and PB by 22.86%. In adjacently displaying the results of the techniques used in Capital Budget preparations with the Assessment type used, it becomes clear that the findings are not distorted. The evidence of this lies in the linkage between the 77.14% use of Discretion / Experience and the 94.29% of Gut-feel.

4.2.2.2 The Impact of Knowledge on Procedure

From the findings thus far it is apparent that there lies a flaw in the way that the Capital Budgeting Proposal is being prepared by the team. In trying to establish the reasons for this, further evaluation of the data received from the survey is presented in Figure 4.6.

The effort of comparing the two variables is to test if a relationship exists between them. Therefore placing them on the same scaling of measurement allows easy interpretation.

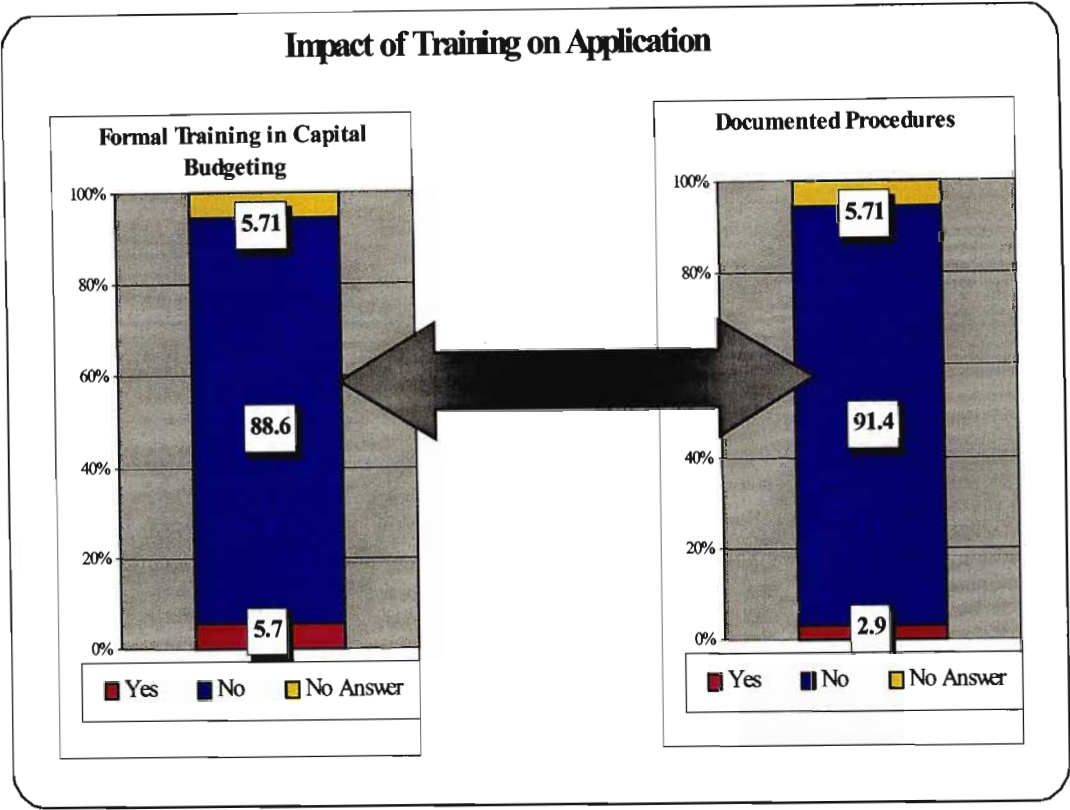


Figure 4.6 The Impact of Knowledge on Procedure

Due to the Maintenance environment being a technical field, and the Management for this field emerging from within, it is understandable that a large concentration of unskilled employment in Capital Budgeting is created. 88.57% of the respondents have had No formal Training in Capital Budgeting, while a further 5.71% chose not to answer this question. Only a 5.71% of the population declared that they received this type of training.

Consequently, the impact of this training is seen in the documented procedures available in the various departments. These procedures should be the silent instructor to those responsible for Capital Budget preparation and form the guidelines to do this task. In reality however, only 2.86% of responses acknowledge that these procedures actually exist. 91.43% of the respondents have No documented procedures, and 5.71% did not answer this question.

Therefore the questionnaire authenticity is ratified in that the amount of formal training received is a direct relationship to the documented procedures available.

4.2.2.3 The Success Rate of Capital Budget Proposal

In submitting the Capital Budget proposal for approval, the first line management wait in anticipation for acceptance of what they feel is critical for sustaining the plants’ performance. This inflated list is sometimes referred to as the ‘wish-list,’ as is evident in Figure 4.7.

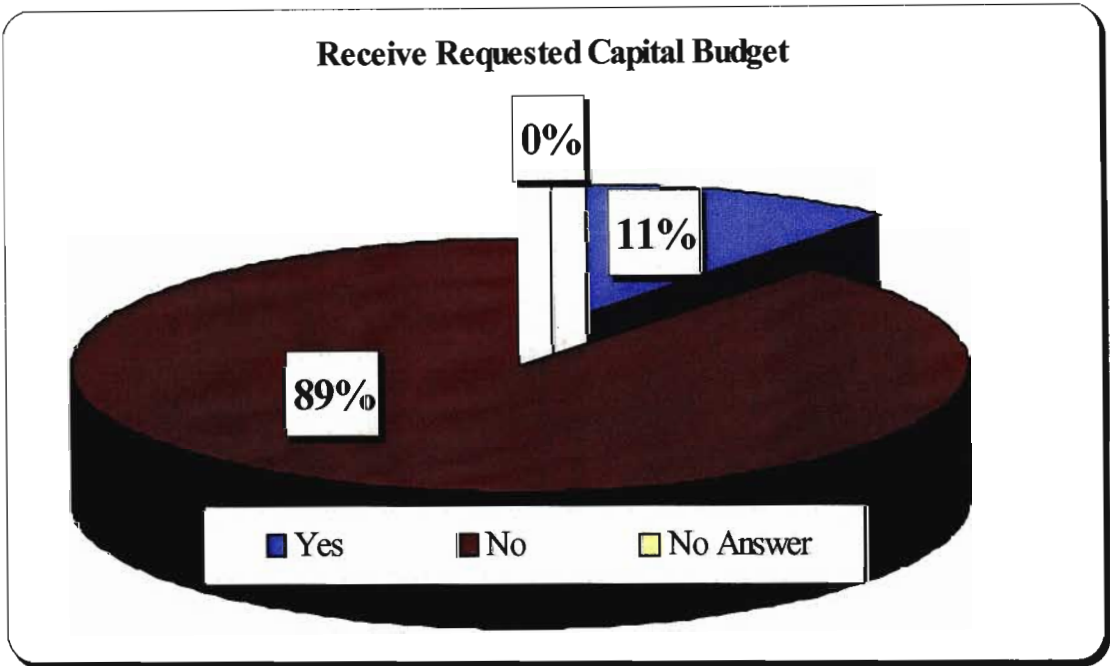


Figure 4.7 Success Rate of Capital Budget Proposal

From the graph it is understood that statistically 88.57% of the respondents do not receive the budget requested for. Only 11.43% are content with the process, as they receive the proposed budgets. Therefore the general approach to this process is that they wish for at least some of the funds requested so that the plant can be kaizenized (improved).

On examination of the results, it becomes evident that the high failure rate to secure sufficient funds is due to the approach used in the justification process. As discussed already, there must be sufficient justification for the company to invest these funds, and this relates back to the techniques and processes used.

A further revelation in the survey is that 91.43% of responses have denied having a team to prepare these budgets, while 8.57% did not answer this question. Effectively, not a single response indicates that they have special teams who are dedicated to preparing budgets.

4.2.2.4 Current Assessment of Risk

As mentioned earlier, the mere mention of the word Risk creates a psychological awareness that prompts one to be extra careful. However, in the preparation of the Capital Budget that awareness is not evident, as is seen in Figure 4.8.

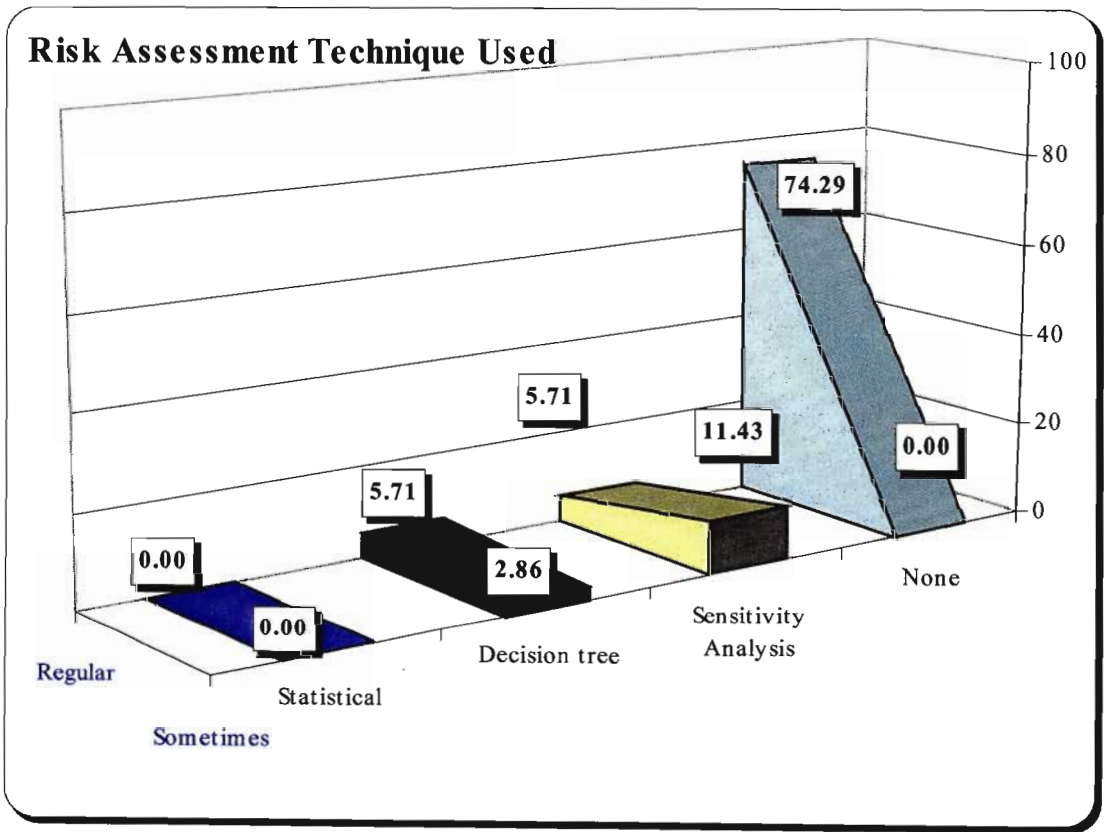


Figure 4.8 Current Assessment of Risk

In this explanation, the background axis of the graph shows the usage of the Risk Assessment Technique that is used on a regular basis, while the Front axis shows the

technique that is used infrequently (sometimes). This study shows no mention of the use of any statistical method in the assessment of the risk involved in the investment. A total of 5.71% of the respondents use the Decision Tree and Sensitivity technique of risk analysis on a regular basis. Surprisingly, 74.29% of the respondents admit to not factoring risk into the decision that is made to procure facilities and / or equipment.

A total of 2.86% and 11.43% of the respondents seldom use the Decision Tree and Sensitivity techniques of risk analysis. The poor usage of Risk analysis also attributes to the poor success rate of the Capital Budget Proposal that is explained in Figure 4.7. This is due to the senior management not grasping the actual effect of the requested investment, and worst still then is them not fully understanding the impact on the company should the budget not be approved.

4.2.2.5 The Viewpoints of the Respondents

The latter part of Section B of the questionnaire is designed to allow feedback on the views of the respondents. A matrix is used where the respondent rates the question asked in one of five categories. These ranges from strongly disagreeing with the comment posed, to strongly agreeing. Table 4.2 shows the results achieved from the comments in both actual responses and percentage values.

34.29% of the population strongly agree that they should do Capital Budgeting as part of their normal function, while 11.43% think that it is not their job. Only 8.57% remain neutral on this point.

A totally contradictory view comes to the surface when 74.29% of respondents strongly agree that another department is responsible for this task. The 5.71% opposing this view is assumed to be those that have been identified as having some sort of exposure to the field of Capital Budgeting.

Viewpoints	Strongly Disagree	% value	Disagree	% value	Neutral	% value	Agree	% value	Strongly Agree	% value
Capital Budgeting is not my job	12.00	34.29	3.00	8.57	3.00	8.57	13.00	37.14	4.00	11.43
Another dept should do capital budgeting	2.00	5.71		0.00	5.00	14.29	2.00	5.71	26.00	74.29
HK should factor my ability to do CB	7.00	20.00	13.00	37.14	8.00	22.86	2.00	5.71	5.00	14.29
Training to be made available for CB	4.00	11.43		0.00	2.00	5.71		0.00	29.00	82.86

Table 4.2 Viewpoints of the Respondents

Hoshin Kanri (HK) is a Japanese term meaning performance management. There seems to be mixed feelings on the need to measure an individual on his/ her ability to prepare a successful Capital Budget Proposal. A total of 57.14% is in disagreement with this and 20% in agreement. Another 22.86% remain neutral.

Although only 5.71% of the team strongly disagrees with the concept of another department doing the preparations for Capital Budgeting, it is pleasing to note that a majority of 82.86% strongly agree that special training on Capital Budgeting be made available for improving the skill of the average management.

In actual fact 42.86% of responses accept Capital Budgeting as their jobs, while 48.57% do not. 80% believe that another department should do Capital Budget preparation and Proposal and only 5.71% are in disagreement.

In the diversity experienced in the plant, it becomes necessary to interpret the true meaning of the results. Whether strongly agreeing, or just agreeing, the end product is still an agreement. The same applies on the converse of this; any form of disagreement is in itself disagreement.

4.2.2.6 The Future Implications of the Study

The respondents were asked true / false type questions that are positioned at assessing the future needs of the company. This was done in preparation for providing direction and objectives in view of continuous improvement. Figure 4.9 illustrates the results of these questions.

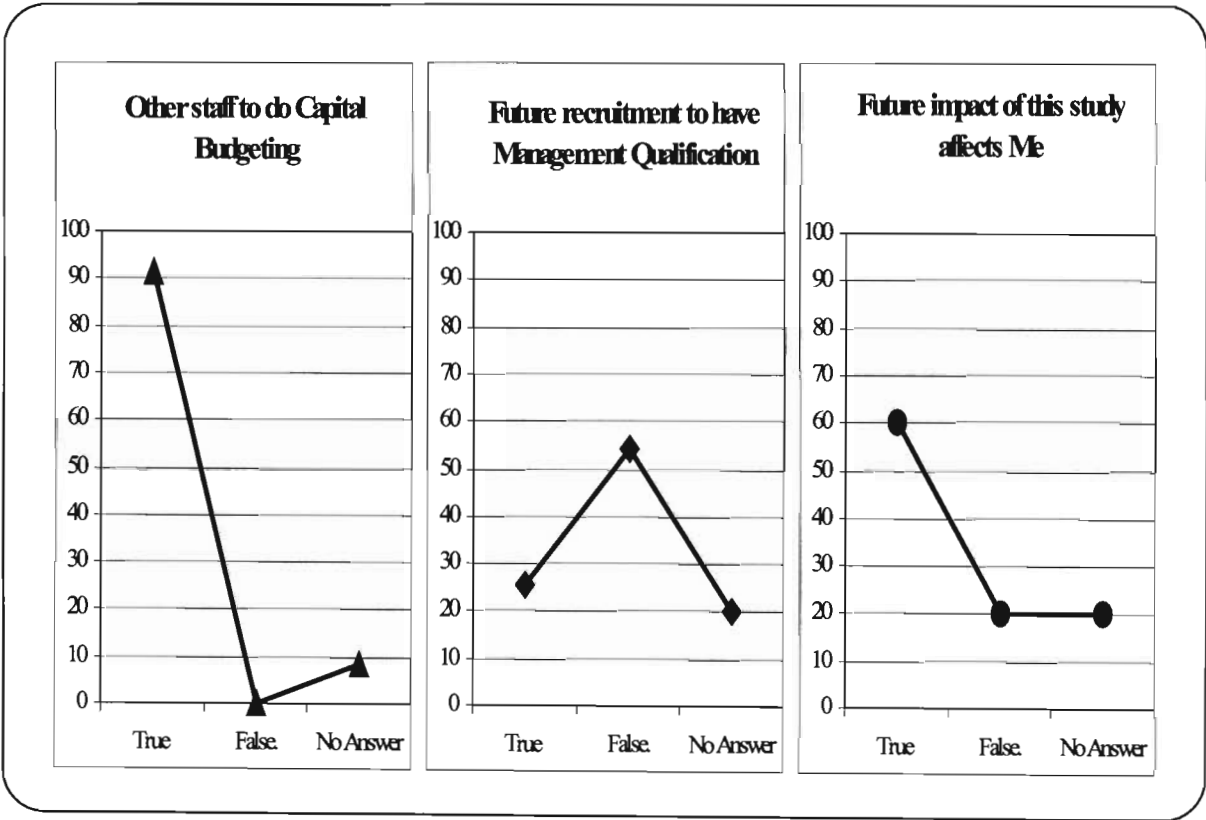


Figure 4.9 The Future Implications of the Study

An almost unanimous decision is achieved when 91.43% of the total population of the survey opt for staff other than managers to prepare the Budget Proposal. This does not mean that the task is shifted away from Maintenance, it merely is indicative that a special team be created to perform this task.

With regards to future recruitment into a managerial level, 25.71% of the respondents are in favour of individuals that possess relevant management type qualification, contrary to the norm of just technical qualification. Although this sounds promising,

54.29% are unmoved by the option of this recruitment. They would still look for technical experience and exposure as the primary requirement.

At the conclusion of answering the questionnaire, 60% are in the view that this study will in some way positively impact them as individuals as opposed to 20% who feel that this study has no actual value to them.

4.3 Conclusion

This survey has not only created learning for the study, but has also delved into the various departments of Toyota South Africa's manufacturing plant exposing both the strengths and weaknesses possessed by the maintenance management in the preparations of the Capital Budget proposals. In the transparency of the techniques used and the gaps present, critical analyses of the results are displayed in this chapter.

Secondary research for capital budgeting in the maintenance management context did not generate significant contribution to the study. The primary research findings of this study show that very little effort and dedication is given to the preparation of capital budgets. Therefore the conclusion drawn is that this task is primarily the responsibility of the Financial Manager, as the various journals revealed.

With 94.29% of the respondents requesting that the findings and results of this survey be shared with them, it only strengthens the case that the Maintenance Management does have a pivotal role to play in the proposal and preparation of Capital Budgets. Chapter 5 is used in creating options and recommendations on how to involve the team in this critical change-point.

CHAPTER FIVE

The Way Forward

5.1 Introduction

The previous chapter has identified the pertinent factors relating to the Capital Budget system used by the Maintenance Management in Toyota South Africa. The results of the survey have been critically examined in the intention of illuminating the current practices used, and thus gauging the status of the company.

The recommendation that follows will enlighten management on the stance that should be pursued in the effort of improving the company. It is anticipated that these recommendations will allow management to deal more effectively with the future requests for Capital Expenditure for the plant.

Further recommendations are made for the future research into this topic, encouraging a heterogeneous sample to be considered in a related industry. Then finally the objectives set out at the beginning of the study are assessed to measure the compliance of the study in meeting its goal.

5.2 Recommendations from this Research

From the research done, many findings emerged that require nurturing and redirection. The purpose of reshaping the current condition is to fit into the corporate strategy of the company, ensuring that its strength and market dominance is maintained. The company is built on a pillar of Continuous Improvement, and in offering these recommendations, the ethos that is propagated is upheld.

The recommendations offered are distributed into two sections, namely: The Company, and The Individual.

5.2.1 The Company

Due to its diversity and physical size, it was noted that thirteen Maintenance Departments exist in the Company. Further study revealed that none of these departments employed an individual or team that was responsible for the preparation of Capital Budgets. Even more astounding was the result that 88.57% of the respondents did not receive any formal training in this topic. It is therefore suggested that the company invest in education and training on the specific population who are expected to carry out this function.

Alternatively, a second strategy would be to rationalise the department, and create a central team of specialists in budgeting whom would take care of the needs of the entire company. Here the thinking is that they would gather that data from the relevant management and then interrogate this and provide the necessary calculation and justification. The final product then being offered to senior management therefore changes from being a wish list, to a reality list.

In a Maintenance environment the trend of recruitment strategy has always been to appoint people with technical qualifications only. In order to face the challenges of growth and development, and more especially globalisation, Toyota South Africa needs to employ a level of Maintenance Management that have suitable qualifications in both a technical and Managerial field. This will close the gap experienced when financial decisions are made.

With or without the generation of a central department to cater for the needs of Capital Budgeting, the Company will have to generate appropriate documentation and procedures to instruct the employees on how to administer the preparation and proposal for Capital Budgets. This should be a legal policy and procedure for the company where

a formal step sheet is used in tutoring the incumbent on the procedure to use the product. Accountability is then attached to this to form an evaluation process.

5.2.2 The Individual

As there are no boundaries to learning, it is encouraged that all employees of the company that hold the responsibility of being in a management capacity ensure they are equipped with the relevant knowledge to be effective in their job. In this instance, reference is made with Management having a basic financial grounding. To this end, it is envisaged that the human resource department maps out the future career path opportunity and expectations that the employer has from the employee. In doing this type of succession planning, the company is assured of the best quality management at all times.

Genchi-Getbutsu is a Japanese concept that teaches that one must see for oneself, meaning that it is best for you to visualise the condition of the plant personally. Due to the Maintenance Management being constantly at the forefront of keeping the plant operational, they possess extensive experience and knowledge of the plant and its condition. Therefore special attention must be afforded to them when they make requests for capital investment with the aim to improve the plant.

5.3 Recommendations for Future Research

The study that was undertaken at Toyota South Africa had many limitations. The survey looked at a homogeneous sample, where the sample members belong to a particular subgroup and are similar (Saunders *et al.* 2003). The findings are therefore considered to be limited. Future research would investigate a heterogeneous sample comprising of a number of different companies.

The survey could either be conducted at the various Motor Industries in South Africa to ascertain their stance in Capital Budgeting, or to keep it in a close proximity, test the Automated Industry in the vicinity of Durban and surrounding areas. This would then become a comparative type analysis, testing if Toyota South Africa is positioned correctly to maintain market leadership.

5.4 Objective Compliance

The objective set out at the beginning of the study was to give an overview of the capital budgeting process. This was to be used as an educator to those in the company that are oblivious to the norms set out by scholars regarding the procedures to follow in making the decision on the procurement of Equipment and Facilities.

This is achieved in Chapter two, where the “Nuts and Bolts about Capital Budgeting” are discussed in detail. The explanations are supported with diagrams to intensify the learning and make clear the understanding. A simplistic model was investigated and presented in Figure 2.4. This model outlines the process to follow in arriving at a decision for Capital Budgeting.

The next objective was to reflect on what the company is currently practicing in terms of capital budgeting. Chapter Four exposes the results from the primary research done at the Company. The findings are explained both in Graphical and Tabular formats. Detailed explanations are then offered in percentage form to illustrate the effects.

Finally, recommendations that need to be adapted in the effort of rectifying any anomaly in the Company are discussed. These will be presented to the Senior Management of the Company at the completion of the study.

5.5 Conclusion

In researching the Decision Making Proposal at Maintenance Management Level, the study attempts to answer this specific question: “ Are Capital Budgeting Techniques being used by Toyota South Africa’s Maintenance Departments, and if so, are they being correctly administered - Is the correct decision made?”

What is evident from the survey is that there is a lack of knowledge in the Maintenance Departments with regards to the usage of Capital Budgeting Techniques. The results prove that much guesswork goes into the proposal, as Gut-Feel and Discretion are key components of the decision. In answering the question of this study, it appears that the use of the specified budgeting techniques for the procurement of Capital equipment is rarely used. These due to the finding that the Maintenance Management has not received relevant type training for this facet of their jobs.

In knowledge of this anomaly, the authenticity of the decision made in Capital Budgeting is under question. As much as the respondents have accumulated numerous years of service in the organisation, and the experience that is possessed by them is irreplaceable, there still is need for proper justification. This is more necessary due to the large sums of money that is committed, and even more importantly, due to the irreversibility of both the funds and the decision.

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APPENDIX 1 – Ethical Clearance of Questionnaire



UNIVERSITY OF
KWAZULU-NATAL

RESEARCH OFFICE (GOVAN MBEKI CENTRE)
WESTVILLE CAMPUS
TELEPHONE NO.: 031 – 2603587
EMAIL : ximbap@ukzn.ac.za

8 DECEMBER 2006

MR. C RAMCHARAN (203516989)
GRADUATE SCHOOL OF BUSINESS

Dear Mr. Ramcharan

ETHICAL CLEARANCE APPROVAL NUMBER: HSS/06816A

I wish to confirm that ethical clearance has been granted for the following project:

"Capital budgeting, The decision making proposal at Maintenance Management Level"

Yours faithfully


.....
MS. PHUMELELE XIMBA
RESEARCH OFFICE

cc. Faculty Office (Christel Haddon)
cc. Supervisor (Mr. M Phiri)

APPENDIX 2 – Covering Letter and Questionnaire (Original)

12 October 2005

The Manager
Maintenance Department
Toyota South Africa

To Whom It May Concern:

COMPLETION OF RESEARCH QUESTIONNAIRE

Note to the respondent

I am currently conducting a study on the Capital Budgeting Practices that are used in Toyota South Africa. My research forms part of an MBA degree at the University of Kwa-Zulu Natal. In researching this topic, the objective is to illuminate the practices adopted by Toyota SA, and investigate if these practices are linked with scholarly theory. It is appreciated if a competent person completes the attached questionnaire.

How to complete the questionnaire

1. Please answer the questions as truthfully as you can.
2. Please use a tick with a *pen* to note your response.
3. Please tick only one response to each question.

This questionnaire is only distributed to Toyota SA Maintenance Managers, so please be assured that your response will be kept absolutely confidential.

Thank you very much for sacrificing 10 minutes from your busy schedule to complete this questionnaire.

Kind Regards
Calvin Ramcharan

QUESTIONNAIRE:

SECTION A – Personal Details

1. Name of Respondent: _____

2. Department: _____

3. Current job Title: _____

4. How old are you, in years only?

- ☐ Under 20
- ☐ 20 ~ 29
- ☐ 30 ~ 39
- ☐ 40 ~ 49
- ☐ 50 ~ 59
- ☐ 60 ~ 65

5. Of what ethnic group do you belong?

- ☐ African
- ☐ Coloured
- ☐ Indian
- ☐ White
- ☐ Other

6. How long have you been employed in Toyota SA?

- ☐ 0 ~ 5 Years
- ☐ 6 ~ 10 Years
- ☐ 11 ~ 15 Years
- ☐ 16 ~ 25 Years
- ☐ 25 Years and Over

7. How long are you in your current job?

- ☐ 0 ~ 5 Years
- ☐ 6 ~ 10 Years
- ☐ 11 ~ 15 Years
- ☐ 16 Years and Over

SECTION B – Job Related

8. Does your department have a specialised team or person to prepare the Annual Capital Budget Proposal?

- ☐ Yes
- ☐ No

9. Do you have a documented procedure for planning the Capital Budget Proposal?

- ☐ Yes
- ☐ No

10. How do you assess whether an asset needs to be procured?

- ☐ Discretion / Experience
- ☐ Factual Calculation
- ☐ Instruction from other people

11. Do you always get the Capital Budget requested for?

- ☐ Yes
- ☐ No

12. Did you receive formal training on the preparation for Capital Budgeting in Toyota SA?

- ☐ Yes
- ☐ No

13. Have you been exposed to Capital Budgeting Proposal in any previous job?

- ☐ Yes
- ☐ No

14. What technique/s do you use when preparing your Capital Budget Proposal?

APPRAISAL METHODS	REGULARLY USED	INFREQUENTLY USED
Net Present Value		
Internal Rate of Return		
Modified Internal Rate of Return		
Payback Period		
Simple Return on Investment		
Profitability Index		
Gut-Feel		
Other, Please Identify.		

15. What RISK Assessment Technique is factored into the Capital Budget Proposal that is prepared for your department?

RISK ASSESSMENT TECHNIQUE	REGULARLY USED	INFREQUENTLY USED
Decision Tree Analysis		
Monte Carlo Simulation		
Sensitivity Analysis		
Cash Flow Standard Deviation Method		
None		
Other, Please Identify.		

16. Please rate the following statements based on the scale below.

1- Strongly Disagree 2- Disagree 3- Neutral 4- Agree 5- Strongly Agree

STATEMENT	1	2	3	4	5
Capital Budgeting is not my job.					
Another department should do Budget Preparation.					
Performance Management should factor my ability to prepare Capital Budgets.					
Training must be made available on the preparation of Capital Budgets.					

17. If Capital Budgeting is a requirement for my department, I will expect other staff to also be trained.

- ☐ True
- ☐ False

18. For future recruitment to managerial positions, I will insist on formal management qualification as prerequisite.

- ☐ True
- ☐ False

19. I think that this study will positively impact the future condition of my job.

☐ True

☐ False

20. Would you like to receive a copy of the findings to this study on completion?

☐ Yes

☐ No

ONCE AGAIN, THANK YOU FOR YOUR VALUED TIME AND EFFORT.

IT IS SINCERELY APPRECIATED.

APPENDIX 3 – Covering Letter and Questionnaire (e-mail type)

12 October 2005

The Manager
Maintenance Department
Toyota South Africa


To Whom It May Concern:

COMPLETION OF RESEARCH QUESTIONNAIRE

Note to the respondent

I am currently conducting a study on the Capital Budgeting Practices that are used in Toyota South Africa. My research forms part of an MBA degree at the University of Kwa-Zulu Natal. In researching this topic, the objective is to illuminate the practices adopted by Toyota SA, and investigate if these practices are linked with scholarly theory. It is appreciated if a competent person completes the attached questionnaire.

How to complete the questionnaire

- 21. Please answer the questions as truthfully as you can.
- 22. Please use  provided at the end of each question to note your response.
(Click, drag & drop)
- 23. Please tick only one response to each question.

This questionnaire is only distributed to Toyota SA Maintenance Managers, so please be assured that your response will be kept absolutely confidential.

Thank you very much for sacrificing 10 minutes from your busy schedule to complete this questionnaire.

Kind Regards
Calvin Ramcharan

QUESTIONNAIRE:

SECTION A – Personal Details

1. Name of Respondent: _____

2. Department: _____

3. Current job Title: _____

24. How old are you, in years only?



- ☐ Under 20
- ☐ 20 ~ 29
- ☐ 30 ~ 39
- ☐ 40 ~ 49
- ☐ 50 ~ 59
- ☐ 60 ~ 65

25. Of what ethnic group do you belong?



- ☐ African
- ☐ Coloured
- ☐ Indian
- ☐ White
- ☐ Other

26. How long have you been employed in Toyota SA?



- ☐ 0 ~ 5 Years
- ☐ 6 ~ 10 Years
- ☐ 11 ~ 15 Years
- ☐ 16 ~ 25 Years
- ☐ 25 Years and Over

27. How long are you in your current job?



- ☐ 0 ~ 5 Years
- ☐ 6 ~ 10 Years
- ☐ 11 ~ 15 Years
- ☐ 16 Years and Over

SECTION B – Job Related

28. Does your department have a specialised team or person to prepare the Annual Capital Budget Proposal?



- ☐ Yes
- ☐ No

29. Do you have a documented procedure for planning the Capital Budget Proposal?



- ☐ Yes
- ☐ No

30. How do you assess whether an asset needs to be procured?

- ☐ Discretion / Experience
- ☐ Factual Calculation
- ☐ Instruction from other people



31. Do you always get the Capital Budget requested for?

- ☐ Yes
- ☐ No



32. Did you receive formal training on the preparation for Capital Budgeting in Toyota SA?

- ☐ Yes
- ☐ No



33. Have you been exposed to Capital Budgeting Proposal in any previous job?

- ☐ Yes
- ☐ No



34. What technique/s do you use when preparing your Capital Budget Proposal?





APPRAISAL METHODS	REGULARLY USED	INFREQUENTLY USED
Net Present Value	X	
Internal Rate of Return	X	
Modified Internal Rate of Return	X	
Payback Period	X	
Simple Return on Investment	X	
Profitability Index	X	
Gut-Feel	X	
Other, Please Identify.	X	


35. What RISK Assessment Technique is factored into the Capital Budget Proposal that is prepared for your department?

RISK ASSESSMENT TECHNIQUE	REGULARLY USED	INFREQUENTLY USED
Decision Tree Analysis	X	
Monte Carlo Simulation	X	
Sensitivity Analysis	X	
Cash Flow Standard Deviation Method	X	
None	X	
Other, Please Identify.	X	


36. Please rate the following statements based on the scale below.

1- Strongly Disagree 2- Disagree 3- Neutral 4- Agree 5- Strongly Agree

STATEMENT	1	2	3	4	5
Capital Budgeting is not my job. 					
Another department should do Budget Preparation. 					
Performance Management should factor my ability to prepare Capital Budgets. 					
Training must be made available on the preparation of Capital Budgets. 					

17. If Capital Budgeting is a requirement for my department, I will expect other staff to also be trained. 

- ☐ True
- ☐ False

18. For future recruitment to managerial positions, I will insist on formal management qualification as prerequisite. 

- ☐ True
- ☐ False

19. I think that this study will positively impact the future condition of my job.

☐ True



☐ False

20. Would you like to receive a copy of the findings to this study on completion?

☐ Yes



☐ No

ONCE AGAIN, THANK YOU FOR YOUR VALUED TIME AND EFFORT.

IT IS SINCERELY APPRECIATED.



APPENDIX 4 – Formula Sheet

1. Payback Period (PP)

PP answers the question:

How many years will it be until the firm recovers its initial investment?

The PP period does not involve using time value of money. One must find the number of years at which the cumulative cash flow from the project equals 0.

2. Net Present Value (NPV)

$$NPV = \sum_{t=1}^n CF_t PVIF_{k,t} - IC$$

where:

NPV = net present value

CF_t = cash flow after taxes in year t

k = required return on project

n = number of years until terminal year of cash flows from project

IC = initial investment at a time 0

3. Profitability Index (PI)

PI = (Present Value of Future Cash Flows / Initial Investment)

Mathematically, the formula for profitability index is:

$$PI = \frac{\sum_{t=1}^n CF_t PVIF_{k,t}}{IC}$$

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where:

PI = profitability index

- CF_t = cash flow after taxes in year t
 k = required return on project
 n = number of years until terminal year of cash flows from project
 IC = initial investment at a time 0

4. Internal Rate of Return (IRR)

IRR, is a measure of the yield on a project if the project is accepted. IRR is the interest rate that causes the present value of the future cash flows from the project to equal the initial investment from the project. Mathematical, IRR is the k that will cause:

$$\sum_{t=1}^n CF_t PVIF_{k,t} = IC$$

where:

- IRR = internal rate of return
 CF_t = cash flow after taxes in year t
 k = required return on project
 n = number of years until terminal year of cash flows from project
 IC = initial investment at a time 0

5. Average Accounting Return (AAR)

The AAR is given by the following formula:

$$AAR = \frac{\left(\frac{\sum_{t=1}^n CF_t - IC}{n} \right)}{\left(\frac{IC}{2} \right)}$$

where:

- AAR = average accounting return

- CF_t = cash flow after taxes in year t
 IC = initial investment at a time 0
 n = number of years until terminal year of cash flows from project

6. Modified Internal Rate of Return (MIRR)

The MIRR assumes that all cash inflows received by the firm before year n will be reinvested until year n at an interest rate equal to the firm's cost of capital. This allows one to compare a terminal value, (TV)

$$TV = \sum_{t=1}^n CF_t FVIF_{k, n-t}$$

$$MIRR = \left(\frac{TV}{IC} \right)^{\frac{1}{n}} - 1$$

where:

MIRR = modified internal rate of return

TV = terminal value

CF_t = cash flow after taxes in year t

k = required return on project (cost of capital)

n = number of years until terminal year of cash flows from project

IC = initial investment at a time 0

7. Cost of Debt (k_d)

After – tax cost of debt = $k_d (1-t)$

where:

t = firm's marginal tax rate

k_d = cost of debt

8. Cost of Preferred Stock (K_{ps})

$$K_{ps} = \frac{D_{ps}}{P_n} = \frac{D_{ps}}{P_n - F}$$

where:

D = annual dividend payment (which remains fixed)

P_n = price of the preferred stock net of floatation cost

F = floatation cost

9. Capital Asset Pricing (CAPM)

$$k_e = R_f + \beta_1 [R_m - R_f]$$

where:

R_f = risk free rate generally taken to be the yield on long-term government bond

R_m = the current expected rate of return on the market or an average stock

B = the stock's beta coefficient and use it as index of stocks risk

10. Dividend Growth Model

$$P_0 = \frac{D_1}{(1 + K_e)} + \frac{D_2}{(1 + K_e)} + \dots + \frac{D_8}{(1 + K_e)}$$

where:

P_0 = intrinsic value of the stock

$$P_0 = \frac{D_1}{(K_e - g)}$$

where:

g = growth rate of the dividend

$$K_e = \frac{D_1}{P_0} + g = \text{dividend yield} + \text{growth rate}$$

11. Sustainable Growth Model

$$g = b \times \text{ROE}$$

where:

$$b = \text{retention rate} = 1 - \text{payout rate}$$

12. Bond – Yield – Plus – Risk – Premium Model

$$K_e = \text{bond's YTM} + \text{risk premium}$$

13. Cost of new common stock

$$K_e = \frac{D_1}{P_0(1-f)} + g$$

where:

$$f = \text{floatation cost expresses as percentage}$$

14. Weighted average cost of capital (WACC)

$$\text{WACC} = w_d k_d (1 - t) + w_p k_p + w_e k_e$$

where:

w_d , w_p and w_e = weights of debt, preferred stock and equity respectively

k_d , k_p and k_e = cost of debt, preferred stock and equity respectively.