SMES’ INVESTMENT DECISIONS: AN ASSESSMENT ON TECHNOLOGY INVESTMENTS BY SMES IN NAIROBI, KENYA

BY

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UNITED STATES INTERNATIONAL UNIVERSITY - AFRICA

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A project Report submitted to the Chandaria School of Business in partial fulfilment of the requirement of the degree of Masters in Business Administration (MBA)

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STUDENT’S DECLARATION

I, the undersigned, declare that this is my original work and has not been submitted to any other college, institution or university other than the United States International University in Nairobi for my academic credit.

Signed: __________________________    Date: ______________________

Duncan Asila Amuko (ID 622099)

This project has been presented for examination with my approval as the appointed supervisor.

Signed: __________________________    Date: ______________________

Marion Mbogo

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Dean, Chandaria School of Business
ABSTRACT

The purpose of this study was to assess the investment decision of SMEs in relation to the decision to invest in technology. The study assessed the major factors that affect the decision to invest such as capital structure, age of the SME, the buy or lease option under cost of acquiring technology, risk and uncertainty associated with technology investments and most asset investments. It also looked into ways of improving the investment decision in technology of Kenyan SMEs.

Descriptive study was adopted for this study. The population list comprising of 107 firms based in Nairobi was retrieved from the following sources: Central Bank, Soft Kenya ICT companies’ directory and Kenyan manufacturers and exporter directory. A sample size of 53 firms was derived using the Yamane sampling formula. Structured questionnaires and interviews were used to collect data. Primary and secondary data were used in this study and the analysis was done via SPSS software package from which the results were used to answer the research questions of the study. The study was conducted and restricted to the Nairobi area.

The findings concluded that all the factors explained in the literature review had significant effect on the technology investment decision making. There was a significant relationship between the buy or lease option and access to financial services in factors that affect investment decision making. There was also a significant relationship between access to financial services and decreased cost of funds in improving investment decision making. When it came to the investment appraisal methods, findings concluded that there is a high preference for the discounted methods, although majority of the respondents lacked knowledge on real options as an investment appraisal technique. The study also found that improving factors like access to finance, cost of funds, knowledge on risk and uncertainty and risk management, access to market information and knowledge on financing alternatives and options would significantly improve technology investment decision making within the SMEs.

The study recommended better capital structure management for SMEs as it has a significant influence on their investment decision and access to finance. Effort should be made by the government to improve access to finance and information in each of the SMEs industry segment that were the subject of study in this research. These businesses should be educated on the benefits of a proper risk management system and how they would be beneficial in their businesses and industries. The study also recommended that SMES should be educated on proper use of investment appraisal techniques. The benefits of each technique should be highlighted to these firms so that they are better able to interpret the data presented to them by their accountants and business advisors. This would be of great benefit to these businesses as the managers and business owners are usually the final decision makers. With this information on hand they would be able to make better decisions as literature reviewed has shown us there is a human element in the final decision made based on experience and intuition.
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CHAPTER ONE

1.0 Introduction

1.1 Background to the Problem

Corporate investment decisions are among the most important decisions that firms have to deal with (Glaser and Micheal, 2008). Previous studies of corporate finance have generally studied the choice of new investments and decisions on how to finance those investments separately yet the field of corporate finance is basically concerned with the two. It is therefore somewhat surprising that researchers have generally studied these two decisions separately from one another (Garfinkel, Flannery, and Elasas, 2008). Perhaps this dichotomy traces to Modigliani and Miller’s (1958) classic analysis, which took a firm’s asset composition as fixed and evaluated the impact of financing choices on firm value (CPA Australia, 2011)

Economics defines investment as the act of incurring an immediate cost in the expectation of future rewards. This includes firms that construct plants and install equipment, merchants who buy and stock goods for sale, and persons who spend time on vocational education are all investors in this sense (Avinash and Robert, 1994). Popescu (2011) argues that defining investment and delimiting the field of investment can be made in various ways. For example, the term "investment" means, strictly speaking, the use of financial resources that are meant to allow the entry into the company’s patrimony of fixed inputs (buildings, constructions, machinery, plants, equipment, tools, etc.) either by acquisition or by their effective creation, yet in terms of accounting and legal areas, expenses are considered investment only when they result in a purchase of durable goods, as tangible, financial or intangible assets (Xiaotong and John, 2002). This study looks at investment in the financial term as with regards to the Small and Medium Enterprise (SME) sector investment decision on technology assets such as machinery and machinery upgrades, IT software such as Management Information Systems (MIS) and IT hardware.

Investment decisions are taken with the primary purpose of future compensations over a present investment cost. These compensations, which may not always be a monetary benefit,
are supposed to presently overcome the initial investment, incrementing the investors’ value. Nonetheless, this basic condition is not plainly transposed, from the theoretical context, (Emanuel, 2011). The decision to invest in finance is based on complex and accurate information about need, opportunity, duration of implementation and operation investments, the expenditure volume and financial resources, the input and output flows of funds throughout the investment operation, the ensuring profitability and liquidity, the recovery of invested capital, etc (Loredana, 2011).

The Small and Medium Enterprise (SME) sector has an important role to play in economic development, poverty reduction and employment creation in developing economies (Government of Kenya, 2005). The sector largely exceeds the average economic growth of national economies in many countries and contributes significantly to employment creation. Accordingly, governments and donors alike have recognized the important role of the SME sector for overall development (Government of Kenya, 2003). In most economies, Kenya included, SMEs comprise approximately 99% of all firms and employ between them about 60% of the people (AfDB, 2012). In many sectors, SMEs are responsible for driving innovation and competition. Globally SMEs account for 99% of business numbers and 40% to 50% of GDP (Government of Kenya, 2003). FSD Kenya (Financial Sector Deepening) strongly believes that in Kenya, SMEs have the potential to contribute significantly to economic growth and poverty reduction through increased production and employment. The SME sector is viewed as a leading edge of modernization and job creation. It is a source of various positive fundamental skills and technology spill overs (Government of Kenya, 2005).

Technological capabilities have been found from empirical evidence to hold the key to competitive advantage of enterprises globally. Technological capabilities are classified as production, investment, minor change, linkage, strategic marketing and major change capabilities (Utkarsh, 2012). An empirical study by Teitel (1993) found out that investment and production capabilities exist in SMEs in Kenya. Another study by Mwamadzingo (1996) revealed existence of minor change and production capabilities in all firms. It also revealed non-existence of investment capability. What is evident from these studies is that SMEs have acquired some technological capabilities (AfDB, 2012).
Technology investment decision making is one of the most challenging organizational decision making processes. Although there is a multitude of methods and models created for effective information system evaluation and selection, many organizations fail in their technology investments (Utkarsh, 2012). The system buyers do not make the effort needed for a successful technology investment decision and most of them do not even have the decision making tools, methods or support. Especially in small and medium size enterprises the ICT management is quite often based on short-term, informal, and ad hoc practices (Xiaotong and John, 2002).

In order to explain the investment decision it is necessary to explain capital structure of a firm using the theories that have been advanced by previous researchers. One such theory that explains this quite well is the pecking order theory. Pecking Order Theory, states that capital structure is driven by firm's desire to finance new investments, first internally, then with low-risk debt, and finally if all fails, with equity. Therefore, the firms prefer internal financing to external financing (Myers and Majluf, 1984).

Another theory that looks into investment in technology is the real options approach. The real options approach - The seminal works of Fischer Black, Robert Merton and Myron Scholes offer us a standard pricing model for financial options (Avinash and Robert, 1994) Together with their colleague at MIT, Stewart Myers, they recognized that option-pricing theory could be applied to real assets and non-financial investments. To differentiate the options on real assets from the financial options traded in the market, Myers coined the term real options, which has been widely accepted in academic and industry world. It is generally believed that the real options approach will play a more important role in the highly uncertain and technology driven digital economy (Xiaotong and John, 2002).

Generally, the use of technology positively influences a firm’s performance and specifically its growth, financial gain, and competitive advantage (Torsti & Outi, 2007). However, the best way to improving investment decision in technology has been found to be inconsistent across sectors, regions and sizes and is affected by a number of factors (World Bank, 2009)
1.2 Statement of the Problem

Today’s fiercely competitive environment means that every player in the real business world must be pro-active in order for them to stay profitable. Limited financial resource and many uncertainties require business practitioners to maximize their shareholders equity while controlling the risks incurred at an acceptable level (Xiaotong and John, 2002). The investment decision is based on complex and accurate information about need, opportunity, duration of implementation and operation investments, the expenditure volume and financial resources, the input and output flows of funds throughout the investment operation, the insurance of profitability and liquidity, the recovery of invested capital and many other factors (Loredana, 2011). Minimum socio-economic requirements and other complementary factors are needed for technology investment to be productive, but baseline survey data and information on technology investment is not available as well as factors influencing these investments in SMEs in Kenya are not available (Kashorda, 2009).

In Kenya, there is currently little or no research work that touches on investment decision making in Kenyan SMEs particularly in the acquisition of technology assets such as machinery including IT and software (Kashorda, 2009). Pádraig and Mark (2007) conducted a study on investments in ICT in Kenya but they only concentrated on the education sector with no mention of SMEs. Mary and Michael (1994) also researched in technology investment in Kenya but only concentrated on environmental impacts of technology improvements with no particular interest in SMEs. This study therefore seeks to contribute to the knowledge gap that exist in Kenya by looking at the technology investment decision and the factors that lead to or inhibit such decisions in relation to technology investments in the SME sector. Moreover, the study brings more insight on the investment decisions that go into investing in all forms of technology including machinery and IT software by Kenyan SMEs rather than looking at only the benefits. This study attempted to find ways of improving the investment decisions that go into acquisition of technology assets.
1.3 Purpose of the Study

The purpose of this study was to assess the investment decisions in Kenyan SMEs with a bias on technology investments and way to improve the technology investment decision making process in Kenyan SMEs.

1.4 Research Questions

This research will be guided by the following research questions

1.4.1 What factors influence the technology investment decision in SMEs?

1.4.2 Which investment appraisal techniques are mostly employed in technology investment decision making?

1.4.3 In what ways can the SMEs improve on their technology investment decision making process?

1.5 Rationale behind the Study

SMEs are the main source of economic growth in developed and developing countries alike (Stella, 2011). In Kenya SMEs comprise approximately 99% of all firms and employ between them about 60% of the people. They are also the main drivers of innovations and competition in the country (AfDB, 2012). These key facts make it essential to understand what affects these firms’ technology investment decisions and how to improve the investment decision making process. For the country to spur growth and development it needs to target the right industries such as manufacturing, service industry and technology industries, improving these firms will improve development and spur economic growth to targeted levels and above.

The SMEs business owners will get to know the major factors that affect the decision to investing in technology by other small firms and if there are any drawbacks from the methods they are currently using. They would also get a better understanding on how best to approach the investment decision and improve their current investment decision making.
The government will benefit by getting insight on the red tapes that inhibit SMEs investment in technology and how to further deepen and encourage SMEs to invest in technology through incentives or subsidies.

Financial institutions will also benefit from this study by gaining knowledge on the investment decisions SMEs make and this will assist these financial institutions in making custom products for the SMEs. This study will also help the financial institutions better advice these firms (SMEs) on how to fine tune their investment decision processes in order to increase access to financing.

1.6 Scope of the Study

The scope of this study covered only SMEs operating in Nairobi, Kenya and its environs. The study targeted both small and medium enterprises in the financial, manufacturing, service industry and technology industries. The estimated time of the project was three (3) months between May 2014 and August 2014.

1.7 Definition of Terms

1.7.1 SMEs

The government of Kenya defines Small enterprises as those that employ between 10 and 50 workers with annual turnovers between KES 500,000 and KES 5 million and capital formation between KES 5 million and KES 20 million for services or between KES 5 million and KES 50 million for enterprises doing (Goverment of Kenya, 2012). An enterprise is considered to be an SME based on value of assets or number of full-time employees. (Islam and Yusuf, 2010).

1.7.2 Technology

The application of scientific knowledge for the practical purpose especially in industry, or machinery and equipment developed from such scientific knowledge (Government of Kenya, 2006).
1.7.3 Employment

Refers to the total number of people working in an enterprise and who may or may not be paid salaries or wages. Thus employment includes any owner/operator and family members working in the business, apprentices, and regular hired (and fully paid) workers (Government of Kenya, 2005).

1.8 Chapter Summary

This chapter introduced the topic of investment decisions with the definitions applicable to this study and some of the theories applicable to technology investments such as pecking order theory and real options theory, it also introduced the purpose, scope and justification of the study. The research questions and scope of the study were also discussed in this chapter.

The next chapter reviews the literature that exists on the investment decisions and addresses relevant theories, outcomes, suggestions and workable solutions that are in place. Chapter three discusses the research methodology used in this study. Chapter four gives the results of the study while chapter five discusses the results and conclusions and gives recommendations for further research.
CHAPTER TWO

2.0 Literature Review

2.1 Introduction

This chapter provides further knowledge and understanding of the existing conceptual and analytical framework on factors that affect technology investment decisions, capital budgeting techniques (investment appraisal techniques) and improving technology investment decision-making by reviewing the past literature on the same topics. The first section in this chapter provides information on the factors influencing the technology investment decision in SMEs. The second section provides information on the most common investment appraisal techniques used by SMEs. The third section will explore the ways the SMEs can improve on their technology investment decision making. Finally, the chapter summary summarizes the literature reviewed on the mentioned topic.

2.2 Major Factors Influencing the Technology Investment Decision in SMEs

The decision to invest in technology is affected by factors such as capital structure, cost of acquiring new technology, access to finance etc.

2.2.1 Capital Structure

A firm funds its operation with capital raised from varied sources. A mix of these various sources is generally referred to as capital structure (CS). The CS has been defined as “that combination of debt and equity that attains the stated managerial goals (i.e.) the maximization of the firm’s market value” (Garfinkel, Flannery and Elasas, 2008). The optimal CS is defined as that “combination of debt and equity that minimizes the firm’s overall cost of capital” (Bhalla, 1997). The origin and composition of the two types of capitals that is debt and equity will supply financial consistency and the capability to pay the long-term liability of the company (Sheikh, Shakeel, Iqbal, and Tahir, 2012). Anton (2010) argues that capital structure adjustments also may be relatively inexpensive when firms choose how to finance large asset acquisitions, which often require them to raise substantial external funds. Likewise, marginal leverage-adjustment costs may be less important when a
firm must raise new external funds such as when it must finance major investment expenditures. New investments must be paid for and the need to finance large investment may reveal information about the pecking order in which firms prefer to manage their capital structure.

Capital structure can be best explained by the pecking order theory. Pecking order theory of capital structure states that firms have a preferred hierarchy for financing and investment decisions. The highest preference in the pecking order is to use internal financing (retained earnings and the effects of depreciation) before resorting to any form of external funds (Garfinkel, Flannery, and Elasas, 2008). Use of internal funds bears these two great advantages i.e. no flotation costs incurred and it requires no additional disclosure of sensitive financial information that could lead to more severe market discipline and a possible loss of competitive advantage. If a firm must use external funds, the preference is to use the following order of financing sources: debt, convertible securities, preferred stock, and common stock (Myers, 1984) This order reflects the motivations of the financial manager to retain control of the firm (since only common stock has a “voice” in management), reduce the agency costs of equity, and avoid the seemingly inevitable negative market reaction to an announcement of a new equity issue (Frank and Vidhan, 2003).

Pecking order theory makes two key assumptions about business owners, mostly financial managers. The first key assumption is asymmetric information, or the likelihood that a firm’s managers know more about the company’s current earnings and future growth opportunities than do outside investors (Anton, 2010). The need or desire is strong desire to keep such information proprietary. Internal funds use precludes managers from having to make public disclosures about the company’s investment opportunities and potential profits to be realized from investing in them. The second assumption is that managers will act in the best interests of the company’s existing shareholders. The managers may even forgo a positive-NPV project if it would require the issue of new equity, since this would give much of the project’s value to new shareholders at the expense of the existing shareholder (Myers and Majluf, 1984).
Pecking order theory allows for the dynamics of the firm to dictate an optimal capital structure for a given firm at any particular point in time (Anton, 2010). A firm’s capital structure is a function of its internal cash flows and the amount of positive-NPV investment opportunities available. A firm that has been very profitable in an industry with relatively slow growth (i.e. few investment opportunities) will have no incentive to issue debt and will likely have a low debt-to-equity ratio. A less profitable firm in the same industry will likely have a high debt-to-equity ratio. The more profitable a firm, the more financial slack it can build up (Frank and Vidhan, 2003). This basically means that profitable firms tend to have a small debt ratio. Good-quality firms use internal funds for financing as much as possible. Since low-quality firms do not have as much profits and retained earnings as high-quality firms they have to use external sources more frequently and this is usually debt (Malkiel, 2003).

This theory is applicable for large firms as well as small firms. Since small firms are opaque and have important adverse selection problems that are explained by credit rationing, they bear high information costs (Garfinkel, Flannery, and Elasas, 2008). Since the quality of small firms financial statements vary, small firms usually have higher levels of asymmetric information. Even though investors may prefer audited financial statements, small firms may want to avoid these costs (Berger, Klapper, and Udell, 2001).

In another research stream, prospect theory has been used to try to explain some capital structure decisions. Ljungqvist and Wilhelm (2005) investigated whether prospect theory can explain the behaviour of managers in the Initial Public Offering (IPO) and Seasoned Equity Offering or Secondary Equity Offering (SEO) market. Prospect theory lends itself well to this as it argues that people do not actually process information in a rational way and that they tend to value gains and losses differently, and as a result their decisions are often based on perceived gains rather than perceived losses. But this is not the case with SMEs as they tend to lean towards pecking order theory in a bid to maintain control and competitive advantage (Ljungqvist and Wilhelm, 2005).
2.2.2 Cost of Acquiring the New Technology

Pecking order theory (POT) to date remains an essential part of corporate finance. It is considered as one of the most influential theories not only in capital structure but also in the cost of acquiring new assets (Sheikh, Shakeel, Iqbal, and Tahir, 2012). Authors state that the POT is even more relevant for the SME sector because of the relatively greater information asymmetries and the higher cost of external equity for SMEs (Anton, 2010).

Myers and Majluf (1984) developed POT based on the premise that ‘inside’ management are better informed of the true value of the firm than ‘outside’ investors. These information asymmetries result in varying costs of additional external finance, as potential investors perceive equity to be riskier than debt. They propose that firms seek to overcome problems of undervaluation arising from information asymmetries, preferring to finance investment projects with internal funds in the first instance. When internal equity is exhausted, firms use debt financing before resorting to external equity. Authors state that the POT is even more relevant for the SME sector because of the relatively greater information asymmetries and the higher cost of external equity for SMEs (Myers and Majluf, 1984). Additionally, a common phenomenon in the sector is the desire of firm owners to retain control of the firm and maintain managerial independence (Fiona, 2004).

These factors suggest that SME owners source their capital from a pecking order of, first, their "own" money (personal savings and retained earnings); second, short-term borrowings; third, longer term debt; and, least preferred of all, from the introduction of new equity investors, which represents the maximum intrusion (Anton, 2010). Empirical evidence from authors such as Gracia and Arias, (2000), Anton,( 2010) and Serrasqueiro et al (2012) supports the applicability of the POT in explaining the financing of SMEs. These studies emphasize that small firms rely on internal sources of finance and external borrowing to finance operations and growth, and only a very small number of firms use external equity. A number of studies report that firms operate under a constrained pecking order, and do not even consider raising external equity (Sheikh, Shakeel, Iqbal, and Tahir, 2012). Adherence to the POT is dependent not only on demand-side preferences, but also on the availability of the preferred source of financing. The supply of finance depends on many factors, particularly
the stage of development of the firm. The most important source of funding for start-up and nascent firms are the personal funds of the firm owner, and funding from friends and family (Myers and Majluf, 1984).

Frank and Vidhan (2003) also report that small firms quite often issue equity, contradicting the pecking order’s prediction that firms with information asymmetries are reluctant to sell equity (Frank and Vidhan, 2003). Loredana (2011) find a stronger negative relationship between debt and investment in smaller firms. According to agency theory, investors are unwilling to invest in new and more rapidly growing firms due to the absence of immediate distribution of dividends. Creditors increase the cost of capital as a way of minimizing the risk of their investment in these firms.

Good-quality firms use internal funds for financing as much as possible. Since low-quality firms do not have as much profits and retained earnings as high-quality firms they have to use external sources more frequently and it will usually be debt. This explains the puzzle about the negative correlation between debt and profitability. (Miglo 2010). Frank and Vidhan (2003) show that greatest support for pecking order is found among large firms.

2.2.2.1 The Buy or Lease Option

Leasing is a contract between the owner of the asset which is called lessor and the business that wants to lease the equipment is called lessee/client. Hence lease is a contract between the owner and the user of assets for a certain time period during which the second party uses an asset in exchange of making periodic rental payments to the first party without purchasing it (Thomas and Angelos, 2013).

The lease vs. buy option has been studied extensively in the private sector from a number of different vantage points (AfDB, 2012). At first sight it would appear that the choice between the two alternatives lease and purchase is relatively simple. If the net present value lease, \( NPV(L) \), is greater than the net present value of the purchase option, \( NPV(P) \), the machine (technology) should be leased and vice versa. But such a decision without comparing present values may be wrong. If we compare the \( NPV \) of the purchase and lease then we find different cash flows. (Loredana, 2011). The lease is like borrowing in that it commits the firm to a series of fixed rental payments. Hence even if the lease alternative has a greater \( NPV \), it
may also expose the firm’s shareholders to greater risk (Haradhan and Kumar, 2012). On the other hand leasing transfers the risk of obsolescence to the lessor while allowing the lessee to benefit from the use of the technology assets at a predefined cost (Thomas and Angelos, 2013).

Independent of the size of organizations, how businesses handle the expense of technology hardware, software, and services is often a determining factor in when and whether they can acquire the new technology necessary to sustain business growth while improving productivity. For smaller organizations, an expenditure of KES 1 million for a server and storage upgrade may have to compete for the same budget that would fund a sales force expansion designed to increase revenue. Larger corporations may weigh the relative merits of a KES 20 million distribution expansion against a corporate wide IT infrastructure upgrade providing significant operational savings. Due to its inherent flexibility, leasing offers innovative ways to acquire technology equipment that can reduce much of the risk and uncertainty associated with new technology purchases and increase the leverage of the operating budget (Torsti and Outi, 2007). United Nations Conference on Trade and Development (2001) concluded that leasing is a convenient option to help SMEs meet their needs for technological business equipment in the sense that 1) Collateral is not required for the contract and the customer can finance up to 100 per cent of the equipment value. 2) A contract can be written with some flexibility according to the customer’s cash flows 3) Tax policies generally allow for the depreciation of equipment. 4) The financing company is likely to have a good relationship with the equipment supplier due to a large volume of transactions, and this can help accommodate the customer’s needs. 5) The economies of scale enjoyed by the financing company may be passed on to the customer in terms of reducing the costs of equipment usage. 6) Not only equipment but also technical expertise will be offered to the customer; and finally 7) Approval time is short (United Nations, 2001).

Traditionally, the theory of financial leasing has focused on the differential tax position of the lessee and the lessor as the primary rationale for leasing. The fundamental argument is that, if a firm is not in a full tax-paying position, purchasing and depreciating an asset may be costly as no or lower capital or depreciation tax allowances are claimed (Thomas and Angelos, 2013). However, by leasing the asset, the lessor would claim the tax allowances
which could be transferred indirectly to the lessee through lower lease payments. Thus, while the after-tax NPV of the asset if purchased could be negative, the lease possibility will make the investment a positive NPV project (Haradhan and Kumar, 2012).

### 2.2.3 Risk and Uncertainty

Risk can be defined as measureable uncertainty of outcome, whether positive opportunity or negative impact, whereby the measureable uncertainty is expressed in terms of likelihood. (Ari, 2009). Based on the classical work by Knight (1921), one may include the notion of measurement, of measureable uncertainty. Thus to clarify the difference between uncertainty and risk, Michail, (2011) defines uncertainty as “a context for risks as events having a negative impact on the project’s outcomes.” A large body of literature has investigated the effect of uncertainty on investment. The theoretical implications of uncertainty on investment are twofold. First, uncertainty may affect the level of investment. Second, uncertainty may affect the timing of investment. Furthermore, risks are known and possible for managers to deal with, while uncertainty is an event or a situation that was not expected to happen. (Alexandra, Željko, and Dimitrios, 2010). Uncertainty is closely related with risk. The word “uncertainty” emphasizes that the choice of decision-making must be made on the basis of incomplete knowledge about projects that do not yet physically exist. Michail (2011) stated that managing the investment and operational risk of capital projects is crucial to the economic viability of many industries.

Investment activity always involves risk taking to achieve a certain gain in the future, called the expected gain. The gain is called expected gain for reasons of uncertainty, as we do not know for sure what the result of the investment will be tomorrow, or next year (Utkarsh, 2012). The role of risk and uncertainty in decision-making is a topic that has increasingly attracted the attention of both practitioners and scholars. However, managers hold widely divergent views on the handling of risk and uncertainty in business situations, with some taking a more analytical approach, whereas others appear to operate on a more intuitive basis (Fiona, 2004) Similarly, researchers have historically developed explanations of how decisions are made under risk and uncertainty from a variety of theoretical perspectives, resulting in a fragmented and often contradictory body of literature on the subject (Albert,
Mun, and Man-Tak, 2011). One such body of literature explaining risk is the Real options theory. Real options theory has been of growing interest in the academic circles as a promising approach to investment decisions with a level of uncertainty (Alexandra, Željko, and Dimitrios, 2010).

### 2.2.3.1 Real Options Theory

Real options are defined as the right to take investment decisions. They relate to the right of the management of a company or a project to, through actions and decisions, react flexible to the circumstances that occur at that time. For a holder of an option, a real option creates flexibility. This flexibility can be used for continuing new insights or changes that can occur in the market that may influence the future cash flows. In contrast to financial options, real options are not traded on the financial markets (Xiaotong and John, 2002). Real options can be described as opportunities that the management in the future holds on to. With financial options this opportunity is the right to sell or buy a common stock for a predetermined price. With real options for example, the opportunity is the possibility to delay an investment or the possibility to launch a new product (Alexandra, Željko, and Dimitrios, 2010). A central and necessary tenet of the real options approach is a requirement for the presence of uncertainties, an inherent characteristic of most technology acquisition efforts. Real options are implicit or explicit capabilities created for real assets that provide the option holder with time-deferred and flexible choices (options) regarding future risks or changes of the technology, and could explicitly address the issue of technology investment choices for future capabilities. Through these capabilities, the option holder (in this case the manager/executives) may choose to adjust, reduce, increase, or abandon the investment in the future, thereby stabilizing returns from these assets (Albert, Mun, and Man-Tak, 2011).

Executives are usually trying to fulfil multiple objectives in their investment decisions and therefore have to make trade-offs between expected return and riskiness. Perhaps it is not surprising given this that entrepreneurs, on average, have nine failures for each major success (Avinash and Robert, 1994). There are multiple industries and sectors, where real option can be a more convenient valuation tool than traditional valuation tools. The common characteristics of technological investment in these sectors are that they are expensive, long
term, affected by multiple risks (market risk, regulatory risk, political and social risks, etc.) and are formed in large part from irreversible costs. Thus standard valuation methods cannot fully capture their real value and result in biased results (Utkarsh, 2012).

### 2.2.3.1.1 Uses of Real Options in Investing Decision

There are also various uses for real option method as a project evaluation tool. Jana and Zdenek (2010) describes them as the option to expand a project if the pilot investment is successful (option to keep a project open), the option to shrink or abandon a project, option to change inputs or outputs of the project (flexibility), or the option to postpone the investment (timing). Again, the particular choice of real option model depends on the characteristic of the underlying project or investment.

The real option approach may have substantial advantages compared to the traditional valuation methods, however, Xiaotong and John (2002) suggests that in certain types of situations it cannot be applied. These situations can be summarized as follows: 1) Decision making under certainty or zero risk; in this case the option value disappears and the real option valuation equals to discounted cash flows. 2) Decision making that cannot be postponed or modified; the real option that measures flexibility does not have sense when flexibility is not possible. 3) Twin options, when the option value would be assigned to more interdependent projects; in such a case, the real option would over-valuate the flexibility. 4) Low budget projects where the estimated option value would exceed the total costs of the projects (Xiaotong and John, 2002).

There are multiple industries and sectors, where real option can be a more convenient valuation tool than traditional valuation tools. Among the sectors, where real option valuation could be successfully deployed are as follows: Mining of minerals, Pharmaceutical industry, Research and development of hi-tech products (biotechnologies, nanotechnologies, etc.), Information and telecommunication technologies, Aeronautics, Energy production and various manufacturing industries (Alexandra, Željko, and Dimitrios, 2010).
When managers are not actively trying to affect the value of the project after deciding to go through with it, they get into a similar situation as someone holding a financial option (Ari, 2009). The orthodox theory of investment has not recognized the important qualitative and quantitative implications of the interaction between irreversibility, uncertainty, and the choice of timing. We will argue that this neglect explains some of the failures of that theory (Avinash and Robert, 1994). Real options offer managerial flexibility to mitigate risk (which most technological investment carry), whose value can be significant enough so that it needs to be explicitly included in the investment valuation (Mittendorf, 2004; Tseng and Barz, 2002; Meier, 2001). The five most commonly cited managerial flexibilities are decisions to (i) abandon, (ii) defer, (iii) expand, (iv). Contract, and (v) switch the operating mode of investments. An investment opportunity can constitute even a set or a sequence of real options (Fiona, 2004).

Prior to its application in any domain, the real-options approach calls for the existence of five pre-conditions, as outlined by Björn and Anders (2007). First a basic financial model must be created to evaluate the costs and benefits of the underlying technology asset. Second uncertainties must exist during the technology acquisition process; otherwise, the real options analysis becomes useless as everything is assumed to be certain and known. The third pre condition is that the uncertainties surrounding the technology acquisition process must introduce risks, which directly impact the decision-making process. Fourth management must have the flexibility or options to make mid-course corrections when actively managing the project. The fifth and final condition is that management must be smart enough to execute the real options when it becomes optimal to do so (Björn and Anders, 2007).

One model most commonly used in calculating real options is the binomial lattice model. This model has the advantage of being flexible and is therefore suitable for real options valuation since it can be adjusted to the specific conditions of a project (Albert, Mun, and Man-Tak, 2011). The main drawback is that it may take a lot of computational power to find an accurate result. When using a binomial lattice model, we start with one or several options with times to maturity of less than or equal to T years (Xiaotong and John, 2002). Glen and Panos (2000) further state that these T years are divided into a finite number of time periods of length denoted as alpha T (Δt) and the next step is to create a binomial tree with project
values at these time periods. In the binomial lattice model, during each period, one models the formula so that the project value can either go up with a factor \( u \) or down with a factor \( d \). If \( \sigma \) is the project’s volatility, \( u \) and \( d \) are calculated as

\[
    u = e^{\sigma \cdot \Delta t} \quad \text{and} \quad d = 1/u.
\]

Where:
- \( \sigma \) = standard deviation
- \( u \) = increase
- \( e \) = exponential factor
- \( t \) = weeks/months/years

Adjusting for risk and uncertainty by use of models such as the binomial lattice model above is becoming a necessity for modern firms especially in technology investments (Utkarsh, 2012). SMEs are riskier borrowers than large firms. This is because SMEs are more vulnerable to market changes and often have inadequate management capabilities because of their smaller size (Ari, 2009). Lack of demand and shortages of working capital were the two most frequently mentioned underlying causes of these business failures. SME activities are highly volatile with a large number of them starting up while many others are closing down (AfDB, 2012).

### 2.2.4 Access to Finance

Generally speaking, financial inclusion, or broad access to financial services, is defined as an absence of price and non-price barriers in the use of financial services (Bataa, 2008). The Global Entrepreneurship Monitor (GEM) Entrepreneurship Framework Condition also highlights entrepreneurial finance, defined as the availability of financial resources for SMEs in the form of debt and equity, as one of the key factors for stimulating and supporting entrepreneurial activity (GEM, 2010). Small firms are disproportionately handicapped by a lack of finance, but they receive a stronger boost in growth than large firms if financing is provided. Financing obstacles affect small firms’ more than large firms. Small firms not only report higher financing obstacles, but they are also more adversely affected by these
obstacles. Financial literacy of SMEs continues to impact access to finance and compliance with existing finance facilities (CPA Australia, 2011).

Access to finance is necessary to create an economic environment that enables firms to grow and prosper. SMEs in developing countries, however, face significant barriers to finance. Financial constraints are higher in developing countries in general, but SMEs are particularly constrained by gaps in the financial system such as high administrative costs, high collateral requirements and lack of experience within financial intermediaries (GEM, 2010). Formal financial institutions in Kenya perceive SMEs as high risk and commercially unviable. As a result, only a few SMEs access credit from formal financial institutions in the country (AfDB, 2012). Increased access to finance for SMEs can improve economic conditions in developing countries by fostering innovation, macro-economic resilience, and GDP growth (Hallberg, 2000).

Access to finance and the available range of financial services are limited for SMEs in developing countries, the benefits of financial access and related services is likely to elude many individuals and enterprises (World Bank, 2009). Studies and empirical evidences on finance consistently indicate that inadequacies in access to finance are key obstacles to SME growth and growth is fueled by proper investment. Beck, Demirguc-Kunt, and Maksimovic (2004, 2006, 2007), and others show that SMEs find accessing financing more difficult than larger firms especially for new SMEs (Bataa, 2008). According to Doing Business (2011) improving access, then, means improving the degree to which financial services are available to all at a fair price. It is easier to measure the use of financial services since use can be observed, but use is not always the same as access (AfDB, 2012). Before we can improve access, or decide whether and how to do it, we need to measure it. Access is not easy to measure, and empirical evidence linking access to development outcomes has been quite scarce due to lack of data. One thing that is for sure is that age of a business does affect the financial access (Bataa, 2008).

2.2.4.1 Age of the SME

According to Garfinkel et al (2008) investment in new and smaller firms tends to be more dependent on cash flow. The researchers further argued that new firms face more restrictions
in financing their investment. Therefore, as firms become more mature they reinforce their capacity to retain profits. Note that financing restrictions diminish as firms survive the first years of their life.

Therefore, adding one more year of age can be expected to have a marginally greater effect on investment in new SMEs, compared to the case of existing SMEs (Serrasqueiro, Mendes, Nunes, and M da Rocha, 2012). New SMEs’ lack of know-how and reputation, and greater likelihood of bankruptcy, increases the risk for lenders. In addition, for existing SMEs it is easier to obtain debt, thereby contributing to a higher level of indebtedness, signalling vitality and credibility to the market (Hallberg, 2000). Investment in new firms is more sensitive to cash flow, suggesting that these firms face more obstacles in obtaining external finance (Serrasqueiro et al, 2012).

2.3 Investment Appraisal Techniques in SMEs

Investment appraisal techniques are also known as capital budgeting techniques. Capital budgeting is defined as the process of analysing, evaluating and deciding whether resources should be allocated to a project or not. It can also be described as a process of formulating and financing long term investment that determine the future growth and productivity of a firm. Capital budgeting decisions are crucial to a firm’s success and maximises shareholder value (Olawale, Olumuyiwa, and George, 2010).

The objective of a manager is to maximise the firm’s value, this is the main assumption of the investment appraisal literature and to do this the manager needs tools that properly predict the profitability of investment projects (Glaser and Micheal, 2008). Investing in technological assets help small firms improve profitability by reducing transaction costs and production inefficiencies, this in turn helps in levelling the playing field with other bigger firms in terms of competition (CPA Australia, 2011). A study conducted in South Africa by Olawele, Olumuyiwa and George (2010) found out that SMEs are using investment appraisal methods such as discounted payback, Net Present value and Internal Rate of Return to evaluate technology investments (Olawele et al, 2010). Further discussions of the investment appraisal methods follows.
2.3.1 Discounted Payback Period

The payback period is the time it takes for a project to realise back its initial investment. Discounted payback period (DPP) is complex version of the payback period (PP) investment appraisal technique in that the time value of money is factored in (Ari, 2009). SMEs often rely on DPP heavily in making investment decisions as it possesses all the useful and admired properties of the traditional payback period and in turn overcomes the PP major limitation by adding the time value element of money. DPP has two main advantages. One is that the manager/business owners gets a more finite estimate of the time that it will take to recover the initial investment. Secondly the time value of money is incorporated into the calculation making the outcome more realistically applicable (Olawale et al, 2010).

One major drawback that this method still holds is that it ignores cash flows beyond the payback period just like the PP, making it inconsistent with the main SMEs owner’s goal of maximizing returns. Lack of consideration of cash flow beyond the payback period may often lead to rejection of projects that take longer to payback making SMEs ignore potentially business changing technology investments (Olawale et al, 2010). Another drawback is that the business has to guess or estimate the cost of capital for the project, though this draw back can be dismissed if we use the weighted average cost of capital to discount the cash flows (Garfinkel et al, 2008).

2.3.2 Net Present Value

The concept of the net present value (NPV) is of great significance in the field of corporate finance. NPV method is based on the discounting of expected future cash flows of an investment project. It provides a frame work in which we can evaluate alternative investment options (Olawale et al, 2010). More specifically, it incorporates the amount of cash outflow in the beginning of the project, the cash flows in the time period in which the project occurs and the net castle at the conclusion of the project if a project is selected. The cash flow stream includes all the payments and receipts associated with the investment project during its economic life, and it should be discounted at the time value of money (opportunity cost of capital).this rate must take into account aspects such as risk and inflation. The general decision rule is that if a project yields a positive NPV, it is accepted it as it is adding to the
wealth of the shareholders. If the NPV is negative the project is rejected and if it is zero, the firm is indifferent (Torsti and Outi, 2007).

One of the biggest setbacks of discounted methods of investment appraisals is that one has to determine their cost of capital (opportunity cost of capital) in order to use it in their calculations. This is a major challenge for small and medium businesses (Serrasqueiro, Mendes, Nunes, and Rocha, 2012). It is of great importance that small and medium businesses learn what these opportunity costs mean and how to derive the most accurate percentage rate to use in discounting the cash flows. What one needs is a good estimate of the cash needed to expand or make the technology investment and the cash flow to be generated. These need to be based on realistic assumptions. The assumptions can be further strengthened by looking at scenarios i.e. the bull, bear and normal so that the business better understands what to expect in each market condition (CPA Australia, 2011).

Another drawback of NPV is that it assumes that positive NPV projects exist and can be easily identified and this is not always the case. Utkarsh (2012) further outlines the general situations in which positive NPV projects occur, he also stated that service is key to supernormal profits in many firms and this is best for small and medium businesses (Utkarsh, 2012). One other minor setback is that it shows absolute figures rather than percentages found in the Internal Rate of Return (IRR) which is deemed easier to understand and is a particular favourite with American SMEs (Alexandra, Željko, and Dimitrios, 2010).

2.3.3 Internal Rate of Return

Also known as the yield method, the IRR is defined as the discount rate where the present value of cash inflows and the present value of cash outflow is zero. In other words, it is the discount rate at which the NPV of a project is equal to zero and is always expressed as a percentage making it easy to understand a favourite to SMEs (Bataa, 2008). IRR is best used to assess the viability of long term projects and a project is deemed to be viable if the IRR is greater than the cost of capital. IRR is similar to NPV in that it considers the time value of money via the use of a discount rate (CPA Australia, 2011).

The mathematical definition of the IRR may seem difficult to understand, especially for small and medium businesses in developing economies, however once understood the
business just checks the cost of the loan to be taken which is usually a percentage against the IRR percentage making the decision to invest an easy pick (Torsti and Outi, 2007). Once understood the IRR can make technology investment decision easier but it has its advantages and disadvantages.

One advantage which IRR holds is similar to the other discounted cash flow methods i.e. it takes into consideration the time value of money, given the risks associated with technology investments and difficulty in accessing financing this is important SMEs (Torsti and Outi, 2007). A second is that it is easy to interpret since it is expressed as a percentage and this fact makes it very popular especially with small and medium businesses (Hana, Jiri, and Lenka, 2010). The third is that it considers all the cash flows of a projects and therefore is all inclusive (Loredana, 2011).

IRR also has drawbacks. One of these is that it ignores the size of a project especially when comparing projects. This maybe a hindrance given the funding required when undertaking large technological investments by SMEs. Size of a project matters to SMEs as this is usually an indication of the capital needed to implement such projects. A second draw back for small and medium businesses is that it ignores future costs, an example is that if we invest in a production plant running on fuel, IRR will ignore future maintenance cost and the fluctuations in fuel prices. A third disadvantage is that IRR ignores the re-investments rate. It rides on the assumption that the cash flows received are re-invested at the IRR rate: This assumption is the usual practice as the IRR rate can be significantly high and investment opportunities that yield such high returns may not be available or occur in rare cases (Utkarsh, 2012).

2.4 Improving Technology Investment Decision Making in SMEs

Complexity and multi-disciplinary are the major characteristics found in decision making literature. This is so as subjects as diverse as sociology and mathematics have made contributions both to the theoretical and empirical literature on decision-making and the decision making process (Alexandra, Željko, and Dimitrios, 2010).
The decision-making process in SMEs follows the same decision making process of most organisations which involves a lot of processing of coded data, like planning, information gathering and analysis. When the knowledge is coded, several people can participate in the process. However, the final decision is often based on un-coded or hidden knowledge, like intuition, experience, attitudes and values. This type of knowledge seems to be an inseparable part of human decision making also in organisational contexts (Torsti and Outi, 2007). This is especially true in SMEs, in which the final decision is usually left to the top manager. Intuition appears to be a significant factor in the process of strategic investment decision making in large companies. Therefore, little is known about the use of different forms of knowledge in SME decision making (Alexandra, Željko, and Dimitrios, 2010).

2.4.1 Investment decision making

In principle, a firm’s decision to invest in a new tech project should be made according to whether the project increases the wealth of the firm’s shareholders. For example, the Net Present Value (NPV) rule specifies an objective process by which firms can assess the value that new capital investments are expected to create (Ari, 2009). Individuals need financial data for decision making and accounting information is one of the data sources that can be used in theoretical fundamentals of financial reporting (Hallberg, 2000). When undertaking decision making in a firm, it is important to use any available source of financial data since an organization can analyse this data and use it for future decisions, the data could be either from the external/ internal environment (Sheikh, Shakeel, Iqbal, and Tahir, 2012). Liabilities are one of the accounting items which should be supplied and presented in financial reporting (balance sheet). Usually liabilities are considered as a factor to predict and more importantly to guide for investments decision making, (C.I.M.A., 2009).

Decisions in SMEs are made by people deep in the organisation and made by them alone in this case the business owner, manager or both (Ari, 2009). Decision making requires the decision executor to have complete knowledge of all the possible courses of actions and all the possibilities of occurrences of these outcomes. This knowledge stream is dependent on the SME owner/manager’s (decision maker) experience and knowledge of all the processes that are involved (Utkarsh, 2012). These decisions are often complicated by (i) market uncertainties about investment payoffs, (ii) the possibility to select a portfolio of investments,
and (iii) the presence of real options, which make it possible to postpone investments until some uncertainties are resolved (Albert, Mun, and Man-Tak, 2011).

2.4.1.1 Investing in Technology

Business decision making on technology investments is almost always accompanied by conditions of uncertainty. Clearly, the more information the decision maker has, the better the decision made will be. The basis of decision theory is treating decisions as if they were gambles. This means that the firm has to trade off the value of a certain outcome against its probability. To operate according to the canons of decision theory, computation of the value of a certain outcome and its probabilities is a must; hence, determining the consequences of choices made (Torsti and Outi, 2007).

Investment decisions on technology are founded on a convenience and efficiency study based on several versions of the project from which it is going to be chosen, the one that ensures maximum results with minimum effort (Loredana, 2011). As previously stated in principle, a firm’s decision to invest in a new project should be made according to whether the project increases the wealth of the firm’s shareholders (Ari, 2009). This rule has steadily gained in popularity since it was formally introduced, but its’ widespread use has not eliminated the human element in capital budgeting. Because the estimation of a project’s future cash flows and the rate at which they should be discounted is still a relatively subjective process, this process is still affected by the behavioral traits of managers. Several approaches have been developed to support investment decision analysis. These methods also apply to technology investments. The conventional approach is to calculate the Net Present Value of the investment by discounting the expected cash flows as presented in corporate finance (Xiaotong and John, 2002).

2.4.2 Financial literacy in investment decision making

Many financial experts agree that financial literacy in SMEs remains a major problem that is impacting the ability of many small and medium businesses to access finance. With the upheld tighter reporting requirements, SMEs are still struggling with the fact that sound reporting practices are not just what the bank wants; it is good for their business and
improves their organisational investments decision making especially on technology (CPA Australia, 2011).

Technology investment decision making is one of the most challenging organizational decision making processes. Although there is a multitude of methods and models created for effective information evaluation and selection, many organizations fail in their technology investments. The technology buyers do not make the effort needed for a successful technology investment decision, and most of them do not even have the decision making tools, methods or support. Especially in small and medium size enterprises the technology management is quite often based on short-term, informal, and ad hoc practices (Torsti and Outi, 2007). People, including managers and business leaders, normally associate the quality of a decision with the quality of the result. When managers observe a good result, they believe that they made a good decision. However, decisions and results are two different things. Decisions are made at a specific moment in time; in the event, people apply these decisions, and the result is observed in the future which normally seems uncertain. In the future, events can happen that managers and firms cannot control nor foresee such as technology obsolesce or failure (Glaser and Micheal, 2008). Such events can cause good decisions to have bad results — and vice versa. Therefore, the quality of the result is not demonstrative of decision quality, and the result is irrelevant as a measure of decision quality (Alexandra, Željko, and Dimitrios, 2010).

2.4.3 Cost of Decision Making

The costs of suboptimal decision making have grown, ever since the first wave of research on decision biases began more than fifty years ago. As more economies have shifted from a dependence on agriculture to a dependence on industry, the importance of optimal decision making has increased as errors based on decisions made become more costly by the day (Katherine, Dolly, and Max, 2008). Success or failure of projects depends on the quality of preparation, evaluation and choice of these projects. The quality of investment decision making is affected by a larger number of factors, the most important of them being the choice of the criterions applied in evaluating and choosing investment projects, this also applies to technology investments in SMEs (Alexandra, Željko, and Dimitrios, 2010). The best decisions are made from a point of knowledge emanating from all factors affecting an
investment decision and all risks associated with the technology choice(s) at hand. On the bright side, SMEs are quite often seen as flexible organizations that can easily adapt their structures and processes according to new technological innovation and thus create competitive advantage. On the other hand, technological change for SMEs is constrained by the small sizes of the organizations as this limits the resources available for the transformation (Torsti and Outi, 2007). Business leaders may like to follow their hunches and there should always be room for some entrepreneurial flair. There has to be a culture where ideas are allowed to emerge but the risk of a costly error can be reduced if the evidence available is also considered (C.I.M.A., 2009).

Nevertheless investment decision making is an important part of strategic decision making in every enterprise because new technology investment projects essentially affect future economic results and the enterprise’s prosperity. Success of new projects dramatically contributes to the growth of enterprises’ efficiency. On the other hand, failure can lead not only to a considerable decline in efficiency, but can even jeopardize its future existence. As discussed earlier, success or failure of projects is dependent on the quality of preparation, evaluation and choices especially in technological based investments due to rapid changes in this era (Hana, Jiri, and Lenka, 2010).

This has created a new dilemma for the modern SME decision makers in evaluating and making decisions on viability of technological investments. This dilemma has been made more complex with the ever tightening of timelines for making these crucial decisions, thus, heightening the need for improved decision making on technology investments before competitive advantage and market share are lost (Utkarsh, 2012). The main reason for these failures is that the technology investment process is mostly seen as a technical process and too little attention is given to its social nature. Though the creation of new knowledge, its identification and management related to decision making is time consuming and expensive, it really improves the decision itself (Torsti and Outi, 2007).
2.5 Chapter Summary

This chapter has reviewed literature touching on the investment decision process and factors that affect the investment decision such as age of the SME, capital structure, risk and uncertainty and the buy or lease option of SMEs. Furthermore it also covered the various theories that attempt to explain the investment decisions, appraisal techniques common to SMEs and the theories that explain how various factors affect the investment decision. The next chapter explains the research methods that were used in carrying out research in this paper.
CHAPTER THREE

3.0 Research Methodology

3.1 Introduction

This chapter describes the research methodology used in the study. This is followed by the description of population and sample design. Thereafter, the sample size, data collection method as well as research procedures are provided. The last subsection provides the procedure applied in analyzing data and concludes with a summary of the chapter covering a brief introduction to the next chapter.

3.2 Research Design

Kothari (2008) defines research design as an arrangement of conditions for collecting and analyzing of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. Burns and Grove (2003) define a research design as “a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings” (Burns & Grooves, 2003). Parahoo (1997) describes a research design as “a plan that describes how, when and where data are to be collected and analysed”.

According to Burns and Grove (2003), descriptive research “is designed to provide a picture of a situation as it naturally happens”. It may be used to justify current practice and make judgment and also to develop theories (Yount, 2010). For the purpose of this study, descriptive research was used to describe the characteristics of certain group (SMEs), to determine the proportion of SMEs who behave in a certain way and to determine relationships between variables. The dependent variable in the study was the technology investment decision and the independent variables used were derived from the research questions such as the capital structure, the cost of acquiring new technology, buy or lease option, risk and uncertainty, access to finance and age of SME.
3.3 Population and Sampling Design

3.3.1 Population

A population comprises of all the possible cases (persons, objects, events) that constitute a known whole. A “population” consists of all the subjects to be studied. “107 SMEs in Nairobi Area” is a population. A population comprises of all the possible cases (persons, objects, events) that constitute a known whole (Yount, 2010). For the purpose of this research our population were the 107 SMEs within the Nairobi area obtained from the following sources as at June 2014: 12 financial institution from Central Bank, 30 SMEs from Soft Kenya ICT companies’ directory and 65 SMEs from the Kenyan Manufacturers and Exporters (KAM) directory.

3.3.2 Sampling Design

3.3.2.1 Sampling Frame

A simple definition of a sampling frame is the set of source materials from which the sample is selected. The definition also encompasses the purpose of sampling frames, which is to provide a means for choosing the particular members of the target population that are to be interviewed in the survey. A perfect sample frame is one that is complete, accurate and up-to-date. (Jackson, 2009). According to Burns and Grooves (2003) the quality of the sample affects the quality of the research generalizations. For the purpose of this study the sampling frame was obtained from the following sources: Central Bank, Soft Kenya ICT companies’ directory and Kenyan Manufacturers and Exporter (KAM) directory covering the four main strata to be sampled.

3.3.2.2 Sampling Technique

Sampling is the process of selecting a group of subjects for a study in such a way that the individuals represent the larger group from which they were selected (Avery, 2004). This representative portion of a population is called a sample. For the purpose of this research stratified random sampling was chosen. Stratified random sampling is a probability sampling procedure in which the target population is first separated into mutually exclusive,
homogeneous segments (strata), and then a simple random sample is selected from each segment (stratum). The samples selected from the various strata are then combined into a single sample. This sampling procedure is sometimes referred to as “quota random sampling.” (Rick, 2010).

The population was divided into four strata that is manufacturing, technology, service industry and financial institution as these industries rely on technology more than others to stay competitive. The population sample list was retrieved from the following sources: Central Bank, Soft Kenya ICT companies’ directory and Kenyan manufacturers and exporter directory.

3.3.2.3 Sample Size

The determination of sample size was through the approach based on the precision rate and confidence level and since the population was finite, Yamane sampling formula was used as follows (Israel, 2002);

\[ n = \frac{N}{1+Ne^2} \]

Where;

n = optimum sample size,

N = number of SMEs registered in the cluster area

e = probability of error

In the study, N=107, e = 10 % (at 90% confidence level). The sample size thus becomes 53 firms as shown in Table 3.1.
Table 3.1 Sample Break Down

<table>
<thead>
<tr>
<th>ORGANIZATION TYPE</th>
<th>SAMPLE SIZE (TYPE OF FIRM)</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Enterprises</td>
<td>32</td>
<td>60%</td>
</tr>
<tr>
<td>Medium Enterprises</td>
<td>21</td>
<td>40%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>53</td>
<td>100%</td>
</tr>
</tbody>
</table>

Stratification was done on the following breakdown based on number of companies in each industry as shown in Table 3.2 below.

Table 3.2: Stratification

<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>SAMPLE SIZE PER STRATA</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>21</td>
<td>39%</td>
</tr>
<tr>
<td>Financial Institutions</td>
<td>12</td>
<td>23%</td>
</tr>
<tr>
<td>Service Industry</td>
<td>10</td>
<td>19%</td>
</tr>
<tr>
<td>Technology</td>
<td>10</td>
<td>19%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>53</td>
<td>100%</td>
</tr>
</tbody>
</table>

3.4 Data Collection Methods

Data was collected through primary source (questionnaires and interviews) and secondary data present from reliable sources such as past interviews with business analysts, Kenya Manufacturers Association, business journalists and articles from reputable organizations such as KPMG who run the top 100 Medium Enterprise programme and Kenyan Manufacturers and Exporters (KAM) directory list of firms that are classified as SMEs. The questionnaire was developed and organized on the basis of the research questions to increase validity and reliability. The first section was designed to specifically weed out participants who were not qualified to participate in the study.
The questionnaire contained both open and closed ended questions. With the open ended questions, the respondent provided answers to the questions. In case of the closed ended questions, a five-point Likert-type scale, ranking from 1 (Strongly agree) to 5 (Strongly disagree) was used for the entire construct. The questionnaire did not request for any personal information such as respondent name or contact details.

The use of questionnaires was justified as they offered an effective way of collecting information from a large sample in a short span of time and at a reduced cost than other methods. The respondents were guided through illustrated answers to ensure that they had a clear understanding of the questions and thus respond appropriately.

3.5 Research Procedure

Research procedure conducted in this study included a pilot study. According to Avery (2004), pilot studies are not usually used in qualitative studies but novice researchers could conduct interviews as a pre-exercise, to get used to the type of data collection. A pre-exercise was done to orientate the researcher to the research project and provide the researcher with insight into the phenomenon. A pilot study ensures that errors can be rectified at little cost. The pilot study was conducted among ten (10) small enterprises and amendments made as per their advice. The response time was measured and estimated to be between 12-18 minutes. The ten SMEs in the pilot study were not part of the final sample in which the study was carried.

3.6 Data Analysis Methods

Analysis involves breaking up the data into manageable themes, patterns, trends and relationships. The main aim of the analysis is to understand the various constitutive elements of one’s data through and inspection of the relationships between concepts, constructs or variables, and to see whether there are any patterns or trends that can be identified or isolated, or to establish themes in the data (Jackson, 2009).

The data obtained was analyzed using descriptive statistics and inferential statistics. The first objective was to explore the effect of variables on the decision to invest in technology. Data
gathered in this research was analyzed using SPSS software package. Quantitative data was entered and qualitative data was grouped into categories then analyzed.

To attain data relevant to the research, the data collection tool was structured as follows, section A to cover the demography, Section B covered the first research question, section C covered the second research question and section D covered the third research question.

3.7 Chapter Summary

This chapter focused on the methodology that was used in conducting the study. Firstly, the research design that was applied for this study is descriptive. The population, the sample frame, the sample size and the sampling technique used were specified. The chapter also looked at the tools of data collection and how the data collected was analyzed. The next chapter covers the results and findings that were collected from research.
CHAPTER FOUR

4.0 RESULTS AND FINDINGS

4.1 Introduction

This chapter presents data analysis and interpretation of the findings. This study sought to assess the investment decision of SMEs with regards to technology investments in Nairobi. The data was gathered exclusively from questionnaires. The research instrument (questionnaire) was designed in line with the three main objectives of this study.

4.2 Response Rate

A sample size of 53 was selected comprising of SMEs in the Nairobi region of which a total of 47 respondents filled in and returned the questionnaire giving a response rate of 89%. This response rate was made a reality after the researcher and research assistant made personal calls and visits to remind the respondents to fill in and return the questionnaires. This is an excellent response rate and conforms to Mugenda and Mugenda (1999) stipulation that a 50% response rate is adequate for reporting and analysis; a rate of 60 percent is good and a response rate of 70 percent and over is excellent.

4.3 Demographic Information

4.3.1 Type of Business of the SME

The study sought to establish the nature of the SMEs being studied. According to the findings 48.9 percent (23) of the respondents were registered as private companies while 23.4 percent were partnerships and 27.7 percent of the respondents in the study were sole proprietorship as shown in the Table below.

Table 4.1: Type of Business of the SME

<table>
<thead>
<tr>
<th>Type of Business</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sole proprietorship</td>
<td>13</td>
<td>27.7</td>
</tr>
<tr>
<td>Partnership</td>
<td>11</td>
<td>23.4</td>
</tr>
<tr>
<td>Private company</td>
<td>23</td>
<td>48.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
4.3.2 Current Role of the Respondent in the Business

This study further sought to establish the role of the respondent in the study to determine if they are in a position to answer the queries in the data collection instrument. It was established that 51 percent of the respondents were both the owner and manager, 46.8 percent were employed in the businesses as managers and 2.1 percent of the respondents owned the business as shown in Table 4.2.

Table 4.2 - Current Role of the Respondent in the Business

<table>
<thead>
<tr>
<th>Role</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Manager</td>
<td>22</td>
<td>46.8</td>
</tr>
<tr>
<td>Owner and manager</td>
<td>24</td>
<td>51.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4.3.3 SME Experience in Its Chosen Industry

The study sought to establish the industry experience the firm has been in business in the current chosen industry and the finding were as follows; 21 percent had more than 10 years’ experience, 25.5 percent had between 6 to 8 years’ experience, majority i.e. 42.6 percent had 3 to 5 years’ experience and only 10.6 percent had less than 2 years’ experience. These findings show that there was an improvement in business opportunities in the last 5 years as 53.2 percent of the firms began operations in their given industry in the last 5 years as shown in Table 4.3.
Table 4.3 - SME Experience in Its Chosen Industry

<table>
<thead>
<tr>
<th>Experience</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 2 years</td>
<td>5</td>
<td>10.6</td>
</tr>
<tr>
<td>3 to 5 years</td>
<td>20</td>
<td>42.6</td>
</tr>
<tr>
<td>6 to 8 years</td>
<td>12</td>
<td>25.5</td>
</tr>
<tr>
<td>more than 10 years</td>
<td>10</td>
<td>21.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4.3.4 The Industry in Which the SME Operates

This study also sought to establish the industry in which the respondent are currently conducting business. From the findings in Table 4.4 it was established that majority of the respondents are from the manufacturing industry at 34 percent while 29.8 percent 21.3 percent and 14.9 percent were from the service, technology and financial services industry respectively.

Table 4.4. - The Industry in Which the SME Operates

<table>
<thead>
<tr>
<th>Industry</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial services</td>
<td>7</td>
<td>14.9</td>
</tr>
<tr>
<td>Technology</td>
<td>10</td>
<td>21.3</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>16</td>
<td>34.0</td>
</tr>
<tr>
<td>Service industry</td>
<td>14</td>
<td>29.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4.4 Factors Influencing the Investment Decision in SMEs

This study sought to establish the extent to which the respondents thought the factors that affect investment decision highlighted in chapter two of this study affects their investment decision in technology.
4.4.1 Cost of Acquiring Technology and the Buy or Lease option

Findings from the analysis of the data collected concluded that the cost of acquiring technology significantly affects their investment decisions with 97 percent of the cumulative respondents claiming the cost highly affects their investment decision as shown in the Figure 4.1 below. This can further be explained with the mean of the data collected being 4.7 in the linter scale in the Table below. Ninety three point six percent of the respondents think that the buy or lease option highly affects their investment decision with 6.4 percent respondents claiming it averagely affects their investment decision. All the respondents in the study say that the buy or lease option significantly affects their investment decisions.

![Cost of Acquiring Technology](image)

**Figure 4.1 - Cost of Acquiring Technology**

4.4.2 The Buy or Lease option

Ninety three point six percent of the respondents think that the buy or lease option highly affects their investment decision with 6.4 percent respondents claiming it averagely affects their investment decision. All the respondents in the study say that the buy or lease option significantly affects their investment decisions as shown in Figure 4.2.
4.4.3 Age of the firm and industry experience

This study sought to find out to what level the age of the firm in the industry and industry experience affect the investment decisions in SMEs. Figure 4.3 below shows the findings with 64 percent of the respondents saying that the age of the firm has significant impact on their investment decision when it comes to technology by rate it highly and very highly on a five-point Likert-type scale, 32 percent say it has an average effect while only 4 percent say is has very little effect on their technology investment decision.
About 70.2 percent of the respondents think that industry experience has significant effects on their technology investment decision, 19 percent think that it has an average effect while 10 percent say that it has little or no effect on their firm’s investment decision as shown in Table 4.5.

Table 4.5 - Level of Experience in the Industry

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>3</td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
</tr>
<tr>
<td>Average</td>
<td>9</td>
</tr>
<tr>
<td>High</td>
<td>15</td>
</tr>
<tr>
<td>Very High</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
</tr>
</tbody>
</table>

4.4.4 Access to Financial Services

This study also sought to find out how access to financial services affects investment decisions on technology related services. The findings were as follows 91.5 percent of the respondents think that access to financial services have a significant effect on their firms investment decision, only 2 percent think it is has minimal effect on the decisions while 6.4 percent think it has a moderate effect on their investment decision as shown in Table 4.6.

Table 4.6 - Access to Financial Services

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1</td>
</tr>
<tr>
<td>Average</td>
<td>3</td>
</tr>
<tr>
<td>High</td>
<td>14</td>
</tr>
<tr>
<td>Very High</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
</tr>
</tbody>
</table>
4.4.5 Effect of Competition in Their Firm’s Investment Decision

On the effect of competition in their firm’s investment decision, 70 percent of the respondents think that competition has a significant effect on their investment decision. 23 percent of the respondents think it has a moderate effect while only 6.4 percent of the respondents feel competition has no significant effect on their investment decision as shown in Figure 4.4.

![Bar chart showing the effect of competition in the industry on investment decision](chart.png)

Figure 4.4 - Effect of Competition in Their Firm’s Investment Decision

4.4.6 Does the Level of Debt Affect Your Investment Decision

This study sought to find out if the level of debt significantly affects the firm’s investment decision and found as shown on Table 4.7 that 72.4 percent of the respondents feel that the level of debt significantly affects the firm’s technology investment decision. 23.4 percent of the respondents feel that the level of debt does not significantly affect their investment decisions while only 4.3 percent say it has a moderate effect on their technology investment decision.
Table 4.7 – Does the Level of Debt Affect Your Investment Decision

<table>
<thead>
<tr>
<th>Level of Debt</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>very low</td>
<td>11</td>
<td>23.4</td>
</tr>
<tr>
<td>Average</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>High</td>
<td>17</td>
<td>36.2</td>
</tr>
<tr>
<td>Very High</td>
<td>17</td>
<td>36.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4.4.7 Considering Risk Exposure before Investing in Technology

This study sought to establish if the SMEs consider the risks they expose themselves before investing in a technology asset. From the analysis it was established that 95.7 percent of the respondents do consider risks associated with the asset while only 4.3 percent of the respondents do not consider such risks when investing in a technology asset as shown in Figure 4.5 below.

![Figure 4.5 – Consideration of Risk before Investing In Technology](image)

4.4.8 Effect of Risk on the Final Investment Decision

The question on whether if risk/uncertainty about the returns of a new technology asset has affected the investment decision of the SME had 91.5 percent of the respondents saying yes it
does affect their investment decision while 8.5 percent of the respondents said it does not affect their investment decision as shown in the Table 4.8.

Table 4.8 - Has the Risk Affected Your Investment Decisions

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>43</td>
<td>91.5</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>8.5</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.4.9 SMEs Reaction to Risk

The study further sought to find out the SMEs reaction to the uncertainty surrounding a technology investment. It was established that 12.8 percent of the respondents reacted by abandoning the investment plan, 38.3 percent delayed their investment plans and 40.4 percent of the respondents opted to switch to other alternatives. Eight point five (8.5) percent of the respondents did not answer the question as they had said no to the previous question as shown in Table 4.9.

Table 4.9 - Firms Reaction to Risk

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abandon investment</td>
<td>6</td>
<td>12.8</td>
</tr>
<tr>
<td>Delay investment</td>
<td>18</td>
<td>38.3</td>
</tr>
<tr>
<td>switch options</td>
<td>19</td>
<td>40.4</td>
</tr>
<tr>
<td>rejected to answer</td>
<td>4</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4.4.10 Government Incentives

The statement on government incentives has 51.1 percent of the respondents replying yes while 48.9 percent replying no. this shows an even split in response in the respondents in the study as shown in the Table 4.10. Majority of those who said yes were from the technology industry while majority of those who said no were from the manufacturing industry.
Table 4.10 - Has the Government Provided Enough Investment Incentives

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>24</td>
<td>51.1</td>
</tr>
<tr>
<td>No</td>
<td>23</td>
<td>48.9</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.4.11 What More Can the Government Do To Encourage Technology Investment

This study also sought to establish what the SMEs feel that the government can do to improve technology investments in their relevant industry. The response received from those answered this question, majority said that tax incentives would really encourage them to invest, 57.4 percent did not answer the query as shown in Table 4.11.

Table 4.11 - What More Can the Government Do To Encourage Technology Investment

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better Leather Making Technology</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Ease Of Access To International Financial Markets</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Export Assistance</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Industry Regulation</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Leather Makers Forum</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Reduce Cost Of Software</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Reduced Lending Rates</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Subsidies</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Tax Incentives</td>
<td>10</td>
<td>21.3</td>
</tr>
<tr>
<td>Technology Subsidies</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.4.12 Most Preferred Method of Acquiring Technology Asset

Given the options between buying or leasing a technology asset or using both to the respondents in the study 57.4 percent of them would prefer the option to use a hybrid of both,
36.2 percent of the respondents would prefer to lease the assets while only 4.3 percent of the respondents would prefer to buy the technology asset as shown in the Table 4.12.

Table 4.12 - Most Preferred Method of Acquiring Technology Asset

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Lease</td>
<td>17</td>
<td>36.2</td>
</tr>
<tr>
<td>Both</td>
<td>27</td>
<td>57.4</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.4.13 Use of Payback Period as an investment Appraisal Tool

The study further found that 29.8 percent of the respondents rarely use payback period in the investment appraisal compared to only 6.4 percent who rarely use discounted payback as shown in Table 4.13 and 4.14. An average use of payback was at 31.9 percent of the respondents compared to 6.4 percent who use discounted payback moderately. 38.3 percent of the respondents give a high preference to payback period compared with 80.9 percent of the respondents who regularly use the discounted payback to determine when their technology investments will pay back the initial investment.

Table 4.13 - Use of Payback Period as an investment Appraisal Tool

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>8</td>
<td>17.0</td>
</tr>
<tr>
<td>Low</td>
<td>6</td>
<td>12.8</td>
</tr>
<tr>
<td>Average</td>
<td>15</td>
<td>31.9</td>
</tr>
<tr>
<td>High</td>
<td>7</td>
<td>14.9</td>
</tr>
<tr>
<td>Very High</td>
<td>11</td>
<td>23.4</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 4.14 - Use of Discounted Payback Period as an investment Appraisal Tool

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>1</td>
<td>2.1</td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Average</td>
<td>3</td>
<td>6.4</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
<td>6.4</td>
</tr>
<tr>
<td>Very High</td>
<td>38</td>
<td>80.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4.4.14 Use of Profitability Index as an investment Appraisal Tool

The study also found out that majority of the SMEs still favor the use profitability index with 70 percent rating it highly in their use in appraising investments in technology assets. Ten point three (10.3) percent rarely use it while 19 percent use it at a moderate level as shown in Figure 4.7.

![Figure 4.6 Use of Profitability Index as an investment Appraisal Tool](image)

4.4.15 Use of NPV as an investment Appraisal Tool

Findings show that the respondents in the study have a high preference in use of NPV method in their investment appraisal with 100 percent of the respondents stating that they use it often and very often in their technology investment decision as shown in Table 4.15.
Table 4.15 - Use of NPV as an Investment Appraisal Tool

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>5</td>
</tr>
<tr>
<td>Very High</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
</tr>
</tbody>
</table>

4.4.16 Use of IRR of as an Investment Appraisal Tool

The study also found that there is also a high preference for the use of IRR in appraising investment projects related to technology with 82.9 percent showing high preference for IRR, 10.6 percent show moderate/average preference to it use while 6.4 percent stated that they do not use it often in their investment appraisal. This is illustrated in Figure 4.8.

![Figure 4.7 - Use of IRR as an investment Appraisal Tool](image)

4.4.17 Use of MIRR as an investment Appraisal Tool

Findings on the use of modified internal rate of return (MIRR) in technology investment appraisal show that 21.3 percent of the respondent rarely use MIRR in investment appraisal, 27.7 percent of the respondents stated that they use it moderately while 51 percent stated that they use MIRR very often to appraise technology investments as shown in Figure 4.8.
This study sought to determine the use and knowledge on real options as an investment appraisal technique. The findings were that 74.5 percent of the respondents rarely use real options, 12 percent stated that they use it averagely while the final 12 percent stated that they use it very often to assess viability of technology investment projects as shown in Table 4.16.

Table 4.16 - Knowledge in Use of Real Options

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>32</td>
<td>68.1</td>
</tr>
<tr>
<td>Low</td>
<td>3</td>
<td>6.4</td>
</tr>
<tr>
<td>Average</td>
<td>6</td>
<td>12.8</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
<td>6.4</td>
</tr>
<tr>
<td>Very High</td>
<td>3</td>
<td>6.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
4.5  Improving Investment Decision Making

4.5.1  Improved Access to Finance

When asked if increased access to finance would help them improve their investment decisions, 91.5 percent of the respondents stated this will help them improve their investment decision. Only 4.2 percent of the respondents think that improved access to finance will not significantly improve their investment decisions while 4.4 percent felt that it would improve their investment decision moderately as shown in the Figure 4.9.

![Figure 4.9 - Improved Access to Finance](image)

4.5.2  Decreased Debt to Capital Ratio

Finding as shown in Table 4.17 concluded that only 8.5 percent of the respondents do not think a decreased debt to capital ratio would improve their technology investment decision making, 17 percent think that it would play some part in improving the decision while 74.4 percent think it would play a significant part in improving their investment decision making.
Table 4.17 - Decreased Debt to Capital Ratio

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>4</td>
<td>8.5</td>
</tr>
<tr>
<td>Average</td>
<td>8</td>
<td>17.0</td>
</tr>
<tr>
<td>High</td>
<td>16</td>
<td>34.0</td>
</tr>
<tr>
<td>Very High</td>
<td>19</td>
<td>40.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4.5.3 Decreased Cost of Fund

The study found that 2 percent of the respondents stated that a decreased cost of getting investment funds in the form of loans and grants would moderately improve their investment decision and a whopping 98 percent stated that this will significantly improve their investment decision making in relation technology investments as shown in Figure 4.10.

Figure 4.10 - Decreased Cost of Fund

4.5.4 Improved Experience in the Chosen Market

Findings in the study show that majority of the respondents think that improved experience in the chosen market would be a big help in improving their technology investment decision making, the majority stood at 93.6 percent of the respondents while 6.4 percent of the respondents think that it will moderately improve their investment decision making as highlighted in Table 4.18.
Table 4.18 Improved Experience in the Chosen Market

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>3</td>
<td>6.4</td>
</tr>
<tr>
<td>High</td>
<td>26</td>
<td>55.3</td>
</tr>
<tr>
<td>Very High</td>
<td>18</td>
<td>38.3</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.5.5 Improved Access to Information

From the Figure 4.11 below, findings show that approximately 98 percent of the respondents in the study rate highly that improved access to information related to the proposed investment will go a long way to improving their investment decisions. Only 2 percent of the respondents think that it will be moderately significant in improving their technology investment decision.

![Figure 4.11 - Improved Access to Information](image)

4.5.6 Increased Knowledge of Risk and Uncertainty

Findings on the third objective further show that majority of the respondents at 78.7 percent rate highly that improved knowledge on risk and uncertainty related to technology investment would significantly improving their technology investment decision, 17 percent feel that it would averagely improve their
investment decision making while only 4.3 percent feel that it would play a very small part in improving their investment decision making, this is illustrated in Figure 4.12.

**Figure 4.12 - Increased Knowledge of Risk and Uncertainty**

### 4.5.7 Increased Information on Financing Alternatives

As shown in the Table 4.19 below a cumulative of approximately 93.6 percent of the respondents feel that increased information on financing alternatives would significantly improve their technology investment making. Only 6.4 percent of the respondents think that increased information on financing alternatives would moderately improve their investment decisions.

**Table 4.19 - Increased Information on Financing Alternatives**

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>3</td>
<td>6.4</td>
</tr>
<tr>
<td>High</td>
<td>15</td>
<td>31.9</td>
</tr>
<tr>
<td>Very High</td>
<td>29</td>
<td>61.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
4.5.8 Financial Advice from Experts

The study found out that approximately 93 percent of the SMEs feel that regular advice from financial experts with specialization in the given industry would significantly improve their technology investment decision making while only 7 percent of the SMEs feel that the advice from experts would moderately improve their decision making as shown in Figure 4.13 below.

![Improved Financial Advice from Experts](image-url)

Figure 4.13 – Improved Financial Advice from Experts

4.5.9 Increased Knowledge on Financial Options

As represented in Figure 4.14 below, approximately 85 percent of the respondents in the study feel that an increased knowledge on financial options as an investment appraisal technique would significantly improve their technology investment decision making, 4 percent feel that it would averagely improve their decision making while 11 percent feet that it will not significantly improve their technology investment decision making.
4.6 Correlations

4.6.1 Correlations between Buy or Lease Option and Access to Financial Services

At 95% confidence level, there is a significant relationship between the buy or lease option and access to financial services as shown on the Table 4.20 below. However, the relationship is positively weak at 30.5 percent, meaning that those who ranked the buy or lease option highly in the study most likely also ranked access to financial services highly as a factor affecting their investment decision.
Table 4.20 Correlations between Buy or Lease Option and Access to Financial Services

<table>
<thead>
<tr>
<th>Buy Or Lease Option</th>
<th>Buy Or Lease Option</th>
<th>Access To Financial Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.305*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.037</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>47</td>
<td>47</td>
</tr>
</tbody>
</table>

Access To Financial Services

<table>
<thead>
<tr>
<th>Access To Financial Services</th>
<th>Pearson Correlation</th>
<th>Access To Financial Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>.305*</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.037</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>47</td>
<td>47</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed).

4.6.2 Correlation between Access to Financial Services and Decreased Cost of Funds

A Pearson correlation test was done between the financial services factor and decreased cost of funds to determine if there is a significant relationship between a factor affecting decision making and improving decision making. At 99 percent confidence level the relationship is significant with a positive weak correlation of 38.6 percent as shown in Table 4.21. This means that the respondents who feel that access to financial services plays a significant role in their investment decision making also felt that a decreased cost of finance would significantly improve their decision making and vice versa.

Table 4.21 - Correlation between Access to Financial Services and Decreased Cost of Funds

<table>
<thead>
<tr>
<th>Access To Financial Services</th>
<th>Access To Financial Services</th>
<th>Decreased Cost Of Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.386**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.007</td>
</tr>
<tr>
<td>N</td>
<td>47</td>
<td>47</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decreased Cost Of Funds</th>
<th>Pearson Correlation</th>
<th>Access To Financial Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>.386**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.007</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>47</td>
<td>47</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
4.6.3 Relationship between Age of the Firm and Improved Market Experience

The test in Table 4.22 was to test if there was a significant relationship the respondents who felt that age of a firm significantly affect their investment decision and if improved market experience would improve their technology investment decision making. The test show that there is no significant relationship between these 2 factors. The significance level is at 31.2 percent, this way above the maximum recommended of 5 percent.

Table 4.22 - Relationship between age of the firm and improved market experience

<table>
<thead>
<tr>
<th>Age Of A Firm</th>
<th>Age Of A Firm</th>
<th>Improved Marketing Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.151</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.312</td>
</tr>
<tr>
<td>N</td>
<td>47</td>
<td>47</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improved Market Experience</th>
<th>Improved Market Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>.151</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.312</td>
</tr>
<tr>
<td>N</td>
<td>47</td>
</tr>
</tbody>
</table>

4.7 Chapter Summary

This chapter looked at the analyzed data collected from 47 respondents (SMEs). Each variable in this study was analyzed using SPSS and results shown as Tables and Figures on the technology investment decisions of Kenyan SMEs. The analysis in this chapter was in line with the main objectives of this study and was able to shade some light on the investment decisions of Kenyan SMEs.

The findings from this study provided that all the factors provided in the literature review have a significant effect on the decision to invest in technology. The findings further show us that Kenyan SMEs have a high preference for discounted methods of investment appraisal but some still like to use some of the non-discounted techniques such a ARR. The study also established that all the dependent variables of the research do have an effect on the independent variable i.e. the technology investment decision.

The next chapter covers the summary, discussions and conclusions from the three main objectives of this study. It will also cover the recommendations made from the results of this study.
CHAPTER FIVE

5.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the purpose of the study and the research questions that the study sought to answer. It also provides a brief summary of the research methodology and a summary of the findings of this study. The final part of this chapter carries the recommendation section, this section gives recommendations on how best to improve the SMEs technology investment decision and also gives recommendation for further studies based on some of the needs identified from the study concluded.

5.2 Summary

The purpose of the study was to get more insight into the investment decisions of Kenyan SMEs in the Nairobi area with an interest on technology investments. It was guided by these three research questions; What factors influence the investment decision in SMEs, Which investment appraisal techniques are mostly employed in technology investment decision making and what are the ways to improve technology investment decision making.

This study used both the descriptive and inferential statistics as the basis of the study, the SMES in the Nairobi area were the population of the study and it is from this population a sample was drawn. Stratified Random sampling was used for the purpose of this research. Given the dynamics of the SME sector, the sampling was done from 4 strata namely, financial sector, manufacturing sector, service industry and technology industry. Data was collected via email and via drop and pick with the aid of a research assistant. The data collected had a response rate of over 90% with 47 questionnaires collected from the planned 52, the collected data was then analyzed via SPSS the 21st version with the results being presented in form of Tables and Figures to enable easy analysis of patterns and perceptions of the respondents, this also facilitated interpretation and discussion of the findings.

All the respondents were deemed to have sufficient credentials to be able to answer all the questions in the data collection instrument ensuring validity. All the SMEs in the study were registered in directories by Central Bank, Soft Kenya ICT companies' directory and Kenyan manufacturers and exporter directory. Findings found that the majority of the respondents at 51.1 percent had taken up a
management role in their own businesses, further query into this reason was the need to maintain control of the business decision making. The SMEs in the study were divided into four strata as earlier mentioned. Majority of the respondents in this study came from the manufacturing sector at 34 percent, followed by the service sector at 29.8 percent. Majority of the respondents were relatively new 53 percent of the SMEs stating that they have been in business for 5 years or less, 26 percent have been in business for 6 to 8 years while 21 percent have been in business for longer than 10 years. There was also a significantly positive correlation between the age of the firm and the number of employees, meaning the longer the business had been in business the more employees it has showing that there was growth in businesses.

With regard to the first research question which was the factors that affect the technology investment decisions in Kenyan SMEs, the study found on the lease or buy option that this decision has significant effect on the SMEs decision to invest with majority of the firms preferring leasing technology assets rather than buying. Findings further showed that majority of the respondents at 95.7 percent say that risk plays a huge role in their technology investment decision with 89 percent claiming that it has affected their decision to invest on a technology asset. Findings also show that the respondents have exercised the use of real options even if they do not understand how it works.

The second research question was concerned with the investment appraisal techniques most evident in SMEs when technology investments were being assessed. The findings concluded that there is a high preference for discounted methods of investment appraisal with the respondents showing a high affinity for the NPV, discounted payback and IRR method. However the respondents were divided when it came to MIRR with 51 percent saying that they use it regularly with 27 percent claiming they use it averagely. 21.3 percent of the respondents claim that they do not use MIRR regularly.

The study also found out that a majority of the respondents claimed that they rarely use Real options to appraise the investments projects with only 13 percent claiming that they use it regularly. When it came to ways that the respondents feel on what the government should do to improve their investment decision majority of those who answered circles around tax incentives, subsidies and government assistance in entering the export markets.

On improving technology investment decision making in SMEs, which was the third and final research question of the study, findings concluded that majority of the respondents felt that improved access to
finance would aid them improve theory decision making also 74% feel that a decreased debt to capital ratio would give them more flexibility helping them to improve their investment decision. Nearly all the respondents at 98% feel that a decreased cost of funds would be of significant help in helping them improve their investment decisions. There was also a significant relationship between access to finance and decreased cost of funds at a 99 percent confidence level.

Further finding on improving investment decision making concluded that 94 percent strongly feel that improved experience in their chosen market industry would enable them make better investment decisions. Moreover majority of the respondents felt that all the factors in this section played a significant role in improving investment decision all with over 75 percent of the respondents giving each factor high or very highly.

5.3 Discussions

5.3.1 Factors influencing Technology Investment Decision in SMEs

5.3.1.1 Capital Structure

Khanqan and Ahmadnia, (2013) argued that capital structure is a major factor that influences technology investment decision this is because capital structure affects the number of positive NPV projects a firm can take on. The findings of this study agreed with this statement by Khanqan and Ahmadnia (2013) with majority of the respondents stating capital structure has an influence on their investment decision. Profitable firms tend to have a small debt ratio. Good-quality firms use internal funds for financing as much as possible. Since low-quality firms do not have as much profits and retained earnings as high-quality firms, they have to use external sources more frequently and it will usually be debt. (Miglo, 2010). The findings in the study concluded that the composition of their capital structure does affect their technology investment decision with a majority of the respondents claiming that the level of debt in their capital structure being a big influencer in all their investment decision in general including technology investments.
5.3.1.2 Cost of Acquiring New Technology

Literature review explained the cost of acquiring a new technology asset by use of the pecking order theory. Authors such as Frank and Vidhan (2003) have argued the pecking order theory (POT) is most relevant to SMEs because of the higher cost of external equity and the relatively greater levels of information asymmetries. POT states that manager/business owners prefer issuing out debt instruments than equity for the basic fact that they do not want to lose control of their firms or lose their competitive advantage due to the information shared. The management of these firms are better informed of the true value of the firm than external investors therefore would be in a better position to know the true cost of getting external financing as opposed to internal financing. The findings of this study partly agree with Frank and Vidhan (2003) findings in that the managers prefer debt over equity. POT states that internal management prefer internal financing as opposed to external and it is for this reason that firms who cannot afford the cost of acquiring a technology asset opt to lease it. This study did not go further as to investigate the reasons behind this preference but went on to add leasing as an option as it allows a firm to own and use technology it has not full paid for. This theory is further supported by the findings in this study stating that decision to buy or lease an asset carries a lot of weight in the SMEs decision to invest. Findings further concluded that given the choice to buy or lease a technology asset, majority of the SMEs in the study would prefer to lease rather than buy.

5.3.1.3 Risk and Uncertainty

Risk and uncertainty play a major role in SME asset investment decision making as highlight in the literature reviewed in chapter two. This is even more pronounced when it comes to technology investments especially in this age where technology is changing and advancing at a rapid pace (Albert, Mun, and Man-Tak, 2011). A large body of literature has investigated the effect of uncertainty on investment. The theoretical implications of uncertainty on investment are twofold. First, uncertainty may affect the level of investment. Second, uncertainty may affect the timing of investment. Furthermore, risks are known and possible for managers to deal with, while uncertainty is an event or a situation that was not expected to happen. (Alexandra, Željko, and Dimitrios, 2010). The findings from the study agrees with
the literature reviewed that risk and certainty does play a major role in technology investments with majority of the respondents claiming that risk about the returns of a technology investment has affected their decision to invest in it. The respondents opted to either abandon, delay or switch to another less costly and less riskier alternative. Leasing instead of buying was a way most respondent chose as a way of transferring the risk from their firm (the lease) to the leasing company (lesser).

5.3.1.4 Access to Finance

Access to finance is a major influencer in the investment decisions of SMEs and particularly investments in technology as it fosters innovation, macro-economic resilience and GDP growth (AfDB, 2012) the findings of this study agreed with this statement as the SMEs stated that access to finance did have a significant effect in their investment decisions. Serrasqueiro et al (2012) also argued that the access to finance is significantly influenced by the age of the firm in the industry with new firms finding it harder to access finance. Financing restrictions diminish as the firms grow older and survives the first years of operations. (Serrasqueiro et al, 2012). This is because the SMEs are able to gain industry experience and are able to build a reputation for themselves, with this comes a reduced probability if the firm going into bankruptcy (Bataa, 2008). Finding in this study echoed the literature reviewed with majority of the respondents stating access to finance is affected by age of a SME therefore significantly influence on their investment decisions in technology. This finding is similar to Serrasqueiro et al (2012); AfDB, (2012); Bataa, (2008). as the researchers used the same kind of population and had almost the same kind of response rate even though the previous researchers used a much larger sample size.

5.3.2 Investment Appraisal Techniques

A study conducted in South Africa by Olawele, Olumuyiwa and George found out that SMEs are using investment appraisal methods such as, NPV, IRR and discounted payback period to evaluate technology investments. They further argued that investment are key business growth. Investment appraisal techniques are critical tools in measuring the returns of investments and this is especially crucial in technology investments. This is because technology investments are supposed to improve profitability by reducing production
inefficiencies and transaction costs. (Olawele et al, 2010). To get a better estimation of returns for investments managers have been advised to use discounted methods of investment appraisal as they do take into account the time value of money. (Miglo, 2010). Findings in the study agree with the literature reviewed by revealing that the respondents have a high preference for discounted payback with majority of the respondents rating highly all discounted investment appraisal technique with a particularly high rating for IRR and NPV as the most preferred choice. These findings agree with findings from study conducted in South Africa by Olawele et al (2010). The only difference would be that their study only concentrated on the manufacturing sector, the studies agree since this specific sector usually requires high level of technology investment to reduce cost and improve efficiencies.

5.3.3 Improving Technology Investment Decision Making

In principle, a firm’s decision to invest in a new tech project should be made according to whether the project increases the wealth of the firm’s shareholders. For example, the Net Present Value (NPV) rule specifies an objective process by which firms can assess the value that new capital investments are expected to create (Ari, 2009). The final decision is often based on hidden knowledge like intuition, experience, attitudes and values as this knowledge is an inseparable part of human decision making in life and also in organizational settings. The findings of this study agree with this statements as majority of the SMEs stated that improved market and business experience would go along way in improving the quality if their decisions. Glaser and Michele (2008) also argued that improving decision making is only possible with improved flow and access to various information that affect the decision to be made which in this case is the technology investment decision. The findings of this study also agreed with Glaser and Michele as majority of the respondents stated improved access to information would assist them in improving their investment decisions with relation technology investments. Kettunen (2009) further argues that Information on issues such the risk exposure, other options available and financing options available. The study also agreed with Kettunen’s findings as the respondents felt that improving Information on issues such the risk exposure, other options available and financing options available would help them improve their technology investment decision making.
Findings further show that the SMEs feel that an increased knowledge on risks exposed and risk management knowledge would go a long way in improving their technology investment decision making as they will have more information on what they are getting into, what they stand to lose and the levels of uncertainty would be clearer.

5.4 Conclusion

All the factors discussed in chapter two have significant influence on the investment decisions of technology investments of the SMEs in the Nairobi area. Capital structure has an influence on the decision to invest in technology assets and so does risk and uncertainty which has led to delayed investment plans, abandonment of the investment plans and postponement of investment plans which may have led to the loss of income and opportunities to expand the SMEs business. Findings also showed us that Access to finance has an effect on the investment decision which as the literature reviewed has shown us is affected by the age of the firm in the industry.

The firms have shown a high preference for discounted methods of investment appraisal such as IRR and NPV. Although one outlier in the discounted methods was in the real options where the respondent showed limited knowledge on this particular technique though researchers might argue that it is understandable since Kenya is a developing economy and the technique being fairly new in the finance field of study

Findings also found out that improved market experience, improved access to finance and increased knowledge on risk and risk management techniques would go a long way in improving investment decision of SMEs with relation to technology. Improved access to information was also cited as a factor that would be of significant help in improving investment decision making.
5.5 Recommendations

The need for better capital structure management is vital for these SMEs as they already acknowledge it has a significant influence on their investment decision and so does access to finance. Effort should be made to improve access to finance and also to improve access to information in each of the SMEs industry segment that were the subject of study in this research. Risk has also been cited as a major influencer in technology investment decision making. Therefore these businesses should be educated on the benefits of a proper risk management system and how they would be beneficial in their businesses and industries.

Proper use of investment appraisal techniques should be highlighted to the SMEs in the study. The benefits of each technique should be highlighted to these firms so that they are better able to interpret the data presented to them by their accountants and business advisor. This would be of great benefit to these businesses as the managers and business owners are usually the final decision makers. With this information on hand they would be able to make better decisions as literature reviewed has shown us there is a human element in the final decision made based on experience and intuition.

5.6 Recommendations for further studies

Given the nature of modern businesses and the rapid changes in the business climate in Africa particularly, the investment decision is getting more dynamic and the time frame to make those important investment decision being reduced dramatically, it has become important to be able to make important decisions on the kind of assets that businesses need to invest in to stay competitive. Businesses are growing at a rapid pace from micro to small and from small to medium. The need is clear for better decision making in investment and this calls for better tools. The Real Options theory (ROT) might be able offer solutions to this problem especially in the developing countries in Africa.

Further studies need to be carried out especially in the medium sized firms on the need for embracing real options theory in investment decision making as a tool of managing risk and uncertainty associated with technology investments and how effective ROT is in reducing the timeline for making these important decisions.
REFERENCES


APPENDICES

QUESTIONNAIRE

INSTRUCTIONS:

Please fill the questionnaire below regarding your enterprise. Your response will be treated with confidentiality and will not be used for any other purpose other than for the current research.

Section A

PLEASE GIVE DETAILS ABOUT YOUR COMPANY AS INDICATED BELOW

1. Ownership
   Sole proprietor [ ] Partnership [ ] Private limited [ ]

2. What is your current role in the business?
   Please tick where applicable
   Owner [ ] manager [ ] owner and manager [ ]

3. How long has the business been transacting in your industry?
   < 2 years [ ] 3-5 years [ ]
   6-8 years [ ] more than 10 years [ ]

4. In which sector does your business fall?
   Please tick where applicable
   Financial service [ ] technology and innovation [ ]
   Manufacturing [ ] service industry [ ]
   Other (Specify ……………………………………………………………………………………………………………………………………………………)

5. How many employees does your business have now?
   < than 5 [ ] 5-10 [ ] 11-50 [ ] 51-100 [ ] > than 100 [ ]
SECTION B

Factors Influencing the Investment Decision in SMEs

The questions in this section will require you to rate the factors that are known to have influence on the Investment Decision in SMEs.

Tick in the scale of 1 to 5; where 5 = Very high; 4 = High; 3 = Average; 2 = Low; 1 = Very low;

From your experience how do you rate these factors that affect your Investment Decision as far as the SMEs are concerned?

| 6. Cost of acquiring technology | 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ |
| 7. Buy or lease option           | 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ |
| 8. Age of your firm in the industry | 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ |
| 9. Industry experience          | 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ |
| 10. Access to financial services | 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ |
| 11. Competition in the industry | 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ |
| 12. Does your level of debt affect your investment decision | 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ |

Given a choice between the following, which one would your firm pick?

13. Acquire technology asset
    - Buy ☐
    - Lease ☐
    - Both ☐

14. Do you consider risk and uncertainty before investing in technology?
    - Yes ☐
    - No ☐

15. Has risk and/or uncertainty about the returns of a new technology affected your investment decision?
    - Yes ☐
    - No ☐

16. If yes in the previous question, what was your firm’s reaction?
    - Abandon investment ☐
    - Delay investment ☐
    - Switch to another option ☐

17. Do you think the government has provided enough incentives to encourage investment in technology in your industry?
Yes ☐ ☐ No ☐ ☐

18. What more to you think the government should do to encourage investment in technology

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SECTION C

Investment Appraisal Techniques

The questions in this section will require you to rate which capital budgeting technique you mostly use to determine your investment decision.

Please tick only ONE appropriate score on the scale of 1 to 5; where 5 = Very high; 4 = High; 3 = Average; 2 = Low; 1 = Very low;

19. Payback period 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐
20. Discounted payback period 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐
21. Profitability index 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐
22. Net present value (NPV) 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐
23. Internal rate of return (IRR) 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐
24. Modified internal rate of return (MIRR) 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐
25. Real options 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐
SECTION D

Improving investment decision making

The questions in this section will require you to rate what you think will improve investment decision making in your organization.

Please tick only ONE appropriate score on the scale of 1 to 5; where 5 = Very high; 4 = High; 3 = Average; 2 = Low; 1 = Very low;

What do you think will help you improve investment decision making in your organization

i. Increase access to finance
   - 5 □ 4 □ 3 □ 2 □ 1 □

ii. Decreased debt to capital ratio
    - 5 □ 4 □ 3 □ 2 □ 1 □

iii. Decreased cost of loans
     - 5 □ 4 □ 3 □ 2 □ 1 □

iv. Improved market experience
    - 5 □ 4 □ 3 □ 2 □ 1 □

v. Improved access to information
   - 5 □ 4 □ 3 □ 2 □ 1 □

vi. Increase knowledge on risk and uncertainty
    - 5 □ 4 □ 3 □ 2 □ 1 □

vii. Enhanced risk management knowledge
     - 5 □ 4 □ 3 □ 2 □ 1 □

viii. Increased information on financing alternatives
      - 5 □ 4 □ 3 □ 2 □ 1 □

ix. Improved financial advice from experts
    - 5 □ 4 □ 3 □ 2 □ 1 □

x. Increased knowledge on financial options
    - 5 □ 4 □ 3 □ 2 □ 1 □

Please return the completed questionnaire in the enclosed return envelope

Thank you very much for your participation

PROVIDE YOUR EMAIL ADDRESS IF YOU WOULD LIKE A COPY OF THE FINDINGS OF THIS STUDY.

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