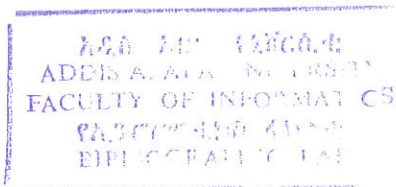


ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
SCHOOL OF INFORMATION STUDIES FOR AFRICA

**INFORMATION TECHNOLOGY INVESTMENT APPRAISAL
PRACTICES IN ETHIOPIA WITH PARTICULAR REFERENCE
TO THE FINANCIAL SECTOR**



***A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE
STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF SCIENCE IN INFORMATION SCIENCE***



By

LIBSNEH REDDA

JUNE, 1999

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
SCHOOL OF INFORMATION STUDIES FOR AFRICA

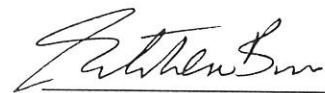
INFORMATION TECHNOLOGY INVESTMENT APPRAISAL
PRACTICES IN ETHIOPIA WITH PARTICULAR REFERENCE
TO THE FINANCIAL SECTOR

BY

LIBSNEH REDDA ABEBE

Name and Signature of Members of the Examining Board

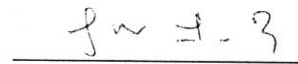
Ato Getachew Birru, Chairman, Examining Board



Ato Habtesellassie Hagos, Advisor



Dr. Lishan Adam, Advisor



Prof. A. Neelameghan, External Examiner



ACKNOWLEDGEMENT

I am pleased to have this chance to express my gratitude to my advisors Dr. Lishan Adam and Ato Habteselassie Hagos for their valuable comments and suggestions throughout their supervision of the study.

I must acknowledge the assistance and co-operation of the Construction and Business Bank and its management. I am particularly grateful to Ato Mekonnen Zikie, CBB's computer programmer, for his help and co-operation during my study.

My sincere thanks also go to Ato Baye Felleke who edited my research report.

I am indebted to Ato Nurhussien Abdella, a computer operator in AACCC, who helped me a lot in completing this work.

I am grateful to all faculty members of SISA. I would like to thank the Addis Ababa Commercial College for sponsoring my studies at SISA.

My thanks are also due to all who encouraged, advised and helped me in completing my study.

Prologue

Information technology has become a powerful tool of the information age. Information technology affects the way organisations do their businesses. It enables firms to grow and prosper, and governments to govern and improve the quality of life of its citizens.

To exploit such opportunities, organisations usually make major expenditures in information technology projects. However, these expenditures are not accompanied by a systematic, standardised and well-documented evaluation practices. This practice will undoubtedly result in wastage of scarce company resources.

The research aims to investigate how IT projects are evaluated and what evaluation problems are encountered in the financial sector.

Chapter one deals with the background, statement of the problems, objectives, justification, methodology, scope and limitations of the study. Chapter two presents a brief review of the financial sector. In chapter three, traditional and recent thinking in IT evaluation are highlighted with a view to recommend appropriate evaluation methods

The results of the survey and a prototype for IT evaluation on the basis of the recommended models is discussed in chapters four and five respectively. Chapter six provides a brief summary of the research process, its findings, conclusions and recommendations.

Table of Contents

Acknowledgement	ii
Prologue	iii
Table of Contents	iv
List of Tables	vii
List of Figures	vii
List of abbreviations	viii
Abstract	ix

Title	Page
-------	------

Chapter One: Introduction

1.1 Background of the Study	1
1.2 Statement of the Problem	5
1.3 Justification of the Study	7
1.4 Objectives of the Study	9
1.5 Scope and Limitations of the Study	10
1.6 Research Hypotheses	11
1.7 Methodology	12
1.8 Application of Results	15

Chapter Two: The Financial Sector

2.1 Definition and function	16
2.2 Types of financial institutions	17

2.3 The Ethiopian context	18
---------------------------	----

Chapter Three: IT evaluation: A theoretical Perspective

3.1 Review of the literature	19
3.2 Investment appraisal techniques	23
3.3 Empirical Studies	44

Chapter Four: Survey Results

4.1 Background of the survey	45
4.2 Information Technology Applications	47
4.3 Evaluation procedures	49
4.4 Projection initiation, evaluation Stages and stakeholders involvement	51
4.5 Responsibility for IT evaluation	53
4.6 Factors Considered	54
4.7 Methods employed	55
4.8 Problems in IT evaluation	57

Chapter Five: A prototype Evaluation of a 'decentralised Branch financial systems software development Project' for Construction and Business Bank

5.1 Historical Background	59
5.2 Objectives of the bank	60
5.3 The existing system – An Overview	61
5.4 The proposed system	64
5.4.1 Project definition	64
5.4.2 Objectives of the proposed system	64

5.4.3	Components of the proposed system	65
5.4.4	Information technology evaluation policy	69
5.4.5	Evaluation of the proposed system	73
5.4.6	Re-examination of the Appraisal methods	77

Chapter Six: Conclusion and Recommendation

6.1	Conclusion	80
6.2	Recommendations	84

Bibliography		85
---------------------	--	----

Appendices

Appendix I:	Questionnaires used in the Survey	91
Appendix II:	Interview Guide	111
Appendix III:	List of Interviewees	111
Appendix IV:	List of Organisations Surveyed	112
Appendix V:	Discussion Guide: Project Assessment	
	Factors Identification Checklist	114
Appendix VI:	Project Cost Estimate Form	117
Appendix VII:	Project Viability Assessment Worksheet	118
Appendix VIII:	CBB's Organisation Chart	120

List of Tables

Table 1. Composition of Organisations under study	46
Table 2. Position of Respondents	47
Table 3. IT application in the sector	48
Table 4. Status of IT evaluation	49
Table 5. Project initiation	51
Table 6. Stages of IT evaluation	52
Table 7. Factors considered in IT evaluation	54
Table 8. Appraisal methods used	56
Table 9. Extent of IT evaluation	57
Table 10. Problems in IT evaluation	58
Table 11. CBB's assessment policy of benefits	70
Table 12. CBB's risk factors assessment policy	71
Table 13. Risk-Return preference policy	72
Table 14. Initial project cost	74
Table 15. Management assessment of project benefits	76
Table 16. Management assessment of project risk	77

List of Figures

Figure 1. Payback Formula	24
Figure 2. ROI Formula	26
Figure 3. NPV Formula	27
Figure 4. IRR Formula	29
Figure 5. Enhanced ROI Formula	33

Figure 6. Project Value Formula	35
Figure 7. ROM Formula	43
Figure 8. Structure Chart of CBB's Branch Financial System	66
Figure 9. Structure Chart of CBB's Branch Saving Accounts Subsystem	67
Figure 10. Structure Chart of CBB's Branch Current Accounts Subsystem	68

List of Abbreviations

AACC	- Addis Ababa Commercial College
CBA	- Cost-Benefit Analysis
BSC	- Balanced Scorecard
ESTC	- Ethiopian Science and Technology Commission
ICS	- Information and Computer systems (in CBB)
IRR	- Internal Rate of Return
IT	- Information Technology
NPV	- Net Present Value
PPV	- Project Priority Value
R&D	- Research and Development
ROI	- Return On Investment
ROM	- Return On Management

INFORMATION TECHNOLOGY INVESTMENT APPRAISAL PRACTICES IN ETHIOPIA WITH PARTICULAR REFERENCE TO THE FINANCIAL SECTOR

Abstract

We live in an era of information where the growth and fate of organisations, individuals and others is determined by the degree of their access to and control over information resources. For this reason, information technology has become a strategic and competitive weapon of the information age. Because of their awareness of its power and potentials, therefore, more and more organisations are spending considerable amount of resources in IT projects.

However, such expenditures many not yield the desired results unless they are evaluated in a systematic and formal way. To this end, a number of traditional and new methods have been designed to evaluate the viability of IT and non-IT projects and to help the concerned policy makers arrive at the right investment decisions.

Of the available methods, the traditional financial techniques have been in use for a very long period of time but they are now being criticised for their inadequacy in evaluating IT projects. Some of the newly proposed methods seem to be practical while others look a bit theoretical and incomplete.

In spite of the availability of alternative evaluation methods, many organisations do not seem to evaluate the viability of their IT investments properly.

The study addresses the foregoing issues and explores how IT projects are evaluated in the Ethiopian financial sector - the sector which is characterised by its information-intensive activity. It also provides a brief account of the results of the survey. The study indicates the prevalence of less systematic, highly subjective, and informal evaluation practices. Lack of skilled and experienced manpower in the area of IT evaluation is considered to be the most serious problem in the sector.

The use of various techniques including the Payback Period, Net Present Value and Information Economics are recommended. There is a need for more emphasis on and coverage of IT evaluation in computing and information science training; for organisation of workshops and short-term training. Further research in this area is also recommended in order to improve the overall evaluation practice in the financial sector.

Chapter One

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Expenditures that bring long term benefits, at least for more than one year, to the sponsoring organisation are called Capital Expenditures or capital projects. Capital expenditures may be made to acquire physical assets such as machinery, equipment, buildings, and computer hardware or intangible assets such as application software, patents and licenses. Information Technology investment refers to capital expenditures that involve the acquisition of computers, communications and related technologies, acquisition and development of software, development, improvement and implementation of information systems and other related costs.

Associated with such capital projects is the concept of investment appraisal. To appraise, according to Webster's Dictionary, means " To judge, analyse the worth, significance, status of; esp. to give a definitive expert judgement of the merit, rank or importance of " something . Information Technology investment appraisal , therefore, refers to the process of analysing, estimating and evaluating the importance, merit , or the worth of an investment in Information Technology.

Information technology, IT, as defined by King et al (1988) refers to "the hardware and software that is used to collect, transmit, process and disseminate data (symbol) in an organisation"(p. 77). For some , IT is just like a weapon, and for others it is something that offers an enormous business opportunity.

In its earlier days, IT was used to handle relatively simple, highly clerical and repetitive tasks. The purpose was to replace labour, improve efficiency and reduce costs. IT departments were placed in the back rooms of most organisations.

IT, compared with the traditional medium - paper - has dramatically improved the flow, accessibility and use of information for a variety of purposes. This in turn has changed the way IT is being perceived by businessmen. As Dance (1994), in his book *Infopreneurs*, noted:

As information became more accessible and access to it was made more flexible, companies began to look at the information held on their computers, and began to consider IT in a different light. Thus, instead of using IT for the purposes of ..[automating backroom and repetitive activities], companies began to use it to create new business opportunities and gain an edge over their competitor (p.34).

Now, IT has become a strategic resource which firms can employ to gain competitive advantage, achieve a cost-leadership, and/or develop new business opportunities. Dance (1994) attributed the failures of business firms largely to their inability to respond proactively and exploit the opportunities provided by information technology. According to Dance, companies " were being beaten by their competitors not because their products were inferior but because of ancillary advantages provided by some innovative use of IT" (p. 36). He further stressed this point by quoting Kearney (1984) who reported that "companies which lagged behind in their use of IT are six times more likely to have a poor financial performance within their sector than companies leading in IT" (p. 19).

Realising its power and contribution, organisations are spending more and more of their scarce resources on IT projects, such as acquisition of computers, development of application systems, networking data centres, and installation of on-line order entry systems.

However, increased investment in IT alone can not be taken as a guarantee for business success. This point is best substantiated by Dance who remarked "Despite the increasing amount of capital being poured into IT, [it] was not being translated into improved financial results or business performance" (p. 4). The major reasons why IT investments fail to yield the desired benefits, among others, are lack of clearly stated business objectives, investing in marginalised activities whose value is not known or is uncertain and over-engineering - the tendency of technical staff to use state-of the-art technologies irrespective of their contribution to the objectives of the organisation. Hence, as Beerel et al (1993) observed, "investments in IT have proved to be a bitter experience for some" (p. 198). For this reason, organisations need to evaluate and prioritise their IT investment options before they decide to commit their resources to long-term investments projects.

The other reason why IT investments should be evaluated probably emanates from the nature of IT itself. IT, unlike other types of capital assets, is a highly versatile tool that we can put to an infinite number of uses. For example, a company may use its IT resources to create new products or services, improve its competitive position, open new distribution channel, strengthen the firm's relationships with its customers, improve the quality of its services, or achieve greater organisational flexibility, to mention some of the ends it desires to achieve.

To be able to exploit all the benefits of IT, however, requires the availability of unlimited resources - obviously an impossible condition. Consequently, organisations are compelled to

make a choice from among a series of investment alternatives and accordingly allocate their scarce resources in ways that they believe will promote their organisational objectives. In other words, "... management's ...blind faith... to IT investments and ... their [pursuit] of a strategy of the more you buy, the better it will be" (Dance, p. 4) approach doesn't simply work, nor brings any tangible benefit to the organisation.

Organisations, thus, must evaluate their IT investment projects "not by their technical elegance, or excellence" (Parker et al, 1988, p. 37) but by their value to the organisation or from the organisation's critical success factor perspective. It is only in this way that real economic benefits from IT investment projects would be guaranteed.

IT is not a sector-specific device. Instead, it is a highly versatile tool that could be put into a number of applications. However, organisations in certain sectors, for instance financial institutions, are more prone to IT uses than organisations in other sectors. Financial institutions, particularly banks and insurance companies, rely more heavily on IT than other types of organisations such as retailing and manufacturing businesses. This is so because, these institutions are mainly characterised by information processing activities. This fact is probably well emphasised by Cowan (1985) who stated that "banking, perhaps more than any other industry, relies upon the collection, storage, retrieval, assimilation and transmission of information" (p. 102). For example, banks use IT not only to handle information but also to deliver their services through the use of credit cards, Automatic Teller Machines, electronic fund transfer, home banking and electronic cash management systems.

For this reason, IT is generally regarded as a 'CORE TECHNOLOGY' by most financial institutions. As a former vice president of the First Wisconsin Bank once commented (quoted by

Miller, 1989), “Technology was needed because market demand was building so fast. Therefore, it was either support the market or get out of it” .

In addition, these institutions are exposed to a variety of risks, such as credit risk, financial risk, interest rate risk, liquidity risk, market risk, purchasing power risk, currency risk and business risks.

Hence, financial institutions should take due care and conduct proper evaluation before they commit their scarce resources to information technology projects. Furthermore, these institutions, because they deal with money - savings, borrowing, lending, and investing - play a vital role in the economy of a nation.

I decided to direct my research to the financial sector because of the greater importance and role of IT in financial institutions

The research, therefore, assesses the practice and the problems associated with IT investment appraisal in the financial sector in Ethiopia.

1.2 STATEMENT OF THE PROBLEM

As explained above, information technology has become a strategic resource by which the success, growth and/or survival of an organisation and even those of a government are determined. In this information age and increased global competition, those who use information technology more effectively and efficiently will undoubtedly win the game and ensure their survival. In this regard, a number of organisations in Ethiopia seem to have realised the potentials of Information Technology. The researcher’s preliminary investigation

indicates that more and more organisations are currently investing substantial sums of money in IT-related projects. For instance, the Networking Project of the Commercial Bank of Ethiopia, Construction and Business Bank's Branch Financial Systems' Software Development Project, The Systems' Upgrading Project of the National Bank of Ethiopia, Dashen Bank's Networking and ATM Project, the Ethiopian Trade Point Project under the Ministry of Industry are a few instances of such projects. Besides, many organisations are also expected to make major IT expenditures in order to tackle the year 2000 computing bug often known as the millennium bug.

An investigation of the import reports of the Ethiopian Customs Authority (1995 and 1996) also indicates total information technology imports of Birr 78,512,030.00 and Birr 112,207,623.00 for the years 1994 and 1995 respectively. This shows a 43% increase in IT imports in 1995 from that of the preceding year.

The above figures show that a significant amount of IT investment is being made by both public and private sector organisations.

Although the increase in IT spending is encouraging, as the researcher's preliminary assessment indicates, almost all the organisations under review do not seem to evaluate the Economic Feasibility, the Technical Viability, and the Strategic and Business Performance aspects of their IT Projects in a formal, standardised, and well-documented manner. This may result in the allocation of scarce resources to less profitable projects. Besides, the lack of formal, standard and well-documented appraisal procedure may make future systems maintenance /upgrading or replacement tasks extremely difficult and costly.

Furthermore, a review of some of the theses on information systems developments by SISA's

former graduating students (Abera, 1995; Kabove, 1995; Zemedehrhan, 1994; Somba, 1993; Temtim, 1993; Bantie, 1998) indicates that cost-benefit analysis were not conducted by most researchers in order to justify the information systems which they proposed, nor were such failures mentioned under the limitations section of their theses.

In other words, the significance of a formal, well-documented and standardised project appraisal techniques seem to have been ignored both by practitioners and by the academic community. This shows how serious and widespread the problem is. But why do organisations fail to evaluate their IT projects in a formal, well-documented and standardised manner? What is the current state of IT investment appraisal practice in the financial sector? What major problems do financial institutions encounter in evaluating their IT Projects?

1.3 JUSTIFICATION OF THE STUDY

Information technology is generally regarded as a key economic resource which could be used to reduce costs, launch new products /or services , limit the actions of competitors and attain the overall objectives of the organisation. It affects our daily life and the way we do business. For example, information technology changes the nature of products, markets , management styles, and organisational structures. However, as has been stated under the problem statement section of this research, the increase in IT spending by many organisations in Ethiopia, though encouraging , appears not to have been supported by formal, systematic and well-documented project appraisal practices. The idea of project appraisal also seems to have received less attention by the academic community. This trend may result in significant wastage of resources and may ultimately deter the growth of not only the individual firm but also that of the national economy as a whole.

A study conducted by a Task Force established under the auspices of the Prime Minister Office (1994) also indicates a widespread under-utilisation of information technology resources by most governmental organisations. According to this study, the under-utilisation of IT resources was attributed to the lack of skilled manpower, maintenance problem and unavailability of spare parts. In order to ensure proper acquisition and utilisation of IT resources, the Prime Minister Office issued a guideline, which specifies a set of criteria by which IT acquisitions should be evaluated. Governmental organisations, therefore, were required to evaluate, justify and notify the National Computer Centre of the Ethiopian Science and Technology Commission (ESTC) within ten days from the date the decision to procure IT was made. However, an interview made with Ato Eshetu Alemu, the Deputy Director of the Information Systems Division of ESTC, indicated that although the efforts made were useful, the task force has not been functioning for the last two years for reasons not known to the commission. As a result, it has not been possible to implement the guidelines and ensure the proper acquisition and utilisation of IT resources.

This research, therefore, explores the current practices, identifies the problems associated with IT investment appraisals, and recommends possible solutions. It also tries to show both to practitioners and to the academia how pervasive and serious the problem is.

Furthermore, organisations are expected to re-assess the status of their IT use and make major expenditures in order to solve the imminent year 2000 computing problems. In this regard, the findings and recommendations of this research will help organisations evaluate their IT expenditures in a formal, standardised and well-documented manner, and to invest their resources in ways that transcend the solutions of year 2000 computing problems.

The use of formal, well-documented and standard appraisal techniques also provides basic information about the existing system. It could serve as a starting point for future system maintenance and/or upgrading projects. The researcher's preliminary investigation, however, indicates the prevalence of informal appraisal practices and insufficient documentation. Such informal practices could make future system maintenance and upgrading more difficult, time consuming and expensive. The research, therefore, tries to suggest possible ways by which formal, standardised and well-documented appraisal procedures could be implemented. It also tries to bring the issue /problem into light. It demonstrates how worthwhile and helpful the application of such standardised techniques are in evaluating IT investment projects.

The research also tries to provide recommendation with a view to improve the evaluation practices in the financial sector.

1.4 OBJECTIVES OF THE STUDY

1.4.1 General Objectives

The general objectives of this research are to examine the applicability of the various information technology appraisal models; to assess the current practice of evaluating information technology investments, and to identify the problems associated with it and to recommend possible solutions.

1.4.2 Specific Objectives

The specific objectives of the study are:

- To assess the degree of alignment between IT investment projects and organisational objectives in the financial sector.

- To identify how IT investment projects are generally initiated.
- To identify how and when the evaluations are conducted
- To identify the tools and techniques that are used by various organisations in evaluating IT projects.
- To identify the stakeholders who are mostly involved in evaluating IT projects.
- To identify the problems associated with information technology evaluation.
- To identify / highlight the problems that might arise in applying the various IT investment appraisal techniques.
- To find out why organisations are not evaluating their IT investment projects.
- To recommend IT investment appraisal models that are specifically applicable to the situations in the financial sector.
- To test and demonstrate how the recommended information technology investment appraisal techniques (both traditional and the recently proposed) could be used in appraising the financial feasibility, technical viability and the impact on business performance and customer-satisfaction of IT projects.
- To recommend possible solutions to the problems of evaluating information technology projects in the sector.

1.5 SCOPE AND LIMITATIONS OF THE STUDY

As has already been stated, the study covers the financial sector. The sector consists of organisations that provide financial services to the public. It includes banks, insurance companies, real estate agencies, investment and finance companies, thrift organisations, credit unions, and many others. These organisations generally deal with money and the movement of funds among investors, consumers, governments, business and non-business organisations, and among themselves. They provide such financial services as acceptance of deposits, lending,

facilitating payments and real estate developments, to mention only a few.

However, owing to the sectors low level of development, the number of such organisations in Ethiopia is very small. Besides, the size of some financial institutions, for instance credit associations, doesn't warrant major IT expenditures.

The research, therefore, covers only those institutions (public and private) that are relatively large enough to make major IT investments. In other words, the study is limited to banking, insurance and real estate organisations.

In principle, IT investments must be evaluated several times during the life of the project. For instance, an IT project may be evaluated at its pre-feasibility stage, feasibility stage, design stage, at the stage immediately after implementation and periodically over the life of the project. The prototype evaluation, however, is limited to the feasibility stage of an IT project. The project under consideration is the development of a 'decentralised branch financial systems software' for Construction and Business Bank.

1.6 RESEARCH HYPOTHESES

- a) Institutions in the financial sector do not have clearly stated guidelines (policies) with respect to IT evaluation. Consequently IT projects are evaluated using informal and highly subjective methods.
- b) There is a high degree of shortage of skilled and experienced manpower in the area of IT evaluation in the financial sector. This has also contributed to the sector's poor IT evaluation practice.

The researcher has found this method extremely useful, because it enabled him to freely interact with respondents and get a more realistic view of the sector's IT evaluation practice.

1.7.3 Literature Review

Relevant materials were also reviewed in order to highlight current developments in the area of IT evaluation. Therefore, both conventional and recent thinking and arguments were 'sufficiently' considered in order to come up with practical recommendations.

1.7.4 Information Technology Appraisal Methods

1.7.4.1 The traditional capital budgeting techniques

The traditional capital budgeting techniques were designed to evaluate the economic feasibility of long-term investment projects. By economic feasibility we refer to the monetary returns that a long-term investment is expected to yield over the life of the project. These methods have been traditionally used by finance managers and accountants to evaluate the viability of both IT and non-IT projects. Included in this category are: the Payback Period, Net Present Value (NPV), Internal Rate of Return (IRR,) and Return On Investment (ROI).

The payback method determines the time that a project takes in order to recoup the initial project cost while the net present value (NPV) measures the extra wealth that a firm is expected to gain by undertaking the project. The Internal Rate of Return (IRR) is a method that equates the present value of benefits with the present value of the costs of the project (These methods are sufficiently discussed in Chapter Three).

The researcher ,therefore, used these methods in order to show their applicability in evaluating IT projects.

1.7.4.2 The Modified Information Economics Techniques

The traditional cost-benefit analysis tools are widely criticised for their inadequacy in evaluating IT projects. The argument against these methods seems to emanate largely from the unique nature of project management. In project management, no two projects are alike. Every thing is unique and represents a one-time experience. According to Lock (1996), "the principal identifying characteristics of a project is its novelty. It is a step into the unknown, fraught with risk and uncertainty" (p. 4). This makes the task of project evaluation, which is one aspect of project management, generally difficult and imprecise. The problem of project evaluation becomes even worse when we come to the evaluation of information technology. Because, information technology, unlike other types of assets, is characterised by a number of intangible benefits and costs. These benefits and costs are non-financial in nature and, therefore, can not be assessed using the traditional financial techniques. As a result, several methods have been proposed in order to achieve proper evaluation of IT projects. One among these methods is Information Economics (please refer to Chapter Three for more discussion on Information Economics).

The researcher, therefore, used the techniques of Information Economics in order to assess the 'true value' of the prototype project. This method is modified in order to adapt it to the existing situations and to incorporate the policy of the bank.

Thus, the researcher employed the foregoing traditional capital budgeting methods and a modified information economics technique in order to test and show how the recommended methods could lead to a better decision.

1.8 APPLICATION OF RESULTS

Managers of public and private sector organisations are expected to apply the research findings in their investment appraisal and decision activities. The findings could serve as an input for enhancing the training and research programmes of academic and research institutions. Information professionals and consultants are also expected to use the results of the study in assisting their client organisations in their effort to evaluate IT investment projects.

Therefore, the expected beneficiaries of the research findings are managers of both public and private sector organisations, academic institutions, research centres, and information professionals.

Chapter Two

THE FINANCIAL SECTOR

2.1 Definition and function

As the title of this material denotes, the research focuses on the financial sector of the Ethiopian Economy. Organisations in this sector are commonly known as Financial Institutions. Financial institutions, according to the Encyclopaedia of Banking and Finance, refer to those “business organisations that offer a broad base of financial services or specialise in specific functions, products, and services. These include commercial banks, thrift organisations, investment banks, credit unions, pension funds, investment companies, insurance companies, securities brokers and dealers, real estate investment trusts, stock exchanges and others” (1994). These institutions facilitate the movement of funds from those who save to those who invest money. They generally deal with savings, borrowing, lending, and investing activities and consider money as a commodity which could be borrowed, lent, brokered, and accounted for.

According to Edmister (1980), the major functions of financial institutions are:

- Create and operate financial markets which consist of agents, brokers, institutions, and intermediaries transacting purchases and sales of securities
- Provide a convenient payment mechanism, that is enabling businesses, governments, consumers and others to complete transactions without cash, e.g. using checks and credit cards.
- Security trading - they buy, hold and/or sell equity and debt securities.
- Provide advisory services to investors and lenders.

2.2 Types of Financial Institutions

There is a great deal of specialisation in the financial sector. The purpose of such specialisation is to provide specific but efficient financial services to customers. The most common types of financial institutions are banks, insurance, real estate agencies, investment companies, finance companies, and credit unions. The following is a brief description of the most common types of financial institutions.

Banks - are institutions that accept deposits and provide loan, payment, exchange and investment facilities to the general public. The industry includes commercial banks, mortgage banks and development banks. Their major sources of funds are:

- Demand deposits
- Savings deposit
- Time deposit

These funds are then invested in loans and in corporate and government bonds.

Insurance companies - are institutions whose major business is to provide protection against risks. They collect money, known as premium, from the insured and indemnify the insured against losses that arise from fire, accident, storm, explosion and from a number of other catastrophes. There are three major forms of insurance: life, property and liability. Life insurance pays death and other benefits in the event of untimely death or accidents. Property insurance covers fire, ocean and inland marine, theft, fidelity and surety bonds, and many others while liability insurance provides protection against obligations arising from negligence lawsuits.

Finance companies - are organisations that are engaged in factoring accounts receivable, financing inventory and purchase of machinery and equipment. They raise funds by issuing

bonds, commercial papers, and through borrowings from commercial banks.

Real estate companies - raise large amount of money from numerous small investors and invest it in mortgage, construction and financing real estates. More specifically, they buy land for speculative purposes, or to develop it for housing and non-housing projects.

Credit unions - are associations formed by individuals who work for the same organisation, live in the same vicinity or with any other unifying factor. They accept savings and grant loans to their members.

2.3 The Ethiopian context

The nature and number of financial institutions in the developed economies might be astonishing. But not all types of financial institutions exist in Ethiopia. The major types of institutions operating in the sector are banks, insurance, real estates and credit associations. The indigenous 'equb' which provides a blend of 'saving and loan' facility to its members may also be included in this sector.

The majority of these organisations were established in the recent past following the introduction of a free market economy by the government. The number of institutions in this sector is also very limited. As of the study-year, there were only eight banks, nine insurance, eighteen real estate companies, and a large number of credit associations and 'equbs'.

The next chapter provides an overview of the various IT investment appraisal methods.

Chapter Three

IT EVALUATION: A THEORETICAL PERSPECTIVE

3.1 Review of the Literature

Companies spend considerable sums of money on IT and non-IT related projects. The aim of making such investments might be to expand current operations, introduce new products or services, modify/ enhance existing systems or to obtain some other benefits.

These types of investments differ from recurring expenditures such as maintenance and repairs, in that they involve large sums of money, longer period of time, and affect the future direction and progress of the organisation (Brockington, 1993). Consequently, any wrong decision may severely hamper the growth or even endanger the very existence of the organisation. For this reason, long-term investments, which are also known as capital expenditures, need a more rigorous investment appraisal and decision techniques than routine and minor expenditures. The view that long-term investments in information technology or other projects should be evaluated on the basis of a set of rigorous techniques is also shared by IT/IS professionals. For example, Ballantine(1998)and FitzGerald(1998) emphasised the importance of evaluating IT investments by stating a number of reasons. Among the reasons stated are the changing nature of IT, increasing IT expenditures, and the global competition that every firm is compelled to face. Grembergen et al., also attributes the need for IT evaluation to the “increasingly becoming crucial nature of IT to achieve organisational and strategic goals” (p. 1).

Accordingly, accountants and finance managers have been traditionally employing a set of financial techniques in order to justify the viability of IT and non-IT investment projects. The use

of such techniques for evaluating IT investments, however, has recently become a subject of wide controversy particularly among accountants and information science professionals. As a result, two Schools of Thought seem to have emerged with respect to the proper evaluation of IT investments. The first school of thought, mostly supported by accountants and finance managers, believes in the appropriateness and relevance of the traditional financial justification techniques - no matter what the investment type is. Proponents of the second school of thought, mostly from information science discipline, argue that the conventional techniques are inadequate and inappropriate for evaluating information technology projects.

The debate seems to emanate from the way how investment in IT is viewed. For accountants and finance managers, long-term investments - be it for industrial plant, construction or information technology - generally exhibit the same characteristics. For example, this type of investments involve relatively large amount of money, longer period of time, and are made with a view to maximise the wealth of stockholders. This view is probably best stated by Brockington(1993) as "the basic criterion for determining whether or not to undertake investment expenditure is the same as that for any business expenditure. The money will be spent when we believe that the resulting benefit will recover the cost and show an adequate profit. In this sense, the purchase of a £1 million new factory is the same as the purchase of a £1 million item of stock in trade" (p. 102). Toraskar (1993) also asserts that Cost-Benefit Analysis is "quite comprehensive and incorporates many important principles and concepts that are particularly valuable for rational IT investment decision" (p. 140). He attributes most of the criticisms of the financial techniques to 'incomplete understanding' and 'faulty' application of the methods. Toraskar, then, urged "analysts and managers [to] educate themselves in the concepts and principles of this methodology and [to be] aware of its limitations" (p. 140). Consequently, accountants and financial managers believe that all IT and non- IT investments

could be evaluated using the traditional capital budget techniques.

IT/IS professionals, on the other hand, seem to stand firmly against this view and generally consider "IT/IS as inherently different from other types of capital investments and as a result, [they continue to argue], the financial techniques which have been historically used to appraise capital investments are inappropriate for IT/IS investments" (Ballantine et al., 1998). Parker et al. (1988) consider the financial techniques as a 'numbers-game' while Bacon (1994) dismisses them as methods "which tend to screen out those providing better customer service, improved decision support, enhanced communication and which denies the reality of intangible benefits". According to Simms (1997), companies who insist on the traditional financial methods would miss 'the true potential of IT'. Ward (1994) also contends that "it is simply not possible to express all the benefits of 'systems' in quantitative terms and it serves no useful purpose to develop spurious calculations to quantify the unquantifiable" (p. 84).

Consequently, IT / IS professionals tend to grossly dismiss the financial techniques as inadequate and misleading (Simms, 1997; Dixit et al., 1995; Kaplan et al., 1992; King et al., 1997; Bower, 1994; Bacon, 1994; Ward, 1994; Hochstrasser, 1994; Coleman et al., 1994; Fitzgerald, 1998; Parker et al., 1988). They, then, proposed a number of methods which they claimed to be better and more appropriate for evaluating IT investments. Some of the methods proposed, among others, were Information Economics (Parker et al., 1988); Options Approach (Dixit et al., 1995); Balanced Scorecard (Kaplan et al., 1992, 1993, 1996); Modular Approach (Hochstrasser, 1994); and Return On Management (Strassman, 1990 quoted by Willcocks). Some of the methods were proposed, for example Return On Management and Options approach, as substitutes while others such as Information Economics were designed to complement and overcome the deficiencies of the traditional financial techniques.

Both schools of thoughts raise a number of reasons in order to justify the methods which they support. Proponents of the traditional techniques, for example, argue that the primary objective of a business firm is to maximise the shareholders' wealth and investment decisions are made in order to achieve this objective. Therefore, any appraisal technique that is used to evaluate an IT investment must be consistent with the objective of maximising the shareholders' wealth - an objective which can only be achieved through the use of the financial techniques. IT professionals, on the other hand, argue that information technology provides various intangible benefits such as improved customer service, increased organisational flexibility, improved competitive position and involve several IT-specific factors and risks that can not be measured using the traditional financial techniques. Even the tangible benefits, for example increased sales, cost reductions etc., arising from IT projects may not accrue directly through IT departments but through the operations of other departments and consequently, it becomes difficult to isolate the contribution of IT from those of the others. Therefore, they continue to argue, we need to look beyond the traditional cost-benefit analysis techniques in order to properly and correctly evaluate IT projects.

Faced with the multiplicity of the proposed techniques, some IT/IS professionals tried to categorise them into a number of ways. For example, King et al., (1997) categorised the methods into three major approaches. According to King et al., the first category refers to the one-best-way approach by which he refers to the proponents of the financial techniques. The second is the contingency approach, while the third approach is the process model. Another attempt to classify the suggested techniques is made by Grembergen. He also classified the whole range of techniques into three categories, namely, the traditional financial techniques, the Information Economics Methods and the Balanced Scorecard.

Because of the multiplicity of classifications, I decided to categorise the methods to be covered in this material in a way that promotes simplicity and understanding. Hence, the methods to be discussed in the following section are grouped into the following categories:

- Traditional Capital budgeting techniques
- Information Economics tools
- Other methods.

3.2 Investment Appraisal Techniques

3.2.1 Traditional Capital Budgeting Techniques

Capital budgeting refers to “ the process of evaluating and selecting long term investments that are consistent with the firm’s goal of owners wealth maximisation”. (Gitman, 1994, p. 104). It involves a set of techniques that has been traditionally employed by accountants and financial managers in measuring the costs and benefits of long-term investments. These techniques may be classified into non-discounted and discounted cash flow methods. The following is a brief description of these two categories of techniques.

3.2.1.1 Non-discounted Cash Flow Techniques

The Payback Method and Return On Investment (ROI) are the two most widely used techniques that fall under this category. This group of techniques do not consider the time value of money.

Payback Period

Unlike information, money, once committed for a specific purpose will no more be available for any other thing. It may even be lost forever. For this reason, investors/managers exercise

The Company requires a minimum return of 10% from similar types of investments and is willing to invest in any project that repays its initial cost in three years time or less.

Applying the payback method:

<u>Year</u>	<u>Amount recovered to date ('000)</u>
1	900
2	2300
3	3800
4	5000

As the above calculation indicates, the company recovers its initial project cost in four years time. This indicates a payback period of four years. According to this method, a project is accepted if its payback period is less than the maximum allowable period set by the firm's management. The project, however, has a payback period which exceeds the maximum allowable period, i.e., three years, set by management. The decision, therefore, is to reject the project.

The payback period, though it fails to consider the benefits that accrue after the maximum allowable time, may serve as a safety valve against the risks and uncertainties caused by global competition and rapid technological changes.

Return On Investment (ROI)

Return On Investment (ROI), also known as the average rate of return or the accounting rate of return is the other non-discounted cash flow technique for evaluating long-term investment projects. ROI is a measure of profitability. It is the ratio of annual profit to the average

investment of a project. Under this method, the initial investment is subtracted from the total cash inflows in order to determine the lifetime profit of the project. The lifetime profit is then annualised and divided by the average investment to determine the Return On Investment (ROI) - the rate of return that a project is expected to yield.

$$\text{Return On Investment} = \frac{\text{Average Annual Profit}}{\text{Average Investment}} \times 100$$

Fig.2: ROI Formula

According to this method, a project would be accepted if its Return On Investment is equal to or greater than the Company's required rate of return.

Using the above example:

$$\begin{aligned} \text{Average Annual Profit} &= \frac{6800 - 5000}{5 \text{ years}} \\ &= 360.00 \end{aligned}$$

$$\begin{aligned} \text{Average Investment} &= \frac{5000}{2} \\ &= 2500 \end{aligned}$$

$$\begin{aligned} \text{Return On Investment (ROI)} &= \frac{360}{2500} \times 100 \\ &= 14.4\% \end{aligned}$$

As the above example indicates, the project is expected to yield a return of 14.4% per annum. This is greater than the minimum rate of return (10%) that is required by management from similar types of investments. Therefore, the decision under this would be to accept the project.

3.2.1.2 Discounted Cash Flow Techniques

In finance, it is a common belief and practice that money currently at hand is worth more than money after a specified period in the future. Because the money which is available at present could be deposited in a bank in order to get interest. This extra benefit - interest - generated from an act of depositing makes present money more valuable than the money in the future.

Discounted cash flow techniques, therefore, are designed to take the time value of money into account when evaluating investment projects. There are two major discounted cash flow techniques - Net Present value (NPV) and Internal Rate of Return (IRR).

Net Present Value (NPV)

Net present value refers to the excess of the present value of benefits over the present value of the costs of a project. To calculate NPV, all cash inflows and cash outflows over the life of the project are discounted in order to determine their present value. The present value of cash outflows is then subtracted from the present value of cash inflows in order to determine net present value. To put it in algebraic form

$$\text{Net Present Value} = \sum_{t=1}^n \frac{C_t}{(1+r)^t} - I$$

Fig.3: NPV Formula

Where t = Time (in years)

C_t = Net cash flow in year t

r = Required rate of return

n = Project life (in years)

II = Initial Investment

The value so obtained may be a negative or a positive figure. If the present value of the costs of the project is greater than the present value of the benefits, the NPV will be a negative value. Under this situation, the project would be considered unprofitable and the decision will be to reject it. If, on the other hand, the calculated NPV is positive, the project would be considered profitable and the decision rule is to accept it. If there are two or more competing projects, the one with higher or highest NPV will be accepted. Because, acceptance of such projects, it is believed, would maximise, in finance terms, 'the wealth of shareholders'. When NPV is zero, the project is expected to yield a return which is only equal to the company's cost of capital, in which case the investor is said to be in a state of indifference.

To evaluate the above project:

<u>Year</u>	<u>Net cash flows ('000)</u>	<u>PV of Birr 1@10%</u>	<u>PV of cashflows ('000)</u>
0 (now)	(5000)	1.000	(5000)
1	900	0.909	818.1
2	1400	0.826	1156.4
3	1500	0.751	1126.5
4	1200	0.683	819.6
5	1800	0.621	<u>1117.8</u>
		Net Present Value	<u>+38.4</u>

The above example shows a positive Net Present Value of Birr 38,400.00. This means that the project will not only repay its initial cost but also yield an additional return of Birr 38,400.00. The decision, therefore, will be to accept the project.

Internal Rate of Return (IRR)

Sometimes, management may wish to know the rate of return that a project is expected to yield. Therefore, instead of calculating the Net Present Value, a financial manager may decide to determine what is known as the Internal Rate of Return (IRR). IRR refers to “the discount rate that equates the present value of cash inflows with the initial investment of the project” (Gitman, 1994, p. 346). In other words, this method seeks to determine the discount rate that yields a zero NPV. Hence, IRR is the rate, r , which satisfies the following relationship.

$$0 = \sum_{t=1}^n \frac{C_t}{(1+r)^t} - II$$

Fig. 4: IRR formula

Where t = Time (in years)

C_t = Net cash flows in year t

r = Required rate of return

n = Project life (in years)

II = Initial Investment

As noted above, IRR is the rate which discounts a project's cash flows to an NPV of zero. However, a reference to the NPV method, above, shows a positive Net Present Value of Birr 38,400.00 at a discount rate of 10%. Therefore, we must try a slightly higher discount rate, say 11%, in order to find the IRR of the above project.

converting decision making into a numbers game and shields management from having to understand the projects themselves” (p.63). Parker et al. believe that the use of the traditional methods would “drive [the] resource allocation process badly" (P. 15). Consequently, they developed a set of techniques called Information Economics in order to, which they claimed, “make the wisest assignment of scarce corporate resources. ... The goal of Information Economics, [they assert], is to be better able to develop rational investment priorities for decision making among all of the investment alternatives. Thus, an enterprise is successfully able to make the business perform better, make the business compete more effectively, differentiate the business or add market share that effectively supports the business strategy with IT “(p. 235).

Accordingly, they expanded the concept of benefit into a broader concept - ‘value’ - which includes not only the benefits that were traditionally considered such as cost-reduction, and revenue generation, but also the effect that IT investment has on overall business performance. The concept of cost is also expanded to include “the many ways which IT investments can negatively affect the organisation” (p. 3). In other words, they defined “value based on improved business performance, and cost based on total organisational cost, which taken together define the true economic impact of information technology” (p. 3). To this end, they identified the following six classes of values and four classes of costs /risks:

value categories

- Enhanced ROI
- Strategic Match
- Competitive Advantage
- Management Information Support

- Competitive Response
- Strategic IS Architecture.

Cost (risk) categories

- Project or Organisational Risk
- Definitional Uncertainty
- Technical Uncertainty
- IS Infrastructure Risk

These classes of values and costs are then grouped into three major categories of factors, namely:

- Economic impact quantification factors
- Business performance Assessment factors
- Technical viability Assessment factors.

The Economic impact quantification category, which consists of the Enhanced ROI, is a financial justification technique. It uses five types of values in order to calculate Enhanced ROI and assess the financial feasibility of IT projects. These are:

- Simple Return On Investment (ROI) or any traditional cost-benefit analysis tool.
- Value Linking
- Value Acceleration
- Value Restructuring
- Innovation Valuation.

Return on investment (ROI) is one of the traditional, non-discounted cash flow techniques. It is determined by dividing the average annual profit by the average investment of the project. Value linking is also a financial measure which “represents the ripple effect of a change (improvement) in a function or process”. (P. 111). It is used to assess the money benefits that the proposed system brings to other departments.

Sometimes the new system may shorten the processing time of a specific task or expedite the attainment of a revenue. Value Acceleration, therefore, is designed to measure those values that accrue from an earlier realisation of benefits. Value Restructuring, on the other hand, is associated with productivity improvements. Such productivity improvements may be caused by a restructuring of a job or a function, as for example, when a specific job is moved from a lower-value function to a higher-value function. Innovation valuation addresses the values associated with innovative applications of information technology. In other words, it assesses the benefits, costs and risks associated with creative and new uses of information technology.

The last four types of values, namely - value linking, value acceleration; value restructuring and innovation valuation, are quantified and then added, for example to Return On Investment, in order to enhance the traditional capital budgeting techniques. Therefore:

$\text{Enhanced ROI} = \text{traditional ROI} + \text{value linking} + \text{value acceleration} + \text{value restructuring} + \text{innovation valuation}$
--

Fig. 5: Enhanced ROI formula

Business Performance and Technical Viability factors also include a number of values and risks.

Business Performance Assessment Factors

- **Strategic Match:** This method presupposes the existence of a clearly stated and well understood business strategy. It assesses the degree to which the proposed system supports the strategic aim of the organisation.
- **Competitive Advantage:** An enterprise may follow a cost - leadership or a product differentiation strategy in order to effectively compete with other organisations. Thus, competitive advantage is used to assess the degree to which the system enhances the way a company competes by, for example, supporting its cost leadership or product differentiation strategy.
- **Management Information Support:** This is used to assess the degree to which the new system provides better management information and support on the core activities of the enterprise.
- **Competitive Response:** This is a negative measure. It assesses the degree to which failure to implement the new system will cause competitive damage to the enterprise. A competitive damage may occur if , for example, the opportunity is overtaken by a competitor should the firm decide to postpone the project.
- **Project or Organisational Risk:** This is also a negative measure which addresses the degree to which the organisation, particularly the business side, has prepared itself to carry out the changes required by the project.

Technical Viability Assessment Factors

- **Strategic IS Architecture:** This method is used to evaluate the degree to which the proposed project is aligned with the overall information strategies of the enterprise. In other words, it assesses whether the proposed system is related to the information system plan of the organisation.

- **Definitional Uncertainty** - assesses the degree to which the users' requirements or specifications are known. It also assesses the complexity of the new system and the probability of non-routine changes.
- **Technical Uncertainty** - considers the readiness of the technical domain to undertake the project. Under this method, factors like the skill and familiarity of the technical staff and the degree of hardware and software dependencies will be evaluated in order to see the ability of the technology domain to deliver the product on time and in a use-able way. Under this method, for instance, the higher the requirement for new skills the more negative will be the resulting evaluation.
- **IS Infrastructural Risk:** A project may require extra investments in the form of hardware, software, and staff before it can be implemented. IS Infrastructure risk, therefore, assesses the degree of non-project investments necessary to accommodate the project. Under this method, the higher the requirement for non-project investment, the greater would be the risk evaluation.

Business Performance and Technical Viability factors are non-quantifiable benefits and costs and, therefore, are assessed on the basis of weighting and scoring methods. The weights to be assigned to each factor and the scores to be given to individual IT projects are determined through management discussion, judgement and even negotiations. According to this technique, each IT project will be assigned a score on the basis of its non-quantifiable benefits and costs (risks). The scores are then weighted and used to determine the total project value, as follows:

$ \begin{array}{ccccccc} \text{Project Value} & = & \text{enhanced} & + & \text{weighted} & + & \text{weighted} \\ & & \text{ROI} & & \text{business} & & \text{technology} \\ & & & & \text{domain scores} & & \text{domain scores} \end{array} $
--

Fig.6: Project Value Formula

Finally, the weighted project scores will be used to prioritise and prepare a ranked list of IT projects which in turn serves as a basis for making investment decisions.

3.2.3 Other Methods

3.2.3.1 The Options approach

The options approach was initially proposed by Dixit and Pindyik (1995) with a view to provide a 'better framework' for analysing IT investments. They criticised and dismissed the traditional financial techniques particularly the NPV method as 'naive' and invalid for evaluating IT projects. Their argument stems from what they called the faulty assumptions of the NPV method which assumes that either an investment is reversible which means that the investment can be undone and the expenditure recovered should conditions change unfavourably or is irreversible and the investment once made can not be recovered and consequently becomes a sunk cost. Given the irreversibility nature of most projects, a company, can not delay its investment opportunity and therefore has to make a decision to invest now or lose the opportunity forever.

Dixit and Pindyik, however, argued that "an irreversible investment opportunity is like a financial call option - [a right but not obligation to take some action in the future]. The holder of the call option has the right for a specified period, to pay an exercise price and to receive in return an asset - for example, a share - that has some value. Exercising the option is irreversible. ... Similarly, a company with an investment opportunity has the option to spend money now or in the future (the exercise price) in return for an asset of some value (the project)" (p. 110).

Like the financial call option, the capital investment is also irreversible. They tried to elaborate their view by drawing a further analogy between an investment opportunity and a financial option as "with a financial call option, the more volatile the price of the stock on which the

option is written, the more valuable the option and the greater the incentive to wait and keep the option alive rather than exercise it. This is true because ... the higher the stock price rises, the greater the net payoff from exercising the option; however, if the stock price falls, one can lose only what one paid for the option (p. 110).

The same argument, they assert, holds true for capital investment opportunities, and continue to argue in support of their view as “the greater the uncertainty over the potential profitability of the investment, the greater the value of the opportunity and the greater the incentive to wait and to keep the opportunity alive rather than exercise it by investing at once” (p. 110).

The issue of investment decision, therefore, is nothing but to decide when to exercise the option in a way that is optimal to the firm. From these premises, they concluded that the NPV method is incapable of measuring the value of creating an option and the value of delaying an investment decision. Consequently, Dixit and Pindyik suggested , which they claimed, a richer framework known as the Options view of investment - an approach that is capable of addressing the “ issues of irreversibility, uncertainty, and time more directly “ (p. 106)

To substantiate their view they considered a £15 million Research and Development (R&D) project which requires additional investment to build production facilities. They further assumed three equally likely scenarios of production costs and two equally likely scenarios of revenues as follows:

Production cost scenarios: £40 million (low), £ 80 million (middle) and
£120 million (high)

Revenue Scenarios: £50 million (low), and £130 million (high).

Using the NPV method, they calculated an expected operating profit of £10 million. Therefore, the NPV method, they asserted, doesn't justify the £15 million R&D expenditure and concluded that "the conventional thinking would kill the project at the outset" (p. 111). Therefore, according to Dixit et al., management has to wait or delay its decision until better information is obtained. If, for example, doing some R&D work shows that production costs will be £120 million, they continue to argue, it would be still necessary to wait until the revenue uncertainty is resolved. If revenue turns out to be £50 million management will decide not to proceed with production. Management will decide to proceed when revenue is £130 million, thereby earning an operating profit of £5 million. This is true, they asserted, because an option is exercised when doing so is advantageous or let it lapse when exercising it becomes unprofitable. If costs are £80 million, it is still best to wait and the expected operating profit will be £25 million. If the cost is £40 million, the operating profit is positive in both cases, yielding an expected operating profit of £50 million and it will be best to proceed with production at once.

Therefore, they concluded, "the proper calculation of NPV that results from the £15 million R&D investment is $(1/3 * 5 \text{ million}) + (1/3 * 25 \text{ million}) + (1/3 * 50 \text{ million}) = £ 26.7 \text{ million}$ " (p. 112). This significantly exceeds and justifies the £ 15 million R&D project.

The options view of investment assumes certainty with respect to the amount of revenue of the proposed system. This is made possible, according to Dixit et al., by waiting until the revenue uncertainty is resolved. However, knowledge of revenue of a new project with certainty seems an oversimplification of reality. Besides, during the waiting period, an investment opportunity may be totally overtaken by a competitor, and put the firm at a disadvantage. Therefore, the options theory of investment, as it is proposed by Dixit et al., has less practical significance with respect to evaluating IT investment projects.

Another version of the options theory is proposed by Kumar (1997) in order to evaluate the value of one type of flexibility called IT-enabled responsiveness. Responsiveness, which is a relatively intangible but important benefit of IT investments, refers to the “ ability to vary the maximum rate at which resources can be committed to a set of tasks in order to respond to change” (Kumar, 1997, p. 4). This approach, he claims, “has the potential for considering and possibly quantifying factors that are often not adequately addressed by traditional financial techniques” (p. 2).

He ,therefore, proposed the following model to determine the value of an investment option:

$$V (B^*, C^*, K, R, S, \gamma)$$

where: B^* = Present value of benefits from project B

C^* = Present value of additional investment required to complete the project

K = Maximum rate of investment, e.g. per year

R = Opportunity cost of waiting to invest

S = Standard deviation of the percentage change in B^* , e.g., per year

γ = Risk - free rate of return

He further suggested the use of differentiation and comparative statistics in order to calculate the value of IT- enabled responsiveness.

Kumar’s option valuation model tries to incorporate several parameters such as the type of option, cost of exercising the option, nature and uncertainty of the costs and benefits, time available to exercise the option, etc. into the decision process. His model also assumes

sequential investment opportunities, projects that need time to complete and management's option to alter the course of the project should situations adversely change.

However, in view of the complexity of the model, difficulty in estimating the value of each parameter and the scarcity of skilled manpower in the area of IT evaluations, Kumar's real option model may not provide a practical solution to the problems of evaluating information technology projects.

3.2.3.2 Balanced Scorecard (BSC)

Kaplan and Norton(1992,1993, 1996) developed a method known as Balanced Scorecard(BSC) in order to help managers focus on the critical success factors of the organisation. The scorecard is mainly a strategic management system that "Provides executives with a comprehensive framework that translates a company's objectives into a coherent set of performance measures" (Kaplan and Norton, 1993, P. 134). The idea of BSC stems from the premise that the traditional financial measures of performance are short-term in nature and as a result bear little relation to the company's long term strategic objectives. It is designed to supplement the "traditional financial measures with criteria that measure performance from three additional perspectives - those of customers, internal business processes and learning and growth" (Kaplan and Norton, 1996, P. 75). In other words, the method tries to evaluate the progress of an enterprise from four perspectives:

- Customers Perspective
- Internal Business Perspective
- Financial Perspective
- Innovation and Learning Perspective.

It also employs a three-layered structure in order to evaluate the company's performance from each of the above perspectives. In the first stage, Management has to formulate the company's mission statement with respect to each of the above perspectives. The second stage deals with the development of a strategy necessary for implementing the mission statement, while the third stage translates the strategy into specific performance measure. For instance, the firm's mission statement from the customers' perspective might be 'to become customers' most preferred supplier. To implement this mission, the firm may develop a number of strategies such as to 'provide services that surpass customers' needs and achieve a high level of customers satisfaction.

These strategies are then translated into specific performance measures. In other words, in order to achieve the mission statement and strategies management has to identify what customers are generally concerned with - e.g. time, quality, cost - and set goals for these factors. The goal for time might be set as 'to improve the time required to meet customers need.' Finally, the stated goals are translated into measures, that match customers' needs such as a delivery time of five days.

Balanced Scorecard is essentially a performance measurement system, but it can also be used to evaluate IT projects (Grembergen et al.). It has some degree of semblance with Information Economics, in the sense that it attempts to evaluate IT projects from various perspectives. One of the scorecard's dimension, the customers perspective, could be used together with Information Economics tools in order to achieve a proper evaluation of IT investments.

3.2.3.3 Modular approach to IT evaluation

Hochstrasser (1994) stressed that " IT investments can only be justified when solid [evaluation]

procedures are in place” (p. 152) and ascribed the failure of many IT projects to the absence of such procedures. He also argues that the traditional financial measures are inadequate to evaluate the intangible benefits of today’s IT projects. Consequently, he proposed a modular framework for evaluating and prioritising non-infrastructure IT investments. The framework is designed to complement the accountancy framework and to standardise the procedures for evaluating IT investments. It consists of four modules that must be applied on a sequential basis.

According to Hochstrasser’s framework, module one addresses corporate standards that must be adhered to when proposing a new IT initiative. It involves identification of critical investment factors that determine the success of IT projects. Once module one is completed, the next stage will be to create awareness among the steering committee members of the true (direct and indirect) costs of IT projects. Thus module two is designed to raise the awareness of the wider effects of IT projects. The next step in the process, module three, specifies how IT projects should be evaluated. The aim of this module is to identify appropriate business criteria by which the benefits from each IT Project could be evaluated and to standardise the evaluation procedures across the whole organisation. To this end, Hochstrasser classified IT initiatives into nine project groups, namely: Internal projects, External projects, Cost replacement projects, Economy of scale projects, Economy of scope projects, Customer support projects, Quality support projects, Information sharing and Manipulating projects, and New technology projects. He then recommended evaluation criteria that he considered appropriate to each project category. Last is module four. Under module four, project priority value (PPV) - the actual business value - is calculated for each IT investment. The purpose of calculating PPV is to prioritise IT projects that are competing for the company’s limited resources. To this end, the firm assigns weights to each investment factor and evaluates each IT investment in terms of its primary objectives, second-order effects, alignment with company strategy and risks. Briefly stated, module four

brings all the factors together into a comprehensive whole in order to calculate project priority value.

3.2.3.3 Return On Management (ROM)

Return On Management (ROM) is "a measure of performance based on the added value to an organisation provided by management" (Willcocks, 1994 , p. 70). It is designed to provide a framework for evaluating IT projects. Under this method, ROM is calculated before and after IT is applied to an organisation in order to isolate the contribution of IT to the business. The process involves the following four steps:

- i. Determine the total value added (in financial terms).
- ii. Separate the contribution of capital from that of labour
- iii. Subtract operating costs from labour value added to obtain management value added
- iv. Calculate Return On Management as:

$$ROM = \frac{\text{Management Value Added}}{\text{Cost of Management}}$$

Fig. 7: ROM Formula

According to this method, information costs are assumed to be the costs of managing the enterprise. Therefore, Return On Management is calculated before and after IT is applied to an organisation in order to isolate the contribution of IT to the business.

However, the determination and isolation of the total value added by management is not only difficult but also involves a high degree of subjectivity. Therefore, this method may not provide

a practical solution to the problems of evaluating IT investment in the financial sector.

3.3 Empirical Studies

Empirical studies in the past sought to explore the practice and problems of IT evaluation. The findings of these studies, however, were not always consistent with each other. Ballantine and Stray (1998), for instance, reported a widespread use of formal evaluation methods while

Ballantine, Galliers and Stray

(1996) found that the majority of UK organisations use informal evaluation procedures. Both studies identified lack of relevant information as the most serious problem in evaluating IT projects and found 'knowledge and experience of managers as the least evaluation problem. Ho and Pike (1996) , on the other hand, considered 'knowledge and experience of managers' as the major problem in evaluating IT investments. They also qualified the problem 'lack of relevant information' to the 'lack of sufficient external data'.

Chapter Four

SURVEY RESULTS

4.1 Background of the survey

As is already stated under the problem statement section of the study, one of the primary aims of this research is to explore how IT investments are evaluated in the financial sector. For the purpose of this study, “size of organization” was used as a major criterion to define the population under investigation. The study, therefore, covers financial institutions that are relatively large enough to make major IT investments. The size of an organization - small, medium, or large - is usually determined by a reference to the volume of its activity and financial position. However, as revenue and financial position data are unavailable, the researcher was compelled to use ‘legal status’ as an indicator of size. Legal status refers to the legal position that an organization occupies. It is determined by the law and covers such things as the rights, duties, activities and capacities of an organisation. Accordingly, the survey covers only those institutions that were established in accordance with the provisions of the Commercial Code of Ethiopia of 1960 and other relevant proclamations. As table 1 below indicates, thirty-four Banking, Insurance and Real Estate organisations were included in the survey.

Industry	Number of Organisations
Banking	8
Insurance	9
Real Estates	17
Total	34

Table1: Composition of organizations under study

Of the thirty-four financial institutions, 16% are public enterprises while 84% of them are in the private sector.

The potential respondents were IT/IS managers, Finance Officers, Business Development/Marketing Department heads, planners, and other managers who were expected to have some degree of involvement in evaluating IT projects. However, during questionnaire distribution, it was found that in some organizations certain functions such as IT and Finance; Marketing and Planning; and Finance and administration were combined to form a single department. We also found some companies without IT/IS, marketing and planning departments. Some companies were established only a few months ago, while the operation of other firms, particularly Real Estate companies, is reportedly constrained by the existing land policy. As a result, IT and other functions in some organizations are still in their rudimentary stage and staffed with only one or two employees. For these and other reasons (refusal), only sixty-three questionnaires were distributed of which forty-two of them were completed and collected. This represents a response rate of 66% . The position of respondents in their organization is summarized in Table 2, below.

Position of Respondents	Proportion (%)
Chief Information Officer	11
MIS Manager	12
System Administrator	3
IT and Finance Manager	5
Finance /Accounts Manager	20
Finance & Administration head	14
Business Development/Marketing Manager	14
Planning and Research Director	8
General Manager	<u>3</u>
Total	<u>100</u>

Table 2: Position of Respondents(No. of respondents = 42)

As the above table indicates, IT/IS and Finance professionals represent about 75% of the respondents. These groups of respondents are generally more familiar with and in most cases involved in the process of evaluating IT projects than non-IT and non- finance experts. So analysis of the respondents' position indicates that the data were collected mostly from appropriate sources.

4.2 Information Technology Applications

The researcher, in order to get a fair view of the extent of IT applications in the sector, asked respondents to indicate the purposes for which Information Technology is used in their

organisation. As the study (table 4, below) indicates IT is used for Accounting (75%), Secretarial (69%), and information access and processing (39%) applications. Information access and processing, according to the respondents, refers to maintenance of customer database and internet services. Since respondents were allowed to list more than one application, the sum of the percentages exceeds 100%.

IT Applications	Percentage (%)
Accounting	75
Secretarial	69
Information access and processing	39
Improve customer Service	22
System development	3
Improve working condition	3
Promote effective decision making	3

Table 3: IT applications in the financial sector

According to the above findings, IT is mostly used for handling clerical and repetitive operations such as accounting and word processing. This indicates that information technology has not yet reached the stage of a strategic importance in the financial sector. The secondary status given to the strategic uses of IT - information access and processing, improve customer service and promote effective decision making - is also another evidence which substantiates this fact. (please see table 3 for details).

However, as the interviews made during the preliminary and main surveys of this research indicate, many organisations are currently planning to make major IT investments with a view to improve their competitive position and the quality of their customer services. Besides management of various financial institutions have strongly expressed their faith in IT potentials and in the contributions they could make to the attainment of business objectives. As a result, the role of IT is expected to change from handling repetitive and clerical operations to a strategic use in a relatively shorter period of time.

4.3 Evaluation Procedures

The study also sought to explore whether and/or how financial institutions are evaluating their IT projects. Table 4 below, presents the results from forty-two respondents.

Do you evaluate IT ?	%
Yes	75
No	17
Don't Know	8
Total	100

Table 4: Status of IT evaluation in the Sector

As the above table indicates, 75 % of the respondents stated that their organisations do evaluate IT investments, 17% indicated that their organisations do not evaluate IT projects while 8% stated that they do not know whether IT projects are evaluated or not. In response to the question why IT projects were not evaluated, respondents considered shortage of skilled manpower and unfamiliarity with project evaluation techniques as the major reasons that deterred their organisation from evaluating IT projects. One respondent stated that his company was

established only a few months ago and as a result it was not possible to evaluate IT investments.

Those who evaluate were then asked whether their evaluation is done formally or informally. A formal approach signifies the existence of clearly stated procedures, the use of standard evaluation techniques and proper documentation of the evaluation process. Analysis of the survey results, however, shows that only 33% of the respondents use formal evaluation procedures while 67% of them use informal procedures in their organisations

To investigate this fact further, the researcher inquired whether financial institutions have policies for evaluating IT projects. According to the study, only 6% of the respondents indicated the prevalence of an IT evaluation policy in their organisation. The majority of respondents, 85%, on the other hand indicated that their organisation do not have such policies. The rest, 9%, answered 'I don't know' on the ground that they hadn't been involved in IT evaluation.

Respondents were also asked whether their organisations follow clearly stated guidelines for evaluating information technology investments. The aim of this question was to check the consistency of the responses. Surprisingly enough, 85% of the respondents indicated that their organisations do not follow clearly stated guidelines in evaluating investments in information technology.

Furthermore, the 6% finding, above, with respect to the existence of an IT evaluation policy, doesn't support the previous 33% survey result on formal evaluation processes. The researcher's personal interview with six IT and finance managers also proves the prevalence of the practice of informal evaluation procedures. Besides, the 85% finding with respect to the absence of an IT evaluation policy strongly supports the 67% response of informal evaluations.

established only a few months ago and as a result it was not possible to evaluate IT investments.

Those who evaluate were then asked whether their evaluation is done formally or informally. A formal approach signifies the existence of clearly stated procedures, the use of standard evaluation techniques and proper documentation of the evaluation process. Analysis of the survey results, however, shows that only 33% of the respondents use formal evaluation procedures while 67% of them use informal procedures in their organisations

To investigate this fact further, the researcher inquired whether financial institutions have policies for evaluating IT projects. According to the study, only 6% of the respondents indicated the prevalence of an IT evaluation policy in their organisation. The majority of respondents, 85%, on the other hand indicated that their organisation do not have such policies. The rest, 9%, answered I 'don't know' on the ground that they hadn't been involved in IT evaluation.

Respondents were also asked whether their organisations follow clearly stated guidelines for evaluating information technology investments. The aim of this question was to check the consistency of the responses. Surprisingly enough, 85% of the respondents indicated that their organisations do not follow clearly stated guidelines in evaluating investments in information technology.

Furthermore, the 6% finding, above, with respect to the existence of an IT evaluation policy, doesn't support the previous 33% survey result on formal evaluation processes. The researcher's personal interview with six IT and finance managers also proves the prevalence of the practice of informal evaluation procedures. Besides, the 85% finding with respect to the absence of an IT evaluation policy strongly supports the 67% response of informal evaluations.

The foregoing survey results, therefore, are sufficient evidences of the existence of wide spread informal IT evaluation practices. This shows that IT projects are mostly evaluated in unsystematic manner, using nonstandardized methods and with little or no documentation of the entire process.

4.4 Project initiation, evaluation stages and stakeholders' involvement

Project initiation, evaluation stages, and stakeholders' involvement may serve as indicators of good evaluation practice. For this reason, the researcher tried to investigate how IT projects are initiated, at what stages they are evaluated, and to what extent stakeholders are involved in evaluating IT investments. Generally speaking, IT projects may arise from the company's annual project call, information systems plan, or user department requests. In respect of this, respondents were asked to explain how IT projects are initiated in their organisation. The findings of the survey with respect to IT project initiation is given in table 5 below.

Project initiator	Responses (%)
Top Management / Steering Committee	39
Company's Long - term plan	33
IT/IS department	31
User department requests	25
Organisation that work in partnership with the company	3
Non - response	3

Table 5: Project initiation in the financial sector

Table 5 indicates that IT projects are mostly initiated by top management (39%), the company's long-term plan (33%), IT/IS department (31%) and by user department requests (25%). The initiation of IT projects by top management is relatively significant. This may deter lower management and the experts concerned from exercising their professional judgement and consequently may undermine the objectivity of the evaluation process.

The practice of annual project call is advantageous in many respects. First, it compels business managers to think of further improvements, and second, it promotes creativity. However, the researchers interview with three IT managers and analysis of the responses on IT initiation indicate that no organisation makes an annual project call. The study also provides no evidence of the existence of an information systems plan in any of the financial institutions.

The other aspect which the researcher was interested to know was the stages at which IT projects were evaluated. A good evaluation practice again requires multiple-stage evaluation such as at the pre-feasibility, feasibility, design, and post-implementation stages. Therefore respondents were asked to indicate the stages at which IT projects are commonly evaluated in their organisation. Summary of the survey results is presented as follows.

Stage of evaluation	%
Feasibility stage	56
Design stage	4
Periodically (no stage specified)	24
Immediately after the system is in place	8
Post - implementation	8
Total	100

Table 6: stages of IT evaluation in the financial sector

According to the above findings, IT projects are evaluated mostly during their feasibility stages (56%), 24% periodically, and 16% after implementation. Post-implementation evaluation enables an organisation to assess the weaknesses and strengths of the entire process, overcome the deficiencies, and generally serves as an exercise from which much would be learned. However, as table 6 indicates, post-implementation evaluation is relatively insignificant. It accounts for only 16% of the cases.

Stakeholders' involvement is also another important aspect of good evaluation practice. Because, it enables the project to be evaluated from different perspectives, promotes mutual understanding and contributes a lot to the success of a project. By stakeholders, we mean owners, customers, user departments, and others who may have an interest in the proposed system. The researcher, therefore, tried to assess the involvement of stakeholders in the process of IT evaluation. According to the survey results, only 22% of the respondents reported stakeholders' involvement during the feasibility-stage evaluation. That is the majority of respondents, 78%, reported that IT projects are evaluated in their organisation without the involvement of stakeholders. The researchers' interview with three finance managers also supports the forgoing statements. According to the interviewees, IT projects are presented to their departments only for processing of IT acquisition and disbursement transactions. The study, therefore, generally indicates a very low level of stakeholders' involvement.

4.5 Responsibility for IT evaluation

The study also tried to explore the responsibility for evaluating IT investments in the financial sector. According to the results of the survey, information technology projects are evaluated by IT / IS Departments (33%), Management Steering Committee (30%), External Consultants (17%), Departmental Committee (10%), and Finance Departments (10%).

4.6 Factors Considered

IT projects, like any investment opportunity, have been traditionally evaluated on the basis of their financial returns. This practice was, to a certain extent, appropriate because in its earlier years, IT had been widely used to automate clerical and repetitive operations. The direct outcome of such automation was to improve efficiency and to reduce labour and other operating costs. At present, however, IT has become a strategic resource with enormous intangible benefits. Therefore, any IT evaluation that fails to take these intangible factors into account will never yield satisfactory results. Realising the importance of this point, the researcher tried to identify the factors that financial institutions are commonly considering in evaluating their IT projects.

Accordingly, respondents were asked to specify and also to indicate, from a list of tangible and intangible benefits and costs, the factors that were considered by their organisation. Table 7 below depicts the findings of the survey

Factors	Most commonly considered (%)	Commonly considered (%)
Efficiency / labour productivity	49	7
Reduction of operating costs	30	26
Customer service	19	7
Competitiveness	15	19
Improved management information and decision	15	11
Accuracy in clerical operation	11	19
Production of additional revenue	4	19
Skill and experience of technical staff	7	15
Fitness to strategic plan	7	-

Table 7: Factors considered in IT evaluation

The factors shown in table 7 may be broadly classified into strategic and non-strategic categories. The strategic factors include customer service, competitiveness, improved management information and decision, and fitness to strategic plan. The rest may be classified as non-

strategic factors.

The study shows that the most commonly considered factors are efficiency/ labour productivity(49%) , and reduction of operating costs (30%) . Next to these are customer service (19%), competitiveness 15(%) and improved management information and decision (15%). As firms consider as many factors as appropriate, the percentage findings do not sum up to 100%. Analysis of the survey results indicate that strategic factors are given secondary importance (56%) than non-strategic factors (85%). This is consistent with the previous findings on the sector's non-strategic application of IT. It is also consistent with the level of development of IT in the sector and the country at large.

4.6 Methods Employed

A firm may have several investment opportunities. But some of these opportunities may be extremely risky, others totally unprofitable, while the rest may look promising. Projects with greater potential may also differ from each other with respect to the degree of their profitability. Besides the scarcity of resources would not allow firms to accept the entire range of profitable options. For these reasons, companies are compelled to make a choice from among a multitude of investment alternatives that are available to them. In this regard, several, financial and non-financial methods have been developed to help investors make the right decisions. The application of these methods, therefore could be regarded probably as indicators of good evaluation practices. Taking this view into account, the researcher tried to take advantage of every opportunity - questionnaire, interview, and even informal discussions - so as to investigate what appraisal techniques are currently employed in the financial sector. The following table presents a summary of the findings of the questionnaire method.

Methods used	%
Informal meetings and consensus	55
Reliance on past experience	7
Reliance on others' experience	7
Observation	7
Faith in IT contribution	7
Payback period	7
Return on investment	7
Net present value	3
Total	100

Table8: Appraisal methods in the financial sector

The methods shown and the respective findings on the first half of Table 8, informal meeting and consensus (55%), Reliance on past experience (7%), Reliance on others' experience (7%), Observation (7) and Faith in IT contribution (7%) are all non-standardised and informal procedures. As one can easily understand, these procedures are generally subjective in nature.

The standard financial techniques - Payback Period, Net Present Value and Return On Investment - rank second in their use (17%). It should be recalled that the use of these techniques for evaluating IT projects, though they are better than the informal methods, is sharply criticised by IT/IS scholars. For this reason, even the 17% application of the standard financial techniques can not be regarded as indicators of a good evaluation practice. The researcher's interview and informal discussions with seven IT, Business Development and Finance Managers, also confirm the above survey results. These are also consistent with the findings on evaluation policies and guidelines and formal/informal approaches to IT evaluation.

In a nutshell, the study indicates the absence of formal evaluation procedures and guidelines, low stakeholders' involvement, consideration of non-strategic factors and a widespread use of informal evaluation methods. These facts suggest that the evaluation of IT in the financial sector is generally poor, unstandardised and extremely subjective.

4.7 Problems in IT evaluation

The very purpose of conducting this research, without exaggeration, is to identify the problems associated with IT evaluation, for doing so would enable the researcher to come up with a realistic recommendation. Therefore, the researcher used both open and closed-ended questions with a view to identify as many types of problems as possible. The first question asked in this regard was whether organisations have problems in evaluating IT projects. Table 9 below, shows that 61% of the respondents have evaluation problems, 36% indicated 'no problem' and 3% answered "Don't know".

Do you have evaluation Problems in IT projects ?	%
Yes	61
No	36
Don't Know	3
Total	100

Table 9: Extent of IT evaluation in the sector

However, the 36% 'no evaluation problem' response seems a bit unrealistic. Because, the findings on the use of informal methods, and the absence of evaluation policies in the sector strongly suggests the existence of serious problems. Therefore, it is highly unlikely that firms in the financial sector do not face or have no evaluation problems.

In a nutshell, the study indicates the absence of formal evaluation procedures and guidelines, low stakeholders' involvement, consideration of non-strategic factors and a widespread use of informal evaluation methods. These facts suggest that the evaluation of IT in the financial sector is generally poor, unstandardised and extremely subjective.

4.7 Problems in IT evaluation

The very purpose of conducting this research, without exaggeration, is to identify the problems associated with IT evaluation, for doing so would enable the researcher to come up with a realistic recommendation. Therefore, the researcher used both open and closed-ended questions with a view to identify as many types of problems as possible. The first question asked in this regard was whether organisations have problems in evaluating IT projects. Table 9 below, shows that 61% of the respondents have evaluation problems, 36% indicated 'no problem' and 3% answered "Don't know".

Do you have evaluation Problems in IT projects ?	%
Yes	61
No	36
Don't Know	3
Total	100

Table 9: Extent of IT evaluation in the sector

However, the 36% 'no evaluation problem' response seems a bit unrealistic. Because, the findings on the use of informal methods, and the absence of evaluation policies in the sector strongly suggests the existence of serious problems. Therefore, it is highly unlikely that firms in the financial sector do not face or have no evaluation problems.

Those who reported evaluation problems were then asked to indicate the types and the degree of seriousness of their problems. In response to this question, 56% of the respondents considered ‘lack of skilled and experienced manpower’ as the most serious problem, while 15% considered it serious. Lack of adequate information about the proposed system is also considered as the most serious (19%) and serious (19%) problem of IT evaluation. Difficulty to identify and measure IT benefits, costs and risks is also considered serious by 19% of the respondents. (please see the following table for more details).

Types of evaluation Problems	Most serious (%)	Serious (%)	Moderate (%)	Least Serious (%)
Lack of skilled & experienced Manpower	56	15	3	-
Lack of adequate information about the proposed system	19	19	7	-
Difficulty to identify and measure IT benefits, costs and risks	7	19	15	22

Table 10: problems in IT evaluation.

Because respondents are able to specify more than one problem, the percentages do not add up to 100%. Lack of adequate information about the proposed system and difficulty to identify and measure IT benefits, costs and risks may be partly attributed to the nature of Information Technology, and partly to the lack of skilled manpower in the area of IT evaluation.

The foregoing facts, therefore, strongly indicate that lack of skilled and experienced manpower is the primary and most serious problem of the sector.

Chapter Five

A Prototype Evaluation of a 'Decentralised branch financial systems Software development project' for Construction and Business Bank.

5.1 Historical Background

Construction and Business Bank (CBB) is a state-owned enterprise with 20 branches, 670 employees, and annual revenue of Birr 4.5 million. The bank is organised into 10 departments and 18 divisions (please see appendix 8 for the Organisation Chart) and provides various banking services to individuals, and to public and private sector organisations. Its inception dates back to the year 1965 when the then 'Savings and Mortgage Corporation of Ethiopia S. C.' was established predominately as a subsidiary of the Commercial Bank of Ethiopia. Its aims were to encourage saving habits of the Ethiopian people, provide loan for the construction, repairs and improvement of residential houses, commercial and industrial buildings (Belai, 1987). Later in 1975, the Savings and Mortgage Corporation of Ethiopia S. C. merged with 'Imperial Saving and Home Ownership's Public Association', under proclamation No. 60/1975 to form the 'Housing and Savings Bank'.

The main reason for the merger was to "encourage and further accelerate the rate of housing construction for the improvement of the living standards and the conditions of the urbanite Ethiopians" (Belai, 1987, p. 90).

Lastly in 1994, CBB was established under proclamation number 293/1994 by transferring the

right and obligations of the Housing and Savings Bank.

5.2 Objectives of CBB

The objectives of CBB according to article 5 of proclamation no. 203/1994, are to:

- Provide loans for the construction, repairs, modification and acquisition of dwelling houses, and buildings; for construction sector activities; and for the development of hotels and tourism.
- Provide, with a limited ceiling, personal loans, as well as loans extended to meet the working capital requirements of commercial and industrial activities.
- Accept savings, demand and time deposits, and to render current account services.
- Render foreign banking services
- Issue cheques and travellers cheques and generally deal with cheques.
- Administer funds available to it by the government or other institutions.
- Draw, accept, discount, buy and sell bids of exchange, drafts and promissory notes payable, within or outside Ethiopia
- Invest in and participate in equity investment of real estate development
- Engage in such other activities as are customarily carried out by banks,

At present, the Bank provides long term loans for construction of dwelling houses and commercial buildings; medium-term loans for equipment and machinery acquisitions; short-term loans for business operating costs and overdraft facilities, foreign banking, saving and recently current account services. Therefore, in order to make it more competitive and profitable, as the interview with Ato Tariku Woldeyes - the Bank's Business Development manager - indicated, management is currently planning to diversify the range of its services and expand its operation

by gradually transforming the bank into a full commercial banking and establishing banking networks in the rural areas. However, management generally felt that its plan might be severely constrained by the unavailability of timely information and consequently suggested to strengthen the computerisation effort of the bank. It is in view of this management concern that the Information and Computer Systems Department (ICS) of the Bank is trying to develop a 'Decentralised branch financial systems software'.

The aim of this part of the thesis, therefore, is to test and demonstrate how the recommended IT evaluation techniques could be usefully employed in assessing the viability of investments in information technology.

5.3 The Existing System - An overview

5.3.1 Background

The branch accounting system is an integral part of the bank's overall financial information system. It consists of three major components, namely, the loan accounts, the saving accounts and the current accounts subsystems. They were developed in-house using different programming Languages. For instance, the loan and current account subsystems were written using the early versions of BASIC programming while the saving accounts subsystem was written in COBOL. The loan, savings, and current accounts subsystems became operational in 1989, 1987, and 1991 respectively. Since then, they have been updated in response to policy changes and additional users' requirements. The subsystems were developed in a DOS environment and on a single user basis.

5.3.2 Function of the subsystems

The Branch financial system was developed to maintain up to date customer records, capture

by gradually transforming the bank in to a full commercial banking and establishing banking networks in the rural areas. However, management generally felt that its plan might be severely constrained by the unavailability of timely information and consequently suggested to strengthen the computerisation effort of the bank. It is in view of this management concern that the Information and Computer Systems Department (ICS) of the Bank is trying to develop a 'Decentralised branch financial systems software'.

The aim of this part of the thesis, therefore, is to test and demonstrate how the recommended IT evaluation techniques could be usefully employed in assessing the viability of investments in information technology.

5.3 The Existing System - An overview

5.3.1 Background

The branch accounting system is an integral part of the bank's overall financial information system. It consists of three major components, namely, the loan accounts, the saving accounts and the current accounts subsystems. They were developed in-house using different programming Languages. For instance, the loan and current account subsystems were written using the early versions of BASIC programming while the saving accounts subsystem was written in COBOL. The loan, savings, and current accounts subsystems became operational in 1989, 1987, and 1991 respectively. Since then, they have been updated in response to policy changes and additional users' requirements. The subsystems were developed in a DOS environment and on a single user basis.

5.3.2 Function of the subsystems

The Branch financial system was developed to maintain up to date customer records, capture

daily transactions, calculate and apply interest, and to generate various reports to internal and external users. The subsystems generally use two types of input data:

- Master data - data that do not require frequent changes, such as customer names, account numbers and addresses
- Transaction data - data that relate to the day-to-day transactions, such as deposits, loan, repayment and withdrawal

5.3.3 Problems of the Existing system

An interview with branch managers and a review of relevant documents indicate that the reports produced by the existing system do not conform to the reporting formats and requirements of the Head Office. Consequently branches are forced to spend considerable time in order to extract the required data from computer printouts and other sources manually, and prepare various reports and statistical information. The reports and statistical information that are manually prepared and sent to the Head Office are:

- ◆ Arrears Report
- ◆ Income and Expense Analysis
- ◆ General Ledger Position
- ◆ .Daily cash position
- ◆ Cash flow statement
- ◆ .Disbursement report
- ◆ Bank reconciliation
- ◆ Schedule of sundry debtors
- ◆ Extend loan repayment payable to borrowers
- ◆ Refund of mortgage redemption insurance and fire insurance payable
- ◆ Schedule of Miscellaneous payable

- ◆ Schedule of suspense blocked account
- ◆ Schedule of sundry debtors
- ◆ Statement of Head Office account
- ◆ Statement of sales tax collection
- ◆ Lending position

In a nutshell, the researcher, after reviewing the relevant documents, conducting interviews and discussions with Branch Managers, Programmers, and System Operators, identified a number of problems that require immediate solutions. These are:

- The savings, loan and current account subsystems are not compatible with each other and with the Head Office. Because, they are written in different programming languages. Besides, the chart of accounts that was used to write the existing system does not conform with the Banks newly revised chart of accounts.
- There is a rounding difference between General ledger and Subsidiary records. The problem is attributable to, according to the Bank's programmer, the inadequacy of the early versions of BASIC programming language.
- The existing systems are not written based on double entry accounting.
- The reports and statistical information to be provided to the Head Office are extracted and prepared manually from the computer printouts and other documents.
- Interim Income and Expense statements are manually prepared because the system produces only end-of-month cumulative balances.
- Collection Report is not sorted by sector.
- Loan trial is not sorted by loan group.
- Schedule of sundry debtors doesn't show name and date in which the debt was created. It only shows customer balances.

The following additional reports were also suggested by branch managers:

- Summary of daily cash transactions
- Statement of undrawn commitment
- Detailed statement of income and expense accounts (with Debit and Credit amounts).
- Make the warning message more informative

5.4 The Proposed system

5.4.1 Project Definition

Some of the limitations of the existing system may be solved through system modification. Other groups of problems such as the revised chart of accounts, the need to apply the double entry system, standardisation of the programming language, and the rounding problem, however, can not be solved unless a complete rewrite of the system is done.

The project, therefore, is to develop a new decentralised financial systems software for CBB's city branches. A decentralised financial system is a system where the detailed accounting functions are performed at the branch level and only consolidation of branch statements is performed by the Head Office. The proposed system includes the branches loan, saving and current accounts subsystems.

5.4.2 Objectives of the proposed system

5.4.2.1 General Objectives

The aim of the project is to develop a 'decentralised branch financial system' that is capable of overcoming the deficiencies of the existing system and accommodating the requirements of users in the future.

5.4.2.2 Specific Objectives

The specific objectives of the proposed system, among others, are to:

- Standardise the formats across the bank's subsystems
- Standardise the programming language
- Implement the double entry system in branch financial systems
- Solve the rounding problem
- Incorporate the revised chart of accounts into the branch financial system
- Make the system more user-friendly
- Make the systems compatible with each other and with the head office

5.4.3 Components of the proposed system

The new system consists of three major components, namely, the loan, saving, and current accounts subsystems. Each subsystem consists of five modules, namely Master File Maintenance, Transaction Data Entry, Update, Report Generator, and Backup and Restore modules. These modules are further divided and subdivided into tasks and subtasks in order to facilitate and document the systems development process. Figures 8, 9 and 10, below, show the components and modules of the proposed system.

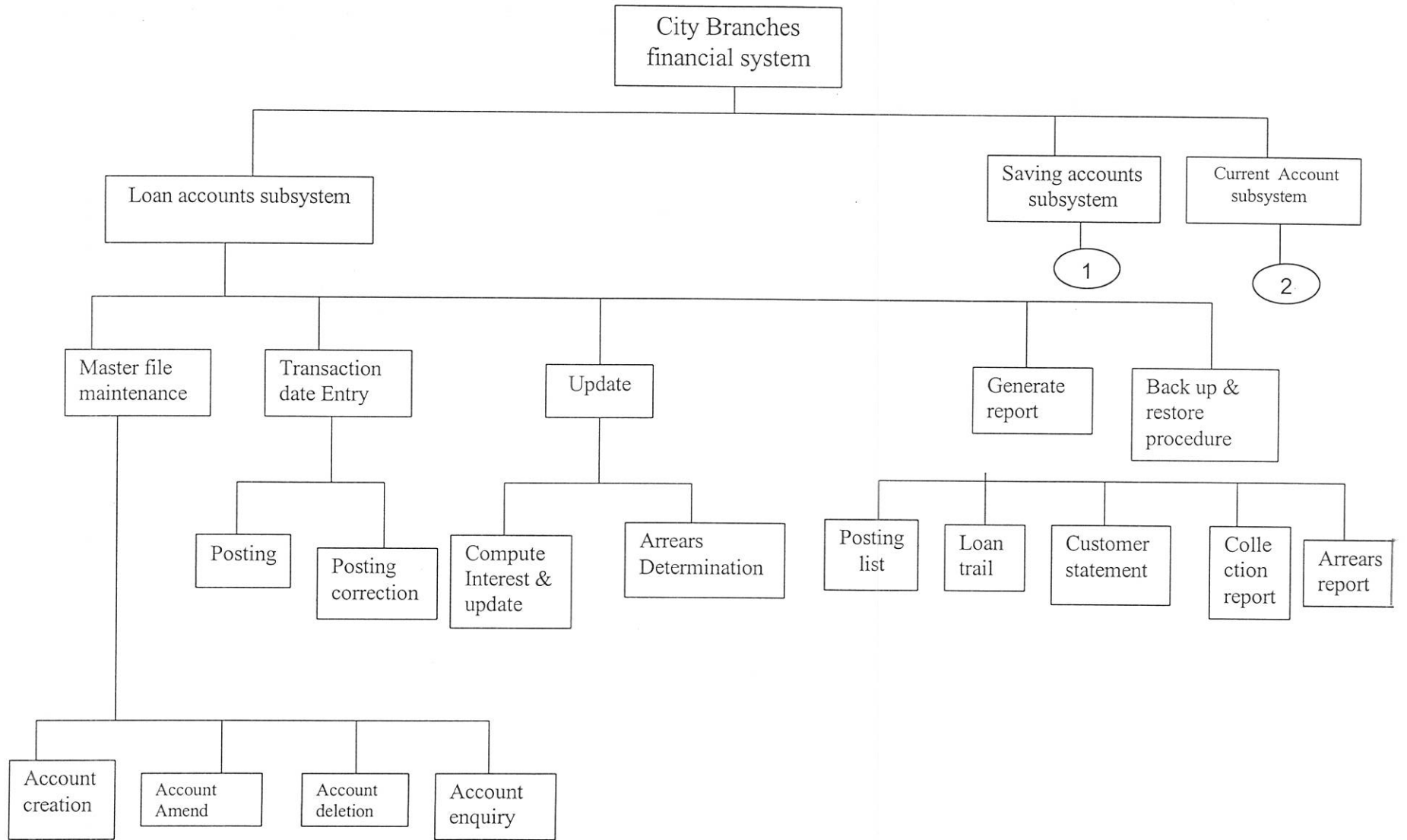


Fig. 8: Structure Chart of CBB's Branch Financial System

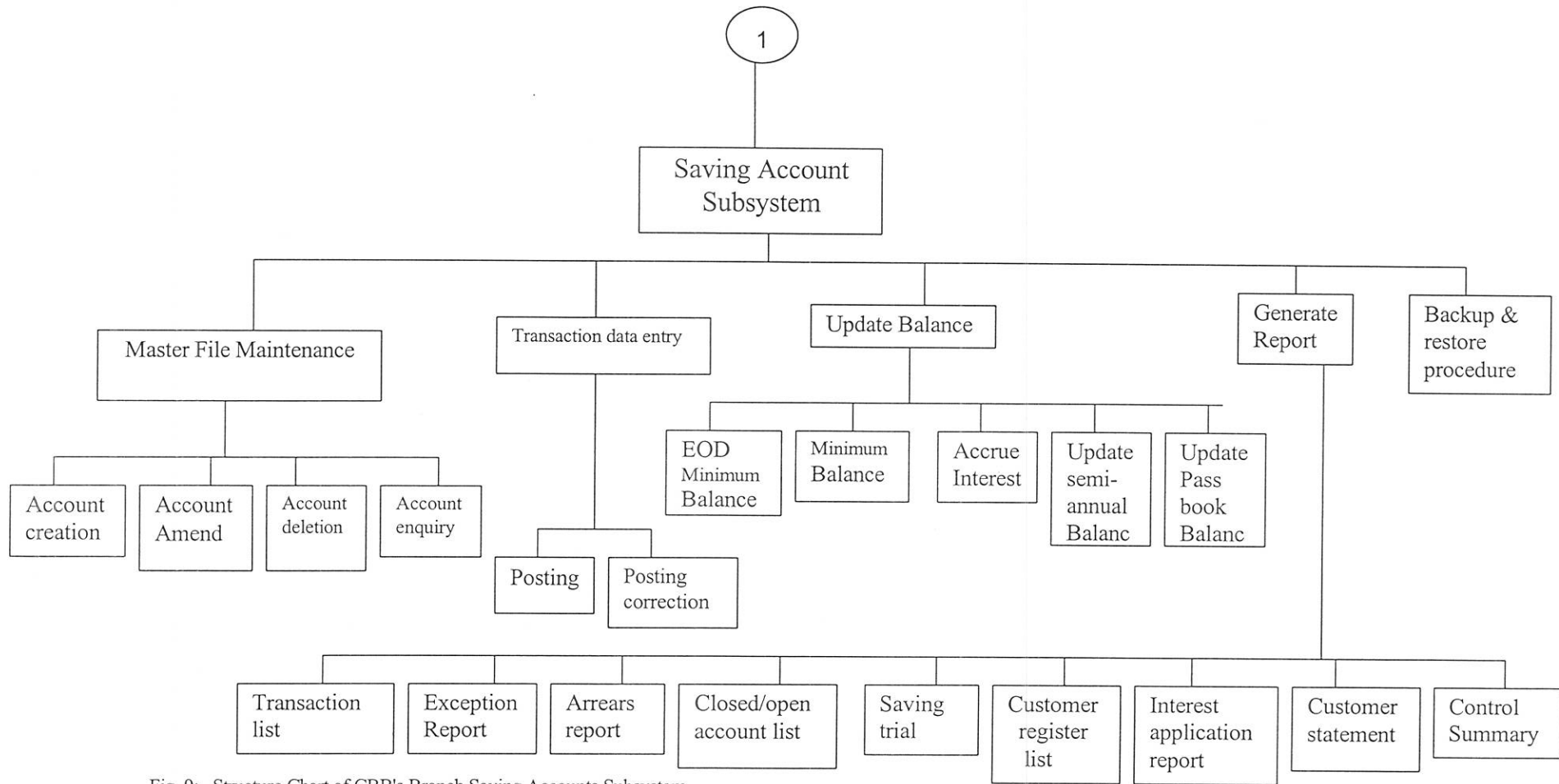


Fig. 9: Structure Chart of CBB's Branch Saving Accounts Subsystem

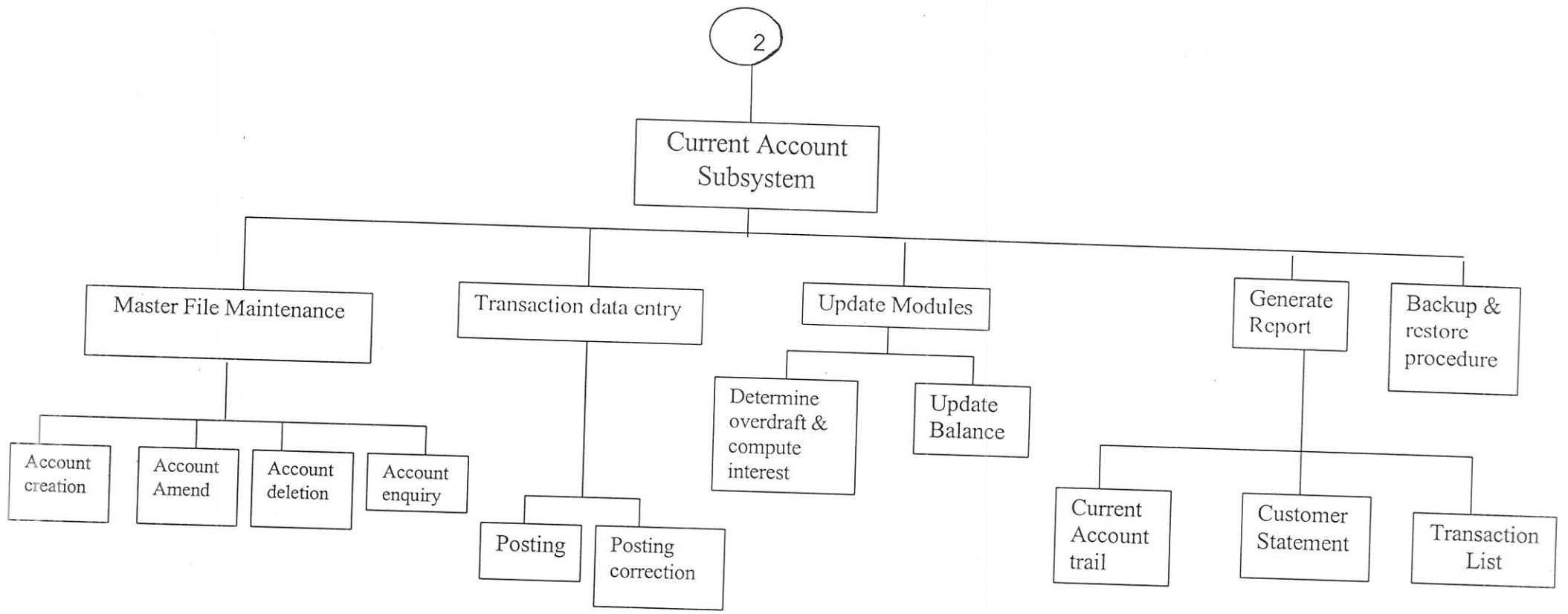


Fig. 10: Structure Chart of CBB's Branch current Accounts Subsystem

5.4.4 Information Technology Evaluation Policy

The initial step in any project analysis is to select an appropriate evaluation method. To this end, the researcher conducted a series of interviews and discussions with CBB's management and came up with the following policy statements.

i) Assessment Policy of Benefits

Generally, management is of the opinion that proper consideration of both tangible and intangible factors would enable the Bank to make the right investment decision. Accordingly, it decided to consider six classes of benefits and four classes of risks for evaluating IT projects. It was also agreed to employ a weighting technique in order to show the relative importance of each benefit and risk. Consequently a weight of 0-20 is assigned, depending on its relative importance, to each category of benefit. The total weight for benefits is twenty. The Bank, therefore, agreed to consider the following categories of benefits in order to evaluate and prioritise its IT projects.

5.4.4 Information Technology Evaluation Policy

The initial step in any project analysis is to select an appropriate evaluation method. To this end, the researcher conducted a series of interviews and discussions with CBB's management and came up with the following policy statements.

i) Assessment Policy of Benefits

Generally, management is of the opinion that proper consideration of both tangible and intangible factors would enable the Bank to make the right investment decision. Accordingly, it decided to consider six classes of benefits and four classes of risks for evaluating IT projects. It was also agreed to employ a weighting technique in order to show the relative importance of each benefit and risk. Consequently a weight of 0-20 is assigned, depending on its relative importance, to each category of benefit. The total weight for benefits is twenty. The Bank, therefore, agreed to consider the following categories of benefits in order to evaluate and prioritise its IT projects.

No	Benefits (total weight = 20)	Weight Assigned
1	Strategic Assessment (weight = 3) <ul style="list-style-type: none"> ◆ Impact and Relationship of the proposed system to the bank's long term plan 	3
2	Competitiveness (weight = 3) <ul style="list-style-type: none"> ◆ Improves the banks' image ◆ Makes the Bank more flexible and adaptable to change ◆ Increases the bank's access to the market 	1.25 1.0 0.75
3	Customer Service (weight = 3.5) <ul style="list-style-type: none"> ◆ Improves quality of customer service ◆ Improves customer support and satisfaction 	2.2 1.3
4	Management Information Support (Weight =4.5) <ul style="list-style-type: none"> ◆ Provide better and timely information on core or critical activities for management ◆ Improves organisational planning 	3.0 1.5
5	Effectiveness (weight =2) <ul style="list-style-type: none"> ◆ Increases accuracy of clerical and repetitive operations ◆ Improves skills and organisational learning 	1.25 0.75
6	Financial return (weight = 4) Net present value or any financial measure	4.0

Table 11: CBB's Assessment Policy of Benefits

ii) Assessment Policy of Risks

Projects are normally surrounded by uncertainties. The degree of uncertainty ,however, may vary from project to project . This in turn determines how risky a project would be. Risk refers to anything that may adversely affect the success of a project. To address this point, the researcher

prepared a list of possible risks from which management is expected to select and give its judgement regarding the relative importance of each risk factor. In this process, additional risk factors were added and inappropriate ones deleted. Finally, the following risk factors were considered appropriate in order to assess the riskiness of IT projects.

No.	Risk Factors (total weight = 10)	Weight Assigned
1	Competitive threat (weight = 3.0) <ul style="list-style-type: none"> ◆ Opportunity is overtaken by competitors if project is delayed ◆ Industry requires that capability ◆ Competitors already provide the service 	1.25 1.00 0.75
2	Technical Risk (Weight = 3.0) <ul style="list-style-type: none"> ◆ Shortage and unavailability of skilled and experience technical staff ◆ Project involves new features, new interface, complex design and programming ◆ Unfamiliarity of technical staff with hardware, software and other requirements of the proposed system 	1.25 1.00 0.75
3	Project / Organisational Risk (Weight = 2.0) <ul style="list-style-type: none"> ◆ Degree of management support to the project ◆ Preparedness of management to undertake the project ◆ Project complexity 	0.80 0.70 0.50
4	Obsolescence (Weight = 2.0) <ul style="list-style-type: none"> ◆ Project gets obsolete before providing the anticipated benefits 	2.00

Table 12: CBB's Risk Factors Assessment Policy

As the above table indicates, the relative importance of each risk was determined using a total weight of ten. The risks associated with each project would then be assessed using a scoring method that ranges from 0– 10.

No	Benefits (total weight = 20)	Weight Assigned
1	Strategic Assessment (weight = 3) <ul style="list-style-type: none"> ◆ Impact and Relationship of the proposed system to the bank's long term plan 	3
2	Competitiveness (weight = 3) <ul style="list-style-type: none"> ◆ Improves the banks' image ◆ Makes the Bank more flexible and adaptable to change ◆ Increases the bank's access to the market 	1.25 1.0 0.75
3	Customer Service (weight = 3.5) <ul style="list-style-type: none"> ◆ Improves quality of customer service ◆ Improves customer support and satisfaction 	2.2 1.3
4	Management Information Support (Weight =4.5) <ul style="list-style-type: none"> ◆ Provide better and timely information on core or critical activities for management ◆ Improves organisational planning 	3.0 1.5
5	Effectiveness (weight =2) <ul style="list-style-type: none"> ◆ Increases accuracy of clerical and repetitive operations ◆ Improves skills and organisational learning 	1.25 0.75
6	Financial return (weight = 4) Net present value or any financial measure	4.0

Table 11: CBB's Assessment Policy of Benefits

ii) Assessment Policy of Risks

Projects are normally surrounded by uncertainties. The degree of uncertainty ,however, may vary from project to project . This in turn determines how risky a project would be. Risk refers to anything that may adversely affect the success of a project. To address this point, the researcher

prepared a list of possible risks from which management is expected to select and give its judgement regarding the relative importance of each risk factor. In this process, additional risk factors were added and inappropriate ones deleted. Finally, the following risk factors were considered appropriate in order to assess the riskiness of IT projects.

No.	Risk Factors (total weight = 10)	Weight Assigned
1	Competitive threat (weight = 3.0) <ul style="list-style-type: none"> ◆ Opportunity is overtaken by competitors if project is delayed ◆ Industry requires that capability ◆ Competitors already provide the service 	1.25 1.00 0.75
2	Technical Risk (Weight = 3.0) <ul style="list-style-type: none"> ◆ Shortage and unavailability of skilled and experience technical staff ◆ Project involves new features, new interface, complex design and programming ◆ Unfamiliarity of technical staff with hardware, software and other requirements of the proposed system 	1.25 1.00 0.75
3	Project / Organisational Risk (Weight = 2.0) <ul style="list-style-type: none"> ◆ Degree of management support to the project ◆ Preparedness of management to undertake the project ◆ Project complexity 	0.80 0.70 0.50
4	Obsolescence (Weight = 2.0) <ul style="list-style-type: none"> ◆ Project gets obsolete before providing the anticipated benefits 	2.00

Table 12: CBB's Risk Factors Assessment Policy

As the above table indicates, the relative importance of each risk was determined using a total weight of ten. The risks associated with each project would then be assessed using a scoring method that ranges from 0– 10.

iii) Risk-Return Preference Policy

Risk and return are two strongly related concepts in the area of investment appraisal. Their relationship is direct. The higher the risk, the higher the return and vice versa. In any investment situation, investors generally prefer to invest in less risky but profitable projects. But this is highly unlikely, because risk-free projects are usually accompanied by low returns. Therefore, investors must be ready to assume higher risks if they wish to earn a relatively higher return from their investment. Generally speaking, they require a rate of return that is high enough to compensate for the level of risk which they will be assuming.

In this regard CBB's Management formulated the following risk-return preference policy with a view to systematise their future IT investment decisions. The policy specifies a total project score that is commensurate with each level of risk. The following table shows the banks' risk-return preference policy.

No	Risk-Level (%)	Required Project Score
1	30 %	50
2	31 – 50	51 – 60
3	51 – 70	61 – 75
4	71 – 85	76 and above
5	85 and above	Reject project

Table 13: CBB's Risk-Return Preference Policy

5.4.5 Evaluation of the proposed system

5.4.5.1 Traditional financial Techniques

5.4.5.1.1 Determination of project costs and benefits

The traditional financial techniques are used to evaluate the financial viability of long-term investment projects. A prerequisite to these methods is the determination of financial returns.

Financial return is a quantifiable economic factor. It refers to the money benefits which the project is expected to yield over its life. This factor has been traditionally used to evaluate the economic feasibility of long-term investment projects. It requires proper measurement of project cash outflows (costs) and cash inflows (benefits). These cash flows are then used to evaluate the viability of investment projects.

The researcher, therefore, conducted extensive discussions and interviews with the Bank's information and computer staff, branch managers and system operators in order to determine the costs and benefits of the project. Accordingly, the project is expected to cost the Bank a sum of Birr 347,596.00 as shown below.

No.	Cost Item	Amount (Birr)
1	Development hardware and software	34,560.00
2	Design, coding and testing	12,640.00
3	Implementation and follow-up	16,290.00
4	Other costs, ribbons, diskettes, stationers	2,700.00
5	Hardware - servers, microcomputers and accessories	264,000.00
6	System maintenance	10,590.00
7	Contingency, 2%	6,816.00
	Initial Project cost	347,596.00

Table 14: Initial Project Cost

As has already been stated, the aim of the project is to develop a new financial system for CBB's city branches. The proposed system is not expected to generate any kind of revenue. Because, the benefits of such projects mainly take the form a reduction in labor input and increased productivity. However, CBB's branches, at present, are staffed only with employees that are adequate enough to handle branch operations. As a result, the introduction of the new system will not bring any reduction of labor. The increase in productivity is also expected to be offset by the incremental operating costs of the proposed system. Therefore, the direct financial benefit from the project is considered negligible.

5.4.5.1.1 Application of the methods

The financial techniques have been traditionally used to justify long-term investment projects.

The most popular methods under this category, among others, are: The payback period; Net

present Value (NPV); Internal Rate of Return (IRR) and Return On Investment (ROI). Let's now consider these methods to evaluate CBB's project.

1) **Payback Period** - The payback method presupposes the existence of direct financial benefits from the project. As has already been stated, the project does not have such benefits. The payback period, therefore, can not be applied to evaluate this project.

2) **Return On Investment (ROI)** - the Return On Investment is calculated by dividing the average annual financial benefit by the average investment. Since the average annual financial benefit is zero, the project has a zero Return On Investment. The decision, according to this method, would be to reject the project.

3) **Internal Rate of Return (IRR)** - IRR is basically a discounting procedure and like any financial technique it requires the existence of cash inflows. The project under study, however, doesn't generate any cash inflow. As a result, the IRR method cannot be used meaningfully to evaluate the viability of CBB's project.

4) **Net Present Value** - Under this method, the initial investment is subtracted from the present value of net cash inflows in order to determine the Net Present Value (NPV) of the project.

Hence:

Present Value of net cash inflows	0.00
Less Initial Project Cost (present value)	<u>347,596.00</u>
Net Present Value	<u>-347,596.00</u>

According to the NPV method, a project will be accepted only when its NPV is greater or equal

to zero. The above computation, however, shows a negative NPV of Birr 347,596.00. The decision, therefore, will be to reject the project.

The project has, as the following section indicates, a number of intangible benefits. The traditional financial techniques, however, have failed to consider those intangible factors, and consequently led to the rejection of the project.

5.4.5.2 The Modified Information Economics Techniques

Although the financial techniques led to the rejection of the project, it is strongly believed that the project has a number of intangible benefits. For instance, the project is expected to provide timely information to management, improve customers services, strengthen operational control, etc. Accordingly, the project is evaluated on the basis of various quantifiable and non-quantifiable factors using a scoring technique that ranges from 0 - 5 for benefits and 0-10 for risk factor assessments. Management's assessment of the intangible as well as the tangible benefits, and risks of the project are summarised below. (Please see appendix VII for detailed calculations).

No	Benefits	Project Score
1	Strategic Assessment	15.00
2	Competitiveness	12.63
3	Customer Service	15.75
4	Information Support to Management	18.75
5	Effectiveness	8.63
6	Financial Return	0.0
	Total Project Score	70.76

Table15: Management's Assessment of Project Benefits.

No	Risk Factors	Project Score
1	Technical Risk	19.50
2	Competitive Threat	16.75
3	Project Risk	13.15
4	Obsolescence	12.00
Total Project Risk Assessment		61.40

Table16 Management Assessment project Risk.

Tables 15 and 16, above, are summaries of management's assessment of the project. Accordingly, the project has scored a total value of 70.76 and a risk factor of 61.40. A reference to the Bank's risk-return preference table indicates that a project with a risk level of 61.40 should earn a total project value of 61 - 75. The project, since its score, 70.76, falls within the required range, has met the Bank's investment criteria. The decision, therefore, is to accept the project. This decision, compared with the financial techniques, seems to promote the strategic objectives of the Bank.

5.4.6 A Re-examination of the Appraisal Methods

As noted earlier, the payback method has two serious drawbacks. First, it doesn't consider the benefits that accrue after the payback period and second it ignores the time value of money. However, given the rapid change in IT/IS industry and the concern of investors with respect to the return of their capital, this method will continue to serve as a useful tool for evaluating IT investment projects.

The Return On Investment (ROI) method doesn't consider the pattern of cash flows or the

time value of money and as a result may lead to a wrong investment decision

The Internal Rate of Return (IRR) method, with the exception of its assumption, is essentially an extension of the Net Present Value method. Under the NPV method, intermediate cash flows are assumed to be reinvested at the company's cost of capital, whereas the IRR method is based on the assumption that intermediate cash flows are reinvested at a rate equal to the project's IRR.

However, a reinvestment of intermediate cash flows at the project's IRR can not be regarded as a realistic assumption of the uncertain future. Besides, The IRR method may provide more than one rate of return or no meaningful rate of return at all.

From a theoretical and practical point of view, the NPV method is superior and hence preferable to the IRR method. Because, the NPV's assumption regarding the rate at which intermediate cash flows are reinvested - the cost of capital - tends to be a reasonable estimate of the rate at which the firm could actually reinvest its intermediate cash flows. The NPV method, therefore, is a proper guide for evaluating the viability of non-infrastructure IT investment projects.

However, it should be noted that the financial techniques are only appropriate for projects that are expected to yield direct financial benefits.

Information Economics (IE), as the prototype evaluation indicates, is probably the most comprehensive approach to IT evaluation. Under this approach, the concepts of costs and benefits are broadened to include the financial and non-financial; tangible and intangible

benefits and costs of an IT project. It also incorporates the financial techniques and enables one to evaluate an IT project from financial, strategic, customers, risk and other perspectives.

This method could be used to evaluate both infrastructure and non-infrastructure IT projects. Its weighting and scoring methods can also promote discussion and understanding between business and IT managers.

In a nutshell, Information Economics, with due modification and proper treatment of the risk factors, may lead to a better decision than the other investment appraisal techniques.

Chapter Six

Conclusion and Recommendation

6.1 Conclusion

Information technology (IT) refers to computer hardware and software, communications and related technologies. It is specifically designed to collect, process, store and disseminate information. At present, information technology is viewed as a strategic resource, which could be used to develop and deliver new services, limit the actions of competitors and to strengthen company-customer relationships.

Realising its vast potential, many organisations are making considerable expenditures on information technology projects. However, such expenditures alone can not guarantee success in business. Besides, owing to the scarcity of resources, companies will have to make a choice from among a number of investment alternatives that are available to them. In other words, organisations need to evaluate their IT projects systematically so as to ensure a maximum return from their IT investments.

For this reason, accountants and finance managers have been traditionally evaluating long-term investment (IT and non-IT) projects using various financial techniques such as the Payback Period, Return On Investment (ROI), Net Present Value (NPV) and Internal Rate of Return (IRR). The use of the financial techniques, however, is sharply criticised by IT/IS professionals on the ground that these techniques are incapable of assessing the intangible benefits of IT investments. Consequently, they have proposed a number of alternative methods that are specifically applicable to information technology projects. Among the methods proposed are

Information Economics, Balanced Scorecard (BSC), Return On Management, the Options and Modular approaches to IT evaluation.

The controversy on the appropriateness of the traditional methods seemed to have given rise to the emergence of two schools of thoughts - The first school of thought who still consider the traditional financial techniques as valid and applicable to any type of project and the second who dismisses the traditional methods as inadequate and misleading. Proponents of the Second School of Thought, therefore, have proposed several appraisal methods as an alternative to the traditional financial techniques.

In spite of the availability of various alternative techniques, many organisations in Ethiopia do not seem to evaluate the viability of their IT investments. This may result in considerable wastage of resources.

The study, therefore, tries to explore the practice and identify the problems associated with IT evaluation particularly in the financial sector - the most information-intensive sector of the economy. The researcher used the questionnaire and interview methods in order to collect the data required for the study.

According to the results of the study:

- ◆ Information technology is not used for strategic purposes in the financial sector. In other words, IT is mostly used to handle clerical and repetitive tasks such as accounting and word processing.
- ◆ IT projects are mostly evaluated informally, leaving little or no documentation of the appraisal processes.

- ◆ Almost all organisations do not have clearly stated guidelines or policies for evaluating IT projects.
- ◆ Stakeholders' involvement is generally low.
- ◆ Evaluation of IT projects is done, almost exclusively, during the feasibility stage only.
- ◆ The appraisal methods are mostly informal, unstandardized and subjective
- ◆ Companies in the financial sector generally have IT evaluation problems of which lack of skilled and experienced manpower is the most serious.

Probably the second most important objective of this research is to examine the applicability of the investment appraisal models and to recommend a method(s) that is more appropriate to the situations in the financial sector. Accordingly, the researcher assessed the relevance and appropriateness of the various project appraisal techniques and consequently came up with the following opinion.

So long as "maximisation of shareholders' wealth" remains to be the primary aim of a business firm, the financial techniques will continue to serve as a useful and valid project appraisal methods. However, some of the financial techniques such as Return On Investment (ROI) and Internal Rate of Return (IRR) have serious limitations and their use may lead to erroneous investment decisions.

The Payback Period, on the other hand, will continue to serve as a valid and useful project appraisal method. Because, it considers the concern of investors with respect to the return of their money and the rapidly changing nature of the IT /IS industry. The NPV method is the most theoretically sound and valid technique and could be used to evaluate the viability of IT projects.

However, the financial techniques, because they were originally designed to measure the financial returns of long-term investments, are inadequate to assess the intangible benefits and costs of an IT project.

Information Economics, on the other hand, seems to provide a better framework for evaluating the viability of IT investments. For this reason, the researcher conducted a prototype evaluation of CBB's branch 'financial systems software development project' in order to test and demonstrate the applicability of the proposed methods and to show how the decision making process could be generally improved. As the prototype evaluation indicates, the information economics models, after they are modified to suit the prevailing situation, together with the financial techniques such as the Payback and Net Present Value methods are believed to be the most practical and appropriate methods for evaluating IT projects in the financial sector.

To sum up, the study provides a fair account of the existing practice, highlights the problems associated with IT evaluation and examines the appropriateness of the various IT evaluation methods. The results of this research, therefore, will help financial institutions to systematise and improve their IT evaluation practices. Other organisations may also find the results of this study helpful in evaluating the viability of IT investment projects. Research and Academic institutions may also use the findings of this study as an input for enhancing their research and training activities.

6.2 Recommendations

As the study indicates, the majority of institutions in the financial sector do not have clearly stated evaluation policies and use unstandardized and highly subjective appraisal methods. Projects are not evaluated in a formal, standardised and well-documented manner. According to the survey findings, lack of skilled and experienced manpower in the area of IT evaluation was found to be the most serious problem in the sector.

To alleviate these problems, it is recommended that :

- ◆ More emphasis and coverage should be given to investment appraisal concepts in Computing and Information science training in order to equip IT /IS professionals with the concepts and techniques of IT evaluation .
- ◆ Give seminars, workshops, and short-term training on information technology evaluation to IT and business managers. The purpose of organising such seminars, workshops ,etc., is to highlight the extent and impact of the existing problems; and to familiarise them with the concepts of IT evaluation.
- ◆ Encourage financial and other organisations to evaluate their IT projects using the standard financial techniques, particularly the Payback, and Net Present Value, methods where appropriate, together with the techniques of Information Economics. These methods will enable them to systematically evaluate and properly document their IT projects. Due consideration should also be given to risk analysis and assessment.
- ◆ Conduct, preferably, a nation-wide research in the area of IT evaluation in order to unearth new facts, understand the nature and magnitude of the problems and to come up with a better solution.

BIBLIOGRAPHY

- Abera Meles (1995). A Prototype Information Support System for Addis Ababa Water and Sewerage Authority. MSc. (I. S.) Thesis. Addis Ababa: SISA, Addis Ababa University.
- Annabel Beerel , Lysia Limited (1996). Expert Systems in Business: Real World Applications. New York: Ellis Hornwood.
- Augustine Kubar Mwamba (1995). Computer-Aided Information Support System For the Management of Forestry in Zambia . MSc. (I. S.) Thesis. Addis Ababa: SISA, Addis Ababa University.
- Bacon J.C. (1994). Why Companies Invest in Information Technology. In Leslie Willcocks,(ed.), Information Management: The Evaluation of Information Systems Investments, pp 31-47. London: Chapman & Hall.
- Ballantine J. A., Galliers R. D., and Stray S. J. (1996). Information Systems /Technology Evaluation Practices: Evidence from UK Organisations. Journal of Information Technology, vol. 11, 129-141.
- Bantie Workie (1998). Strategic Information Systems Planning for the Banking Industry: The Case of Commercial Bank of Ethiopia (CBE). MSc. (I. S.) Thesis. Addis Ababa: SISA, Addis Ababa University.
- Bower L.J.(1994). Capital Budgeting as a General Management Problem. In Ed Rhodes and

- David Wield,(ed.), *Implementing New Technologies: Innovation and the Management of Technology*, Second edition (pp. 349-363). United Kingdom: NCC Blackwell Ltd.
- Brockington R. (1993). *Financial Management*, 6th ed., London: DP Publications Ltd.
- Burn J. M.(1996). *Information Systems Innovation and Organisational Alignment - A Professional Juggling act*. *Journal of Information Technology*, vol. 11, 3 -12.
- Coleman T. and Jamieson M. (1994). *Beyond Return on Investment*. In Leslie Willcocks, (ed.), *Information Management: The Evaluation of Information Systems Investments*, pp. 150-165.
- Cotterell M. And Hughes B. (1995). *Software Project Management*. London: International Thomson Computer Press.
- Cowan L. D. (1985). *The Impact of Technology in Banking*. In Bryan L. Livy (ed.), *Management and People in Banking*, 2nd ed., (pp. 101-108). London: The Institute of Bankers.
- Dance S. G. (1994). *Infopreneurs: The Hidden People Who Drive Strategic Information Systems*. London: The MacMillan Press Limited.
- Dixit K.A. and Pindyck S.R. (1995). *The Options Approach to Capital Investment*. *Harvard Business Review*, May-June, pp 105-115.
- Earl M. J. (1988). *IT and Strategic Advantage: A Framework of Frameworks*. In Michael J. Earl, (ed.), *Information Management: The Strategic Dimension* (pp 7 - 32). New York:

Clarendon Press.

Ethiopian Customs Authority (1995). Import Annual 1995 Report, 1B, vol. I (unpublished).

Ethiopian Customs Authority (1996). Import Annual 1995 Report, 1B, vol. II (unpublished)

Gitman J.L. (1994). Principles of Managerial Finance, 7th ed., New York: Harpercollins College Publishers.

Grembergen V.W. and Bruggen V.R. Measuring and Improving Corporate Information Technology Through Balanced Scorecard. <http://is.twi.tudelft.nl/ejise/vol11/issue1/paper3/paper.html>

Hchstrasser B. (1994). Justifying IT Investments: In Leslie Willcocks, (ed.), Information Management: The Evaluation of Information Systems Investments, pp. 150-165.

Kaplan S.R. and Norton p.(1992). The Balanced Scorecard - Measures That Drive Performance. Harvard Business Review, January-Febraury, pp 71-79.

Keyes J. (1993). Infotrends : The Competitive Use of Information. New York: McGraw-Hill.

King M. and McAulay L. (1997). Information Technology Investment Evaluation: Evidence and Interpretation. Journal of Information Technology , 12(2), 131-143.

King W. , Hufnagel E., and Grover V. (1988). Using IT for Competitive Advantage. Michael J. Earl, (ed.), Information Management: The Strategic Dimension (pp 77 - 86). New York:

Clarendon Press.

Kumar L.R. Understanding the Value of Information Technology Enabled Responsiveness. [http://is.twitudelft.nl/ejise/vol 1/issue 1/paper 1/ paper. html](http://is.twitudelft.nl/ejise/vol%201/issue%201/paper%201/paper.html)

Lock D. (1996). Project Management, 6th ed., USA: Gower.

Meredith J. R. And Mantel S. J. (1995). Project Management, 3rd ed. New York: John Willey & Sons, Inc.

Miller R. B. (1989). Super Banking: Innovative Management Strategies (that work). USA: Richard D. IRWIN.

Parker M. M., Benson R. J. And Trainor H. E. (1988). Information Economics: Linking Business Performance to Information Technology. New Jersey: Prentic-Hall.

Polakoff C.J. (1990). Computer Integrated Manufacturing: A New Look at Cost Justifications. Journal of Accountancy, March, pp. 24-29.

Simms J.(1997). Evaluating IT: Where Cost-Benefit can Fail. Australian Accountant. [http://www.cpaonline.com.au/html/aa/9705/ pg-aa 9705 - evaluating it. html](http://www.cpaonline.com.au/html/aa/9705/pg-aa%209705-evaluating%20it.html).

Temtum Assefa (1993). Information Support System for Urban-Regional Plan Preparation at the National Urban Planning Institute. M.Sc. (I. S.) Thesis. Addis Ababa: SISA, Addis Ababa

University.

Toraskar and Joglekar (1993). Applying Cost-Benefit Analysis (CBA) Methodology for Information Technology Investment Decisions. In Rajw D. Banker, (ed.), Strategic Information Technology Management: Perspectives on Organisational Growth and Competitive Advantage. USA: El Peso. pp 119-142

Vote Duncan Somba (1993). An Academic Resource Centre in the University of Malawi, Its Needs and a Plan for its Development Together with Prototype Databases. M.Sc. (I. S.) Thesis. Addis Ababa: SISA, Addis Ababa University.

Ward J. (1994). A Portfolio Approach to Evaluating Information Systems Investments and Setting Priorities. In Leslie Willcocks, (ed.), Information Management: The Evaluation of Information Systems Investments, pp. 81-97. London: Chapman & Hall.

Willcocks L.(1994). Information Management: The Evaluation of Information Systems Investments. London: Chapman & Hall.

Willcocks L. and Lester S. (1994). Evaluating the Feasibility of Information Systems Investments: Recent UK Evidence and New Approaches. In Leslie Willcocks,(ed.), Information Management: The Evaluation o Information Systems Investments, pp 31-47. London: Chapman & Hall.

Woodsworth A. (1991). Patterns and Options for Managing Information Technology on Campus. Chicago: American Library Association.

_____ (1994). Encyclopaedia of Banking and Finance, 10th ed. Charles J. Woelfel, (ed.). Chicago: IRWIN.

_____ (1996). International Encyclopaedia of Business and Management , vol. 1. Malcolm Warner, (ed.). London: Routledge.

_____ (1989). The Oxford English Dictionary, 2nd ed., vol. 1. Simpson J. A. and Weiner E. S. C. (ed.). London: Clarendon Press.

_____ (1976). Webster's Third New International Dictionary of the English Language - Unabridged. Philip Bobcock Gove and The Merriam Webster Editorial Staff (ed.). Springfield, Massachusetts, USA: G. and C. Merriam Company, Publishers.

_____ (1994). Computers, & Facsimile and Printing Equipment Utilisation and Control Task Force Report (unpublished). Addis Ababa: Ethiopian Transitional Government, The Prime Ministers Office.

Appendix I: Questionnaires used in the survey

(Questionnaire: IT Managers)

1. General Information: (please tick the appropriate box)

i) Sector in which you are working (public or private) -----

ii) Industry(Banking, Insurance, etc.) -----

iii) Position in your organisation: _____

iv) For how long have you been working in this position ? _____

2. Does your organisation invest in information technology, i.e. in computer hardware, software and related facilities ?

Yes

No

Don't know

3. If your organisation is not investing in information technology, what do you think is the reason ? _____

Please respond to the following questions if your organisation is investing in information technology.

4. For what specific purposes do you invest in information technology? Please state the purposes in the order of their importance (from the most important to the least important).

1. _____

2. _____

5. Project Initiation: Which of the following best describe your organisation's practice regarding the initiation of IT investment projects? Please indicate by putting a tick mark in the appropriate box.

- Derived from the organisation's long term plan
- Mostly initiated by top management
- Mostly initiated by a Steering Committee
- Arise from user Department requests
- Arise from the organisation's annual project call
- Initiated by Information Systems /Computer Centre staff
- Initiated by a higher government body
- Initiated by organisations that work closely or in
 Partnership with our organisation
- Others; please specify _____

6. What procedures do you follow after a project is initiated?

7. Do you evaluate the viability of your IT investments?

Yes No Don't know

If your organisation is not evaluating IT investment projects, what do you think is the reason for not evaluating IT projects?

8. Do the following problems explain the reason for not evaluating IT investments? Please indicate using a tick mark in the appropriate box.

- Shortage of skilled manpower in IT evaluation
- Shortage of time
- Operational urgency
- Unfamiliarity with project evaluation technique
- The indispensability nature of IT Projects
- Other reasons, please specify _____

Please respond to the following questions if your organisation have an IT evaluation practice.

10. Who is specifically responsible for evaluating IT investment projects? Please

indicate using a tick mark in the appropriate box.

- Steering Committee composed of Senior Management
- Finance / Accounts Department
- Information systems / computer centre manager
- Departmental Committee
- Computer hardware and software vendors
- External consultants

Others, Please specify _____

11. At what stages are IT investment projects commonly evaluated in your organisation?

Please indicate by placing a tick mark in the appropriate box

- During feasibility study
- End of the analysis stage
- Design stage
- Immediately after the system is in place
- Sometime after implementation.....
- Periodically, e.g. annually, over the life of the project
- Other stages, please specify, if any _____

12. Is there an organisational policy that dictates the use of a specific project appraisal technique?

- Yes No Don't know

If yes, please specify the techniques _____

A) IT investment projects may be evaluated from various perspectives. What factors do you consider in evaluating investments in information technology? Please indicate how often each factor is considered.

Factors	most commonly	commonly considered considered	less considered	not considered
a) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B) Does your evaluation process consider any of the following factors? Please indicate your answer by placing a tick mark in the appropriate box.

Factors	most commonly considered	commonly considered	less considered	not considered
Reduction of operating costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Production of additional revenues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fitness to the company's strategic plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves labour productivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves efficiency of existing operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of skilled and technical staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Readiness of the technical staff to undertake the project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationship of the project with the organisation's information systems plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The need for additional infrastructure investments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project's contribution to the stated objectives of the organisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effect on customers' attitude towards the organisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improvement of organisational skill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project improves the company's market share	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improvement of the quality of customer service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Used to deliver company service to customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Help to establish a strong link with customers and suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves the company's ability to cope with the competition and rapid technological changes ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased accuracy in clerical and repetitive operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves organisational planing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves the speed and quality of business decision	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. How does your organisation evaluate IT investments?

Formally Informally Don't know

15. Evaluation Techniques Used: **Formal**

a) If your organisation is evaluating IT projects formally, what techniques does your organisation use to evaluate IT investment projects? Please indicate the methods and degree of their usage.

METHODS USED	MOST COMMONLY USED	COMMONLY USED	RARELY USED
1. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

a) Does your formal evaluation technique include the following methods? Please indicate the methods and the degree of their usage in your organisation by placing a tick mark in the appropriate box.

Techniques of evaluation	most commonly used	frequently used	rarely used	Never used	Don't know
Payback period	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Net Present Value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Rate of Return	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Return on Investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information Economics tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16) Evaluation Techniques Used: **Informal**

a) If you are evaluating your IT projects informally, what methods does your organisation use to evaluate them? Please state the methods and the degree of their usage.

Informal methods used	MOST COMMONLY USED	COMMONLY USED	RARELY USED
1. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

a) Does your informal evaluation method include any of the following? Please tick the appropriate box.

Informal Techniques used	most commonly used	frequently used	rarely used	Never used	Don't know
Informal discussion and consensus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reliance on past experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reliance on the experience of other organisations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faith in IT's contribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendors advice and recommendation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. At any point in time, an organisation may have a number of competitive IT investment alternatives. On what basis do you prioritise or rank such investment options?

18. What criteria do you use to accept or reject IT investment projects?

19. Are users or stakeholders such as customers, owners, company planners, and vendors involved in IT project initiation, planning, evaluation and implementation processes in your organisation?

Yes No Don't know

20. If your answer to question no. 19, above, is yes, please indicate which group of users/stakeholders and in which stage of the process they are involved.

No.	user or stakeholder	stages (initiation, planning, etc.)
1.	_____	_____
2.	_____	_____

21. Project Authorisation: Who is responsible for giving final approval for IT investment projects? Please indicate using tick marks.

Company President / Executive Director/ General Manager	<input type="checkbox"/>
Senior-Management-Level Steering Committee	<input type="checkbox"/>
Departmental-Level Steering Committee	<input type="checkbox"/>
Board of Management	<input type="checkbox"/>
Board of Directors	<input type="checkbox"/>
Others	<input type="checkbox"/>

22. If your answer for question no.21, above, is 'Others', or if you want to qualify or elaborate any of your answers above, please explain your organisation's project approval procedures and responsibilities. _____

23. Does your organisation face problems in evaluating IT investment projects?

Yes No Don't know

24. If your answer to question no. 23, above, is yes:

a) What major problems does your organisation face in evaluating IT investment projects?

Please show the type of problems that you face and the degree of seriousness of each problem.

Problem Type	most serious	serious	moderately serious	least serious
1. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b) Does your organisation encounter any of the following types of problems? Please also show their degree of seriousness by placing a tick mark in the appropriate box.

Problem type	most serious	serious	moderately serious	least serious	problem doesn't exist
Difficult to identify & measure IT benefits	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Difficult to identify & measure relevant costs	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficult to identify and quantify project risks	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Lack of adequate information about the proposed project	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of time	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of skilled and experienced manpower in the area of project evaluation	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. Does your organisation have a clearly stated and well documented guideline for evaluating IT investment projects?

Yes No Don't know

26. If your answer to question no. 25, above is 'YES', do the guidelines clearly specify the following? Please indicate by using a tick mark in the appropriate box for each of the following choices.

Procedures	Yes	No	Don't know
The steps to be followed in evaluating such projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project evaluation tools and techniques to be applied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria to be met by each project before its acceptance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Key issues that must be considered in project evaluation and selection process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scope of responsibility for IT investment approvals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. How does your organisation communicate the findings of the evaluation process to the concerned officials, departments, etc.? Please show using a check mark.

Method of Communication	Most commonly used	Commonly used	Occasionally used	Never used	Don't know
Conduct regular meeting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workshops and presentations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Informal meetings and discussions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other methods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If your organisation is using other methods of communicating project details, please indicate the methods employed _____

(QUESTIONNAIRE : FINANCE MANAGERS / ACCOUNTS DEPARTMENT HEAD)

1. General Information: (please tick the appropriate box)

i) Sector in which you are working (public or private) _____

ii) Industry(Banking, Insurance, etc.) _____

iii) Position in your organisation: _____

iv) For how long have you been working in this position ? _____

2. Does your organisation invest in information technology, i.e. in computer hardware, software and related facilities ?

Yes

No

Don't know

3. If your organisation is not investing in information technology, what do you think is the

reason ? _____

Please respond to the following questions if your organisation is investing in information technology.

4. For what specific purposes do you invest in information technology? Please state the purposes in the order of their importance (from the most important to the least important).

1. _____

2. _____

5. Project Initiation: Which of the following best describe your organisation's practice regarding the initiation of IT investment projects? Please indicate by putting a tick mark in the appropriate box.

- Derived from the organisation's long term plan
- Mostly initiated by top management
- Mostly initiated by a Steering Committee
- Arise from user Department requests
- Arise from the organisation's annual project call
- Initiated by Information Systems /Computer Centre staff
- Initiated by a higher government body
- Initiated by organisations that work closely or in Partnership with our organisation
- Others; please specify _____

6. What procedures do you follow after a project is initiated?

7. Do you evaluate the viability of your IT investments?

Yes

No

Don't know

If your organisation is not evaluating IT investment projects, what do you think is the reason for not evaluating IT projects?

8. Do the following problems explain the reason for not evaluating IT investments? Please indicate using a tick mark in the appropriate box.

- Shortage of skilled manpower in IT evaluation
- Shortage of time
- Operational urgency
- Unfamiliarity with project evaluation technique
- The indispensability nature of IT Projects
- Other reasons, please specify _____

Please respond to the following questions if your organisation have an IT evaluation practice.

9. Who is specifically responsible for evaluating IT investment projects? Please indicate using a tick mark in the appropriate box.

- Steering Committee composed of Senior Management
- Finance / Accounts Department
- Information systems / computer centre manager
- Departmental Committee
- Computer hardware and software vendors
- External consultants
- Others, Please specify _____

10. At what stages are IT investment projects commonly evaluated in your organisation?

Please indicate by placing a tick mark in the appropriate box

- During feasibility study
- End of the analysis stage
- Design stage
- Immediately after the system is in place
- Sometime after implementation.....
- Periodically, e.g. annually, over the life of the project
- Other stages, please specify, if any _____

11. Is there an organisational policy that dictates the use of a specific project appraisal technique?

Yes No Don't know

If yes, please specify the techniques _____

12. A) IT investment projects may be evaluated from various perspectives. What factors do you consider in evaluating investments in information technology? Please indicate how often each factor is considered.

Factors	most commonly	commonly considered	less considered	not considered
a) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B) Does your evaluation process consider any of the following factors? Please indicate your answer by placing a tick mark in the appropriate box.

Factors	most commonly considered	commonly considered	less considered	not considered
Reduction of operating costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Production of additional revenues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fitness to the company's strategic plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves labour productivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves efficiency of existing operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of skilled and technical staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Readiness of the technical staff to undertake the project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationship of the project with the organisation's information systems plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The need for additional infrastructure investments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project's contribution to the stated objectives of the organisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effect on customers' attitude towards the organisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improvement of organisational skill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project improves the company's market share	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improvement of the quality of customer service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Used to deliver company service to customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Help to establish a strong link with customers and suppliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves the company's ability to cope with the competition and rapid technological changes ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased accuracy in clerical and repetitive operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves organisational planing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves the speed and quality of business decision	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. How does your organisation evaluate IT investments?

Formally Informally Don't know

14. Evaluation Techniques Used: **Formal**

- a) If your organisation is evaluating IT projects formally, what techniques does your organisation use to evaluate IT investment projects? Please indicate the methods and degree of their usage.

METHODS USED	MOST COMMONLY USED	COMMONLY USED	RARELY USED
1. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- b) Does your formal evaluation technique include the following methods? Please indicate the methods and the degree of their usage in your organisation by placing a tick mark in the appropriate box.

Techniques of evaluation	most commonly used	frequently used	rarely used	Never used	Don't know
Payback period	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Net Present Value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Rate of Return	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Return on Investment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information Economics tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. Evaluation Techniques Used: **Informal**

- a) If you are evaluating your IT projects informally, what methods does your organisation use to evaluate them? Please state the methods and the degree of their usage.

Informal methods used	MOST COMMONLY USED	COMMONLY USED	RARELY USED
1. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b) Does your informal evaluation method include any of the following? Please tick the appropriate box.

Informal Techniques used	most commonly used	frequently used	rarely used	Never used	Don't know
Informal discussion and consensus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reliance on past experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reliance on the experience of other organisations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faith in IT's contribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vendors advice and recommendation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. At any point in time, an organisation may have a number of competitive IT investment alternatives. On what basis do you prioritise or rank such investment options?

17. What criteria do you use to accept or reject IT investment projects?

18. Are users or stakeholders such as customers, owners, company planners, and vendors involved in IT project initiation, planning, evaluation and implementation processes in your organisation?

Yes No Don't know

19. If your answer to question no. 18, above, is yes, please indicate which group of users/stakeholders and in which stage of the process they are involved.

No.	user or stakeholder	stages (initiation, planning, etc.)
1.	_____	_____
2.	_____	_____

20. Project Authorisation: Who is responsible for giving final approval for IT investment projects? Please indicate using tick marks.

- Company President / Executive Director/ General Manager
- Senior-Management-Level Steering Committee
- Departmental-Level Steering Committee
- Board of Management
- Board of Directors
- Others

21. If your answer for question no. 20, above, is 'Others', or if you want to qualify or elaborate any of your answers above, please explain your organisation's project approval procedures and responsibilities. _____

22. What are the major sources of finance for IT investment projects?

23. How much did your organisation invest/spend in IT related projects/activities? Please indicate your company's budgeted and actual expenditure for the last two years.

	Year 1997	Year 1998
IT / EDP or Computer Center budgeted expenditure	_____	_____
IT / EDP or Computer Center actual expenditure	_____	_____
Investment made in IT projects	_____	_____
Revenue or Gross income of the organisation	_____	_____

24. Does your organisation face problems in evaluating IT investment projects?

Yes No Don't know

25. If your answer to question no. 24, above, is yes:

a) What major problems does your organisation face in evaluating IT investment projects?

Please show the type of problems that you face and the degree of seriousness of each problem.

Problem Type	most serious	serious	moderately serious	least serious
1. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b) Does your organisation encounter any of the following types of problems? Please also show their degree of seriousness by placing a tick mark in the appropriate box.

Problem type	most serious	serious	moderately serious	least serious	problem Doesn't exist
Difficult to identify & measure IT benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficult to identify & measure relevant costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficult to identify and quantify project risks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of adequate information about the proposed project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of skilled and experienced manpower in the area of project evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. Does your organisation have a clearly stated and well documented guideline for evaluating IT investment projects?

Yes No Don't know

27. If your answer to question no. 27, above is 'YES', do the guidelines clearly specify the following? Please indicate by using a tick mark in the appropriate box for each of the following choices.

Procedures	Yes	No	Don't know
The steps to be followed in evaluating such projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project evaluation tools and techniques to be applied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria to be met by each project before its acceptance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Key issues that must be considered in project evaluation and selection process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scope of responsibility for IT investment approvals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. How does your organisation communicate the findings of the evaluation process to the concerned officials, departments, etc.? Please show using a check mark.

Method of Communication	Most commonly used	Commonly used	Occasionally used	Never used	Don't know
Conduct regular meeting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workshops and presentations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Informal meetings and discussions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other methods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If your organisation is using other methods of communicating project details, please indicate the methods employed _____

(QUESTIONNAIRE: SENIOR MANAGERS)

1. General Information: (please tick the appropriate box)

i) Sector in which you are working (public or private) _____

ii) Industry (Banking, Insurance, etc.,) _____

iii) Position in your organisation: Please indicate by circling the appropriate number.

1. Company President / Board Chairman

2. Vice President

3. General Manager

4. Deputy General Manager

5. Marketing Manager

6. Planning Department Head

Other, Please specify _____

iv) For how long have you been working in this position ? _____

2. Does your organisation invest in information technology, i.e. in computer hardware, software and related facilities ?

Yes

No

Don't know

3. If your organisation is not investing in information technology, what do you think is the reason? _____

Please give your opinion to the following questions if your organisation is investing in information technology.

4. For what specific purposes do you invest in information technology? Please state the purposes in the order of their importance (from the most important to the least important).

1. _____

2. _____

5. What procedures do you follow to initiate and approve IT investment projects?

6. Do you evaluate the viability of your IT investments?

Yes

No

Don't know

7. If your organisation is not evaluating IT investment projects, what do you think are the reasons for not evaluating such projects?

8. Which of the following problems explain the reason for not evaluating IT investments.?

Please indicate using a tick mark in the appropriate box.

Shortage of skilled manpower in IT evaluation

Shortage of time

Operational urgency

Unfamiliarity with project evaluation technique

The indispensability nature of IT Projects

Other reasons, please specify _____

9. If your organisation is evaluating IT investment projects:

a) Who is specifically responsible for evaluating IT investment projects? Please indicate using a tick mark in the appropriate box.

- Steering Committee composed of Senior Management
- Finance / Accounts Department
- Information systems/computer centre managers
- Departmental Committee
- Computer hardware and software vendors
- External consultants
- Others, Please specify _____

b) How does it evaluate them?

Formally Informally Don't know

10. Are users or stakeholders such as customers, owners, company planners, and vendors involved in IT project initiation, planning, evaluation and implementation processes in your organisation?

Yes No Don't know

11. If your answer to question no. 10, above, is yes, please indicate which group of users/stakeholders and in which stage of the process they are involved.

No.	user or stakeholder	stages (initiation, planning, etc.)
1.	_____	_____
2.	_____	_____

12. Project Authorisation: Who is responsible for giving final approval for IT investment projects? Please indicate using tick marks.

- Company President / Executive Director/ General Manager
- Senior-Management-Level Steering Committee
- Departmental-Level Steering Committee
- Board of Management
- Board of Directors
- Others

13. If your answer for question no.12, above, is 'Others', or if you want to qualify or elaborate any of your answers above, please explain your organisation's project approval regulations.

14. What are the major sources of finance for IT investment projects?

15. At any point in time, an organisation may have a number of competitive IT investment alternatives. On what basis do you prioritise such investment options?

16. What criteria do you use to accept or reject IT investment projects?

17. Is there an organisational policy that dictates the use of a specific project appraisal technique?

Yes

No

Don't know

If yes, please specify the techniques. _____

18. Does your organisation encounter problems in evaluating IT investment projects?

Yes

No

Don't know

19. If your answer to question no.18, above, is yes:

a) What major problems does your organisation face in evaluating IT investment projects? Please show the type of problems that you face and the degree of seriousness of each problem.

Problem Type	most serious	serious	moderately serious	least serious
1. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

b) Does your organisation encounter the following types of problems? Please also show their degree of seriousness by putting a tick mark in the appropriate box.

Problem type	most serious	serious	moderately serious	least serious	problem Doesn't exist
Difficult to identify & measure IT benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficult to identify & measure relevant costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficult to identify and quantify project risks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of adequate information about the proposed project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of skilled and experienced manpower in the area of project evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. a) Does your organisation have formal procedures or guidelines for evaluating IT investment projects?

Yes No Don't know

b) If your answer to question no. 11 (a), above is 'YES', does your guideline clearly specify the following? Please indicate by using a tick mark in the appropriate box for each of the following choices.

Procedures	Yes	No	Don't know
The steps to be followed in evaluating such projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Project evaluation tools and techniques to be applied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Criteria to be met by each project before its acceptance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Key issues that must be considered in project evaluation and selection process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scope of responsibility for IT investment approvals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix II

1. Interview Guide: IT, Finance and Marketing Managers

1. What methods do you use to justify IT projects?
2. Do you have formal guidelines that specifies how IT projects should be evaluated? For instance guidelines that specifies what factors to consider, what yardsticks to use, and when to accept or reject a project?
3. Are stakeholders involved in the evaluation process?
4. What problems do you encounter in evaluating IT projects/
5. What do you suggest to improve the evaluation process in your organization?

2. Interview Guide: Executive Management (CBB)

1. What are the major objectives and the future plan of the Bank?
2. What type of services does the Bank provide to its clients?
3. Do you have problem in evaluating long term investment projects? What are the causes to the Problems? Please specify.
4. Do you have problem in obtaining information from the Bank's loan, saving and current account systems? Please specify.
5. What do you suggest to solve the problems?

Appendix III: List of Interviewees

No.	Name	Position
1.	Ato Yadeta Kumsa	Finance Manger (Awash Bank)
2.	" Tilahun Berhanu	Info. and Computer Service Dept. Manager (CBB)

3.	"	Mesfin Tessema	Accounts and Investment Dept. Head (CBB)
4.	"	Meressa G/Mariam	Admin. Dept. Manager (CBB)
5.	"	Tariku Woldeyes	Business Devt. Manager (CBB)
6.	"	Assebu Mamo	Branch Operations Manager (CBB)
7.	"	Asrat Mengistu	Branch Manager (CBB)
8.	"	Kebede Wagari	Finance manager (NICE)
9.	"	Tewodros Bogale	IT Manager (NICE)
10.	"	Melku Kokeb	Marketing Representative (Warit International)
11.	"	Tessma Yaee	General Manager (Boren Real Estate)
12.	"	Eshetu Abera	IS Deputy Director (Science and Tech. Commission)
13.	"	Solomon Mamo	Finance and IT Manager (Dashen Bank)

Appendix IV: List of organisations surveyed

No.	Name of organisation
1.	National Bank of Ethiopia
2.	Commercial Bank of Ethiopia S. C.
3.	Construction and Business Bank S. C.
4.	Development Bank of Ethiopia
5.	Dashen Bank S. C.
6.	Wegagen Bank S. C.
7.	Awash International Bank S. C.
8.	Abysinnia Bank S. C.
9.	Nyala Insurance S. C.

10. Awash Insurance S. C.
11. Africa Insurance S. C.
12. National Insurance Co. of Ethiopia S. C.
13. The United Insurance Company S. C.
14. Ethiopian Insurance Corporation
15. Lion Insurance S. C.
16. Nile Insurance S. C.
17. Global Insurance S. C.
18. Jakros Ethiopia PLC.
19. Boren Real Estate S. C.
20. Tambo International Ethiopia PLC.
21. N. Ethio Trading PLC.
22. Ayalew Berhanu Kassa
23. Dasset PLC.
24. Mulugeta Mengistu Tekle
25. Hibisit Dersehe Kassa
26. Huda Real Estate
27. Samaritan PLC
28. Abdul Ture
29. Ethio Agricultural and Industry Amalgamated S. c
30. Yidnekachew Construction PLC.
31. Mohamed Adem Ahmed
32. Mulugeta International PLC.
33. Abinet Girmay
34. Warit International

Appendix V: Discussion Guide: Project Appraisal Factors Identification Checklist.

The Information and Computer Systems Department (ICS) is currently studying the viability of developing a computerized financial system for its city branches. The proposed system includes branch current, saving and loan accounting systems. The aim of the project is to harmonize branch and head office financial systems, provide better and timely information to management, overcome the deficiencies of the existing system and to make the bank more competitive. It is believed that management involvement and consideration of relevant factors in evaluating IT projects will enable the bank to make the right investment decision. It also ensures the success of the proposed system.

In view of the above facts, which of the following quantifiable and non-quantifiable factors, in your opinion, should the Bank consider in evaluating long term investments in computers and related technologies. Please indicate, using a tick mark, which factors should be considered and which should not.

Benefit Factors To Be Considered

No.	Factors by Category	Consider	Don't Consider
1	Strategic Assessment Relationship of the proposed system to the bank's strategic plan		
2	Effectiveness Improves skills and organizational leaning Increases accuracy of clerical and repetitive operations Makes the bank more flexible and adaptable to change		
3	Management information support Provide better & timely information on critical or core activities for management Improves organisational planning		

4	<p>Improves the speed and quality of business decisions.</p> <p>Competitive advantage</p> <p>Improves the bank's image</p> <p>Establishes strong linkage with customers and suppliers</p> <p>Increases the bank's market share</p> <p>Used to deliver the bank's service to customers</p> <p>Increases access to the market</p> <p>Differentiate the bank's service from other banks</p> <p>Help the bank to gain a cost advantage over competitors</p>		
5	<p>Competitive response - Negative Factor</p> <p>Delaying the project puts the bank at a disadvantage.</p> <p>Other banks already provides the service</p> <p>The industry (sector) requires that capability</p>		
6	<p>Project risk</p> <p>Degree of Management support to the proposed system</p> <p>Preparedness of management for change</p> <p>Existence of well formulated plans & procedures to implement the project</p> <p>Existence of plans for users training</p>		
7.	<p>Customer Service</p> <p>Improves quality of service to customers</p> <p>Improves customers satisfaction</p>		
8.	<p>Financial justification factors</p> <p>Reduction of operating costs</p> <p>Generation of additional revenues</p> <p>Improved resource utilisation</p> <p>Improves efficiency of existing operation</p>		

9.	<p>Technical Risk - Negative factor</p> <ul style="list-style-type: none"> ◆ Availability of skilled and experienced technical staff ◆ Familiarity of technical staff with hardware, software, and other technical requirements by the proposed system. ◆ System involves new features, new interface, complex design and programming ◆ Readiness of technical staff to undertake the project 		
10.	<p>Definitional Uncertainty</p> <ul style="list-style-type: none"> ◆ User requirements are not known ◆ System specification is difficult ◆ Probability of major changes 		
11.	<p>Strategic information system architecture</p> <ul style="list-style-type: none"> ◆ Relationship of the proposed system to the banks information system plan 		
12.	<p>Information system infrastructural Risk</p> <ul style="list-style-type: none"> ◆ Compatibility of existing hardware, software and other facilities ◆ Need for non project investment such as communication capabilities, data dictionary, hardware, soft ware, 4 staff to undertake the proposed system 		
13.	<p>Other factor, please specify</p>		

Appendix VI: Initial Project costs estimate form

Form A- Programming time & cost

No	Module	Programming days					Total
		Staff- update & preparatio n	Functional specificati on	System s Design	Coding & testing	System integratio n	
Total programming Days							
Total cost (Prog. Days x Br/ day) =							

Form B - Non-programming costs

No	Items	Quantity required	Unit cost	Total cost
1.	Programming Environment cost (e.g. Microcomputer, compiler, CASE tools)			
2.	Materials- Development time			
3.	New hardware and software requirement of the proposed system. (mini/microcomputers, storage devices, printers etc)			
4.	User training			
5.	Installation costs			
6.	Other costs			

Summary

Programming cost	_____
Programming environment cost	_____
Materials- Development time	_____
New hardware costs	_____
User training	_____
Installation cost	_____
Other costs	_____
Total Project cost - initial	=====

Appendix VII: Project Viability Assessment Worksheet

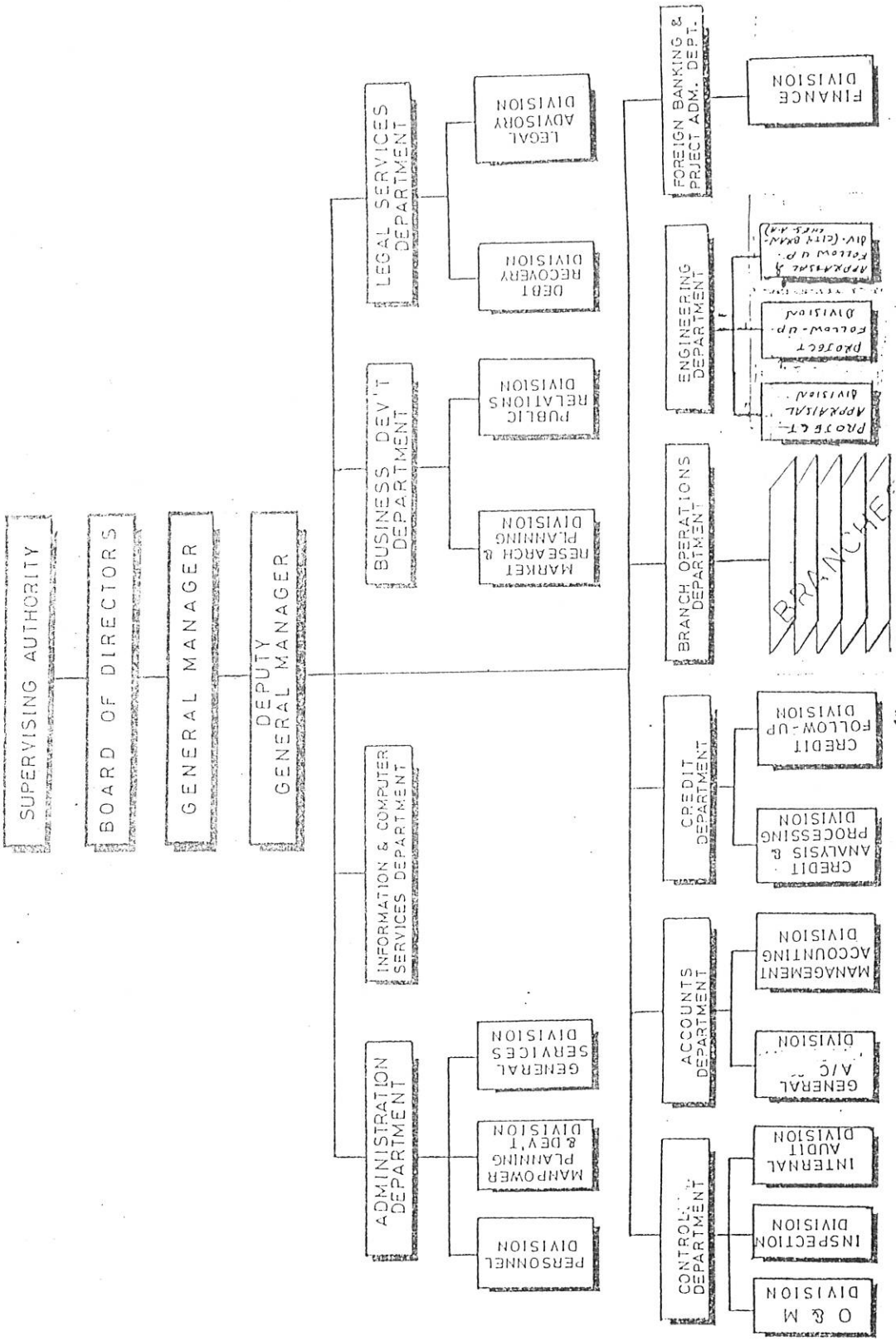
i) Risks

No	Risk Factors	Weight Assigned	Score 0 - 10	Weighted Score
1	Competitive threat (weight = 3.0) <ul style="list-style-type: none"> ◆ Opportunity is overtaken by competitors if project is delayed ◆ Industry requires that capability ◆ Competitors already provide the service 	1.25 1.00 0.75	5.00 6.00 6.00	6.25 6.00 4.50
2	Technical Risk (Weight = 3.0) <ul style="list-style-type: none"> ◆ Shortage and unavailability of skilled and experience technical staff ◆ Project involves new features, new interface, complex design and programming ◆ Unfamiliarity of technical staff with hardware, software and other requirements of the proposed system 	1.25 1.00 0.75	8.00 5.00 6.00	10.00 5.00 4.50
3	Project / Organisational Risk (Weight = 2.0) <ul style="list-style-type: none"> ◆ Degree of management support to the project ◆ Preparedness of management to undertake the project ◆ Project complexity 	0.80 0.70 0.50	6.50 8.50 4.00	5.20 5.95 2.00
4	Obsolescence (Weight = 2.0) <ul style="list-style-type: none"> ◆ Project gets obsolete before providing the Anticipated benefits 	2.0	6.0	<u>12.0</u>
	Total Project Risk - weighted score			<u>61.40</u>

ii) Benefits

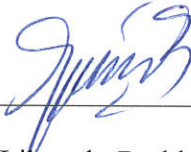
No	Benefits	Weight assigned	Score 0 - 5	Weighted Score
1	Strategic Assessment (weight = 3) ◆ Impact and Relationship of the proposed system to the bank's long term plan	3.00	5.00	15.00
2	Competitiveness (weight = 3) ◆ Improves the banks image ◆ Makes the Bank more flexible and adaptable to change ◆ Increases the bank's access to the market	1.25 1.00 0.75	4.50 4.00 4.00	5.63 4.00 3.00
3	Customer Service (weight = 3.5) ◆ Improves quality of customer service ◆ Improves customer support and satisfaction	2.20 1.30	4.50 4.50	9.90 5.85
4	Management Information Support (Weight =4.5) ◆ Provide better & timely information on core or critical activities for management ◆ Improves organisational planning	3.00 1.50	4.00 4.50	12.00 6.75
5	Effectiveness (weight =2) ◆ Increases accuracy of clerical and repetitive operations ◆ Improves skills & organisational learning	1.25 0.75	4.50 4.00	5.63 3.00
6	Financial return (weight = 4) Net present value or any financial measure Total Project Score	4.00	0.00	<u>0.00</u> <u>70.76</u>

ORGANIZATION CHART OF CONSTRUCTION AND BUSINESS BANK



DECLARATION

The thesis is my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.




Libsneh Redda Abebe

This thesis has been submitted for examination with our approval as university advisors.



Dr. Lishan Adam



Ato Habteselassie Hagos