ANALYSIS OF FACTORS CONSIDERED IMPORTANT IN THE SUCCESSFUL IMPLEMENTATION OF INFORMATION SYSTEMS: A CASE STUDY OF COMMERCIAL BANKS IN KENYA

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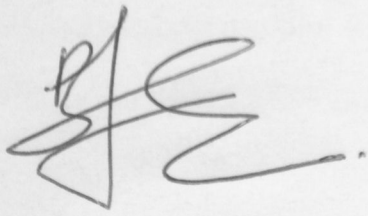
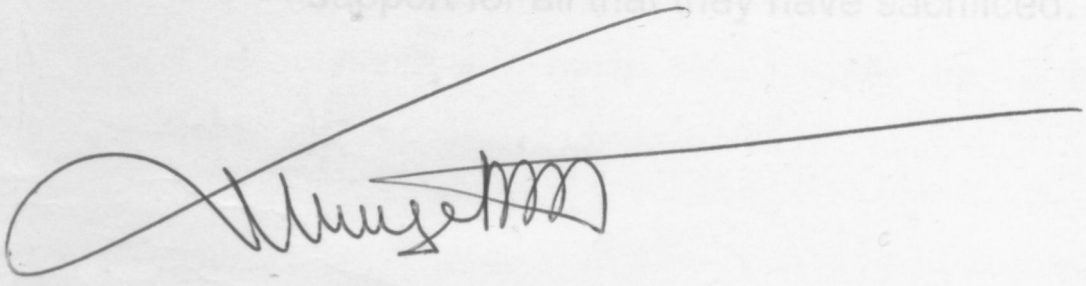
DECLARATION

This management research project is my original work and has not been presented for a degree in any other university.



Ochieng John Baptista

This management research project has been submitted for examination with my approval as the university supervisor.



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Dedicated to Jennings Magawa, Oliver Kinesi, Marian Akello and to my late sister Pauline Anyango for their support for all that they have sacrificed.

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ABSTRACT

Compelled by competition and the drive to lower costs, organisations are investing in Information technology systems infrastructure at unprecedented rates, integrating technology into a nearly all aspects of corporate operations. The mismanagement of Information Technology investments can lead to lost opportunities and exposure to enormous business risk. Information systems are a catalyst for change; it reallocates and therefore tends to redistribute power and must therefore be implemented with caution.

Today, nearly every facet of a business is dependent, tactically and strategically upon an effective computer based information system. Information has in fact emerged as a key strategic resource in national and international business development and the proper implementation and management of this resource can have an enormous impact on the growth and development of a business. Indeed in many cases it is a prerequisite for survival.

From the study the following factors were determined to be important during the implementation of information systems, strategic planing for information systems, participation of all key players, adequate controls procedures suppliers reliability, adequate change procedures, availability for alternative products, information systems managers understanding of the business, adequate capacity for the new system to support growth in business and sufficient processing speed for the new systems. These factors if taken into consideration during the implementation process will improve the reliability of the implementation by providing a framework which organisations can refer to.

TABLE OF CONTENT

TABLES

CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND

The use of computer information systems (IS) effectively and efficiently demands a thorough understanding of the technology and its implications for the company strategy. Many companies have invested heavily but have failed to secure the full benefits available, for example the U.S patent office spent $289 million between 1984 to 1991 on information systems without deriving any benefits from their investments(O'Brien, 1993). Information technology systems implementation has often been relegated to relatively junior managers who lack sufficient knowledge, experience and authority. There has been a rapid diffusion of Information systems throughout the economy for more than a decade. With electronic revolution companies are gaining access to extraordinary amounts of information as fast as they want forcing executives to re-examine their practices more closely.

Information systems are transforming our economic and recreational activities and it merits careful attention as one of the most important sociologically phenomena of the century (Scott, 1993). Without doubt, Information system has had one of the single most powerful effects in the office environment. It has changed not only the way people work, but also their ability to produce work. There is an increased emphasis of the new technology's potential for providing decision making in forms previously non existent. Computerized systems for example can release information simultaneously throughout the organization as events take place thereby extending management's control. The new system can monitor processes and people and integrate their

actions to a greater extent than ever before. Land (1992) demonstrated that a company's approach to IS systems affects other strategies in a way that significantly affects economic performance. The main purpose of IS is to monitor performance in the whole range of the company's critical operations so as to help control direction (Cole, 1985). Operations are monitored to identify emerging problems and have the information to solve them, this function is critical to organizational survival. Hence the Information systems must collect information and make it available in ways to ensure that the organization will be flexible, resilient and capable of responding to rapid changes in the environment. Growing appreciation of the changing role of information systems has highlighted the need to focus on different approaches to information system planning which aligns information systems plans with business plans. Information systems have now become sufficiently powerful drivers to have become interdependent with business strategies and may therefore require planning approaches which support or even initiate their roles as leaders of business strategies (Cole, 1985). Information systems need to be integrated with the organization processes and structure to achieve lasting advantage. IS can influence change in the organization processes, products and even its markets (Kovacevik, 1993).

Although IS is an agent of transformation, significant technical problems still exist which constrain effective deployment in local business domain. This implies that Information systems implementation is no longer a sequential process but an iterative process which spans different domains, business strategy, organizational infrastructure and processes. The rapid expansion of IS has not been matched by a corresponding understanding of the impact that it has had on the working environment. Many companies do not understand the full implications of introducing new Information systems. New

considerations of work patterns, health and safety operations, storage of documents, methods of communications are all issues that must be considered if the investment has to improve efficiency, productivity and profitability of a business (Taylor, 1991).

Information Systems implementation are more successful when they are implemented as part of a more general strategy concerning the firms development (Cain, 1996). 80 to 85 percent of the IS project is done at this stage. Many African countries are littered with technical artifacts that are no longer in working order or that worked only for a short time before they were abandoned. Many systems are brought and implemented with a lot of excitement, but after a couple of months use, are then dropped. IS are often abandoned by reverting to the manual method, or to new ones this is a waste of meager resources. The problem of lack of implementation and post implementation review has been reported by many (Woheren, 1993). There will be no meaningful technological acquisition of IS without the ability to implement, repair, enhance and adapt that technology when necessary.

Practically any company of any size in any country can benefit from using the new information tools currently available to assist with the implementation process. While it is becoming abundantly clear that a fundamental shift in business dynamics is taking place, many businesses in developing countries are failing to exploit the potential of this strategic asset. There may be many reasons for this, such as poor telecommunications, the high cost of computer equipment, lack of role models, lack of available skills, lack of understanding of the dynamics of the information. It is important to demystify the technology and to start looking at the new IS tools from a business perspective rather from a technological one. Although building good

information systems is seldom easy, it is far easier than revamping the process by which people work, the organizational structure and culture which need to be altered to implement IS. The change in structure, culture, process and people roles which are the most crucial must be controlled to ensure successful implementation of Information systems (Nunamaker, 1997). It is important that the introduction of information systems be beneficial to the business rather than a gesture in technological modernity when the firm seeks IS solutions to enhance operations and support the organisational objectives. Used improperly IS can waste a lot of money and divert management's attention and even increase overall costs, treated in isolation it is unlikely to significantly improve performance but properly applied IS can enable performance improvements (Blennerhassett. et al, 1993).

Implementation may require some political maneuvering adjustment of formal systems, changes in the organization structure and attempts to influence cultural traditions. Managers should recognize the limits imposed by personalities, system organization structure, and culture on any implementation process. Managers should be aware of the social question of privacy and the depersonalization of individuals should be considered during implementation (Scott, 1993).

Information systems play a vital role in business success by providing the information a business needs for efficient operations, effective management and competitive advantage. However IS can fail if they do not support strategic objectives, business operations or managerial needs of an organisation, they can seriously damage its prospects for survival and success. So the proper management of information systems is a major challenge for managers.

If the information system meets the technical performance specifications and/or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among the project participants, then the information system can be considered an overall success (Baker et al, 1986).

1.2 SUCCESSFUL INFORMATION SYSTEMS

Defining the criteria for success of IS is problematic, the concept of success can be defined as success in overcoming the obstacles to implementation and in realizing the aims of the information systems(Land, 1992). It requires time to measure the impact and the conceived benefits of implemented systems, most of the benefits arising from new information systems are intangible making the process more difficult (Hevner, 1992).

Information system implementation is usually said to be successful when it satisfies the project objectives which are normally in multiple criteria such as time, cost, quality, safety (Hayfield, 1986). If the information system meets the technical performance specifications and/or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among the project participants, then the information system can be considered an overall success (Baker et al, 1986).

The aim of a system is coordination of managerial efforts towards the goals of the firm. A system must be acceptable to the organizations managers and the people who are involved in it's operation. A well planned system has a foundation of sound procedures, and is designed and assembled in such a way that the system can easily adjust to changing conditions, flexibility should be built into a good system because the environment is dynamic and not

statistic. In assessing success or failure of implementation the study will rely on the opinion of the information technology managers of the organization under study.

1.3 DEFINITION OF TERMS

An information system is a set of people, procedures and resources that collects, transforms, and disseminates information in an organization (Heeks, 1995). Today managers rely on many types of information systems. The research concentrate on computer based information systems that use hardware, software, telecommunications and other forms of information technology to transform data resources into a variety of information products. Information systems may be based on any combination of human endeavors, paper based methods and information technology. The concern is with the efficient utilisation of resources for providing the required level of information support for the management of business operations. It represents the application perspective.

Information Technology (IT) includes computing, telecommunications and office systems as automatic means of handling information (Heeks, 1995). IT represents the technical perspective and includes telecommunications, computers and automation technologies. It is the enabling mechanism which facilitates the processing and flow of information, as well as the technologies used in the physical processing to produce a product or provide a service.

1.4 RESEARCH PROBLEM

Despite the continuous growth of the application of IS and the success the technology has had in helping whole industries to transform, it is accepted that many applications still fail to meet the aspirations of the sponsors (Land, 1992). Half of the computer systems installed in the US never prove their worth according to one estimate (Scott, 1993). Attempts to computerize the operations of the Customs and Excise Department failed for a third time at the implementation stage after a great deal of resources had been spent, approximately Kshs 80 million was used before the project was abandoned when it was 90 percent through with implementation (Standard, January 25, 1994).

Many of the implementation problems stem from social and organizational factors rather than technology itself (Hevner,1992). In Kenya currently the country does not have a national policy framework on computers or a local professional body to regulate the activities of the information systems professionals. Despite claims that there are methods which can bring improvements in information systems implementation their penetration into the market place has not been very deep. One question is whether the same kind of factors which influence the success of new technology in other environments are also relevant to the introduction of information systems in new environments. The IS industry is complex, uncertain and changing so quickly that many organizations are finding it difficult to capitalize on new opportunities (Sunker, 1992).

The implementation of a large computer system is one of the most complex activities undertaken by organisations. The number of staff involved and the resources consumed often make computer development projects one of the

most costly of all projects undertaken. In addition many of these systems do not meet user needs, exceed their projected development costs and time scale (Hevner,1992).

A study by Pettersson (1990) indicated that within a single organization, the same system introduced into a number of different locations yielded widely different degrees of implementation success. Woodward's studies in the 1960's indicated that organisational and social issues had a significant effect on the level of success obtained in utilizing new technology in the workplace.

In Kenya different studies have been done focusing on different aspects of information systems Kipngetich (1991) studied management satisfaction with information systems, Gatune (1993) studied the factors considered important in implementing local area networks, Nyambane (1996) studied the evaluation of the extent of and factors limiting information technology usage in publicly quoted companies in Kenya. None of the studies above have addressed the pertinent issue: what are the factors considered important in successful implementation of information systems?

1.5 OBJECTIVE OF THE STUDY

The objective of the study is to determine the factors considered important in successful implementation of information systems.

1.6 IMPORTANCE OF THE STUDY

The study will help companies effectively implement their information systems in order to achieve a competitive advantage. Many of the strategic opportunities that companies seek to pursue depend largely or entirely upon IS for their success. The high cost of installing and maintaining existing information systems and the long term nature of IS investments demands that organisations strategically plan for this resource. IS if implemented successfully lowers costs of products. Any mistake made in the early phases show up here and must be recovered along with technical problems that have developed.

The study will benefit the following groups of people

1. IS managers to effectively implement their IS.
2. Sensitise investors on appropriate strategy to ensure IS resources work for the business.
3. The academicians, since the study will enhance the overall understanding of the IS implementation. It will enable further studies in areas where the knowledge of IS implementation is an essential input.

CHAPTER TWO

LITERATURE REVIEW

2.1 DEVELOPMENTS IN INFORMATION SYSTEMS

Milestones in the development of IT were first the big expensive mainframe computers introduced in the 1960's to handle large scale operations. The development of integrated circuits led to the production of smaller, less costly but powerful minicomputers. The second half of the 1980's saw the wide adoption of personal computers throughout the organizations widely due to the low price of personal computers and the development of a wide range of user friendly software packages. Initially, early computer based systems tendered to be associated with scientific applications with commercial applications developed later. These applications were inevitably centered around the data processing functions with their impact being felt only at the operational level of information preparation and decision making. This trend was reinforced because the prime justification for computerization during this period was cost saving and it was more focused on operational areas (O'Brien, 1993). Linkages through communication networks increased dramatically in the 1990's and with the coming of the global network, lowering of taxes paid on computers more companies are gaining access to what used to be the domain for rich companies.

Within a period spanning barely a decade, computers have dominated the world and firms are hastening to keep abreast with the new technology as computers became more and more affordable, so does the exploitation of them spread and individuals find themselves obligated to be computer literate. The full potential of computers remains under-utilised, a research of

about 500 US firms indicated that only 9 percent of the executives were happy with the services they were getting from their information technologies (Mirani, 1993).

Information Technology has emerged from its initial stage as a labor saving and cost cutting function and now exerts an all pervasive influence which encompasses corporate organisation and structure, product development, manufacturing process distribution, customer relation, retailing, marketing and advertising. The transition from an industrial to an information era is evidenced by the decrease of industrial employment and increasing employment of service and information workers. There has been a radical growth of computer literacy with improved communications resulting in the spread of communication related activities such as telebanking and teleconferencing, since it is cheaper to move information than it is to move people and goods (Reck, 1987).

The potential of Information Technology should be appreciated as was that of its predecessors - the introduction of steam, the internal combustion engine or electricity. IS is now a powerful driving force and management's task is to drive that technology to their advantage and not be driven by it. The new emerging technologies such as electronic commerce are having dramatic impact on the way national and international business is being conducted. The information revolution is fundamentally changing the way we do business, communicate with our clients, market our products, source suppliers and find buyers. In addition, new virtual industries that exist electronically but do not have the physical premises such as virtual shopping malls and virtual banks, have sprung up in the past few years. As the impact of the information era permeates into society, it will induce structural changes,

new desires and attitudes to which successful business must respond. The momentum of interaction between technology and society is likely to accelerate in the years ahead.

Implementation can be viewed as the process that carries out operational plans developed at the information systems planning process. More specifically the implementation follows the investigation, analysis, and design stages of the systems development process. Implementation should be addressed in the initial plan and throughout the IS development process. Without a clear criteria for implementation, there is a likelihood of the projects failing to meet their objectives. Organisations have to attribute priority to each of the component elements of the implementation, because some aspects of the system may be important in fulfilling corporate objectives than others. Implementation is concerned with putting the systems design into practice. Implementation goes beyond the physical environment thus management must carefully plan for the whole process.

Information system implementation is usually said to be successful when it satisfies the project objectives which are normally in multiple criteria such as time, cost, quality, safety (Hayfield, 1986). There is usually a trade off among the criteria but the satisfaction of the key project participants is always crucial to the project success. Indirect benefits include factors such as increased cash flows through efficient processing of transactions, better customer service or faster and more accurate information.

Various methodologies have been developed to attempt to quantify the **success of systems implementation.** Key performance analysis is one such technique whereby one identifies and set the standards required for the

system but the end product is usually an organisational standard. The degree of success achieved through the use of an implemented computer based IS will depend on the cumulative success of all the previous stages in the systems development methodology. Difficulties in defining success criteria is problematic because of the wide variety of goals different IS attempt to achieve (Lambert, 1993). In assessing success or failure of implementation the study will rely largely on the opinion of the management of the organisation under study. Aspects of organizational, managerial and social context in which IS is installed contribute crucially to it's likely success. Indeed factors identified in one situation appear to have relevance in all sites.

2.2 IMPACTS OF INFORMATION SYSTEMS IN THE ORGANISATION

Although a clear and consistent relationship between information systems investment and financial performance is yet to emerge, companies have continued their large investments in IS. This is so despite the dissatisfaction expressed by general managers in measuring the value of IS to their organizations. If managers have been rational in such investments, it is possible that research may not have captured the true benefits that companies derive from IS (Mitra et al., 1996). Most benefits are difficult to predict and have proved elusive in many cases because the benefits are future oriented and difficult to quantify. The benefits should not be aimed at cost cutting rather at the more intangible company wide benefits. The process by which IS reduces operating costs is not well understood (Maier, 1997).

Information systems can be seen to affect Organisations in two different ways. The automation effect refers to the replacement of clerical labor with IS capital examples include automated order entry, invoicing and payroll. The automation effect of IS is better understood, easier to quantify in terms of

labor savings, and more local in its impact. Several firms have used IS and communication networks to lower labor costs by relocating certain jobs offshore through the use of satellite lines for data communication, voice communication and teleconferencing; examples include software development companies in the United States that employ programmers in third world countries such as India, connecting them to the clients through electronic communication channels.

The information effect refers to the better control, monitoring and decision making that IS provides to management. Such effects are harder to identify and quantify because their impact may be felt in various areas of the organization as well as in the performance indicators that may seem unrelated to IS. IS provides better information that leads to better investment decisions. Thus managers are able to identify the firms less profitable lines of business and decrease their investments in such endeavors.

The primary benefit of IS lies in the information and controls that IS provides to management, and less in the automation aspects that are considered the primary source of cost savings from IS use. IS is enabling progressive organisations to leverage more effectively the skills of their people. IS can be said to function as a support activity which is useful but not critical to the success of the organisation, as a factory activity where IS is crucial to current operations but not at the heart of the company's strategic development, as a turnaround activity where IS is used to open new opportunities and as a strategic activity where without the IS the firm cannot function. We cannot overlook the role of information in sustaining successful relationships, via the critical progression from data to information to knowledge and a competitive edge. Indeed information systems value added in the organization must be

defined in terms of its value added in the market, where business knowledge is ultimately put to work.

Information flowing between organizations can enhance relationships and simplify value chains and shift competitive power and advantage. No single approach - IS, marketing, production or financial is ever successful on its own; clearly management adds value by integrating all its resources. IS resources must be coaligned with the firm i.e. working for common objectives. Business and information system cannot be separated or made separable, only then can information systems be strategically used creatively and critically by decision makers. It is only then that the dreams of systems designers to enhance organization effectiveness and its capital and labor productivity truly became a reality. Information systems no longer just support existing business activities, it shapes organizations identity (Lambert, 1993).

2.3 CHALLENGES IN INFORMATION SYSTEM IMPLEMENTATION

The implementation process begins after management has accepted the new system. Implementation consists in installing the new system and the removing the current systems. It involves hardware, software and people. The implementation process is often the most difficult (Fitzgerald, 1987). During implementation, problems that had not been anticipated during the study and design effort often appear. Solutions to these problems usually require modification to the original design. The analyst should be willing to accept changes where necessary, but should prevent extreme distortions of the original design.

Successful implementation of IS depends on successful linking or integration of demand, supply and application development and providing an ongoing

framework for organisation decision making. Organisations need to review their structure and emphasis to ensure that they have within their departments the appropriate resources to meet the demands placed on them and are prepared to continually review issues critically to ensure they are making the most effective use of organisational resources (Lambert, 1993).

Implementing IS involves change and this change needs to be managed if the IS strategy is to be successfully implemented, this requires IS to be closely integrated with the people, strategy and culture of the organisation. Human resource policies can create a climate conducive to adopting new technology and thus reducing the associated resistance to change (Peppard et al, 1993).

The Information systems development passes through several phases. Before a project can be undertaken, the need for such a project must be ascertained, the project must be defined as a solution to this need, and the project must be tested for feasibility within the constrains imposed upon it by the organisation. A feasibility study is a preliminary study to investigate the information needs of prospective end users, the objectives, constraints, basic resource requirements, costs, benefits, and feasibility of proposed project. Alternatives should be compared in terms of their technical, economic and operational costs and benefits, with the aim of producing a recommended solution, this will be the system with the greatest apparent benefit value. It has been argued that the process of selection and justification of IS has a strong agenda setting influence on the subsequent introduction of the technology (Scott, 1986).

Establishing and allocating realistic budgets is probably the most important element in the successful implementation of IS. This is done at the initial

stages of the development process. It is vital to have tight control over the project cost to ensure that the budget limits are not unnecessarily exceeded. It is also vital to ensure adequate control over the system so that the integrity and security of the assets, data and information are maintained and the system itself operates efficiently and effectively. Cost control is a continuous process and should be monitored continuously using various tools for example network diagrams, project evaluation and review techniques and Budgets.

The detailed analysis stage identifies the problems with the current system. It involves analysing the information needs of end users, the organisational environment, and any system presently used. It also develops the input, output, storage and control requirements of a system that can meet the needs of the end users (Cutts, 1993).

The design stage involves developing specifications for the hardware, software, people(specialist and endusers), data resources, and information products that will satisfy the information needs of end users. Design will address both computerized and manual procedures in data capture, program design, output design, file design and security. The aim of the phase is to arrive at a detailed statement of how the system is to be made operational.

Implementation involves hardware and software acquisition, testing, documentation, conversion activities and training end users in the information and use of new information system. Thus implementation is a vital step to the success of new systems. **Even a well designed system can fail if not properly implemented, the other stages in the development of system are technical and problems are rarely encountered**. Post implementation

review involves the monitoring, evaluating, and modifying of a system to make desirable or necessary improvements

The issues involved in implementation can be seen as follows IS strategic planning, selection of hardware and software, training, testing, conversion process and organisational factors and post implementation review.

2.3.1 IS STRATEGIC PLANNING

A strategy is a general statement of long term objectives and goals and the ways by which these will be achieved. Developing a strategy is a complex and time consuming exercise and should only be done when the subject matter justifies it. Strategic decisions have an impact on many aspects and functions of the organizations, and influence its direction, management and structure in fundamental ways. Strategic choices are accomplished through assessment of organization strengths and weakness, and environmental opportunities and threats, formulation of managerial objectives, generation and evaluation of strategic alternatives, and selection and implementation of strategic choices which are followed for the attainment of managerial objectives (Harrison, 1995). Any business investment must be based on a coherent strategy, IS is no exception. Any move towards implementing the use or expansion of IS should be derived from the business objective set in the company's business plan. It should be coherent and adaptable to changes in requirements and technology. Many IS still have their primary use as operational tool rather than a strategy tool, the root of the problem is that information professionals do not speak the language of the business and business people are too often separated from information systems (Taylor, 1991).

The information systems strategy set (system objective, system constraints and system design strategies) should be derived from the organization strategy set (business mission, objectives, strategy and other strategic organizational attributes) for competitive advantage to be secured from IS applications (Thompson, 1997). Information strategy formulation deals with the identification of the business needs and the IS framework to satisfy them, evaluation of current systems which helps organisations target their resources and determine the efficiency of current systems and identify the gaps in the current system coverage in the organisation, identification of IS opportunities to help organisations determine areas where IS can effectively be used. Several tools can be used to assist in the determination of the above factors - Porters five force model (current competitors, threats of new entrants, threats of substitutes, suppliers and customers), critical success factors, Porters value chain and a stakeholder analysis (Hickey, 1993).

Beyond examining its own functions an organization must compare its relative position with others in its industry, to judge how successful it is performing in the face of competition today and in the future. IS professionals must became aware of the industry chain and value of information flowing along it and use this knowledge to guide them to external data source.

2.3.2 HARDWARE AND SOFTWARE SELECTION

A formal evaluation process reduces the possibility of buying inadequate or unnecessary computer hardware and software. Organizations should evaluate and select information systems based on some minimum physical and software requirements established within the organisation. Badly organized computer operations, inadequate systems development, and poor purchasing practices may cause inadequate or unnecessary acquisitions. It

is necessary to use a variety of methods for evaluation to measure several key factors for computer hardware, software and services. The financing decisions is an important consideration in the choice of hardware or software, various financing options are available direct purchase, leasing or rental (O'Brien, 1993).

Once the performance of the system has been evaluated using benchmark and simulation test, the organisation should consider other features of the proposal for example the standing of the supplier, cost, the warranty period, maintenance contract and the software support. It need not be overemphasized that a formal evaluation process reduces the chances of acquiring incorrect or unnecessary equipment and software products. Some evaluations factors include cost performance ratios, mean time between failures, availability of spare parts, ease of maintenance and potential for growth and the associated technical support (Cheng, 1982).

It is common for a business firm to acquire resources from many sources. It is essential for business firms to secure the continual support of firms in order to make effective and efficient use of the computer based system. Issues to address is whether to develop the computer based system itself or to acquire the system from outside sources, loss of control over the system, longer response lead times and higher long run unit costs are the main shortcomings of such reliance on external agents (Scott, 1986).

The decision process leading to the acquisition of an IS has two components. The first is concerned with an evaluation of organisational needs and with decisions on how these might be met by the IS. The second is related to the evaluation of the IS itself, particularly in terms of the organisations projected

use of it, hence this ensures there is a match between the functional strength of the IS and the intended needs to which it is addressed.

Many organizations have invested in IS in an ad hoc manner, dealing with each new system on its own merit. The result is IS which are incompatible, duplicate effort, and fail to impact organizational effectiveness. Some mechanism is therefore needed to guide and coordinate the use of Information systems (Heeks, 1995).

2.3.3 SYSTEMS TRAINING

People not machines are the key to the success of business. Both time and money should be set aside for training staff in the use of the IS equipment and in educating them to understand the full benefits of the new technology. If a change is introduced, dealing with people becomes important. Organization change may be necessary to optimize the benefits of technology, therefore the deployment of staff is a critical factor that must be considered at the onset of any IS investment.

The only way to integrate technology successfully into an organization is to involve the people who will actually use it. Staff at the working level usually have a genuine concern about efficient working practices of how a business operates. Specialists can be used who can bring the greater benefit of wisdom to a business without pitfalls of a learning curve. Organisations can conduct a cross impact analysis whose starting point is to categorize change and prioritize those issues which are most likely to affect the organization.

The information systems and system professional can be a catalyst for moving IS's responsibility well beyond automated bookkeeping through

working with management to assess likely features. Only with significant understanding of their firms business and issues can information systems professionals take full advantage of opportunities technology is providing, deciding how to secure the firms information systems, protect its competencies and advantages and so be part of the solution rather than being part of the problem. All other things being equal, the leader who is fluent enough in IS to maintain a proprietary edge will come out ahead.

Information systems professionals have to be in the forefront if they are to realize their full potential. A unique systems approach is needed in articulating the business problems and the IS's possible contributions to their solutions. A true systems approach will safeguard the IS community use of information systems and ensure the right systems are put in place. IS professional must take positions of influence framing the major strategic issues and use their expertise to shape and respond to this strategic information flows and only then offer technical expertise to improve the quality of the information or to improve control on these issues.

2.3.4 SYSTEM TESTING

A system must be thoroughly tested before implementation, otherwise there is a danger that the new system will go live with faults that might prove too costly. The scope of tests and trials will vary with the size of the system. Three types of testing are identified, program testing which test all the programs with dummy data, system testing which tests the interface between individual programs in a system and in the overall system, acceptance testing where the user departments will want to carry out tests or trials on the system, whether it is designed in-house or brought from a software house (Cutts, 1993).

2.3.5 SYSTEM CONVERSION

The initial operation of a computer based system can be a difficult task. Conversion process occurs where the personnel, procedures, equipment, input/output forms, and database of the old information system are replaced with the new systems. Changeover process can be made using different approaches (O'Brien, 1993). Direct changeover is where the old system is completely replaced by the new system in one move. This may be unavoidable when the two systems are substantially different or where the new system is a real time system. Parallel changeover where both old and new system are run in parallel for a period of time both processing current data and enabling cross checking to be made. This method provides a degree of safety should there be problems with the new system. The main problem is the delay in the implementation, a possible indication of lack of confidence with the new system. Phased changeover where only a few departments are converted at a time. This approach is suitable for large projects or those where distinct parts of the organisation are geographically dispersed. Pilot change is where the new system is tested in one site until developers feel it can be implemented throughout the organization. The approach is cheaper and easier to control and provides a greater degree of safety (Scott, 1986).

The timing of the implementation process is important. The new system should be installed and became operational at a time convenient to the users. The management should be careful when selecting the conversion method or a combination of methods.

2.3.6 ORGANISATIONAL FACTORS

Organisational issues concerning structure have to be considered during the implementation of information systems. Developments in computer applications have also led the world in directions not foreseen three decades ago, many organizations have flattened eliminating many middle management positions (Redman, 1995). The Organisational issues pertaining to implementing a computer based system are concerned with the grouping of computer resources into logical and efficient units so as to carry out plans and adhere to goals. The final decision of the approach depends on the management policy and philosophy of the business firm concerned. Through their policies firms have to determine organisational structures that can better cope with the technology.

Security issues to safeguard the physical asset of the system both hardware and software, prevent system attack and penetration by unauthorized persons, protect the privacy rights of people using the system, physically protect the computer resources against natural and manmade disasters such as fire, flood and theft have to be considered.

Management support is necessary for IS implementation projects to succeed. The influence of IS on the way business, people, building and services function is felt everywhere, it is no longer an area to be left to an IS specialist alone. In any project to implement or expand technology, an executive of director status should be appointed to steer the project and be responsible for coordination and integration between and across all aspects of the business. The person chosen should transcend departmental boundaries and vested interest if he is to obtain confidence and commitment from the staff, the project must be seen to have the full commitment of the chief executive and

fellow directors. In order to achieve success in IS implementation there is need to identify a person who directly reports to the top management.

2.3.7 POST IMPLEMENTATION REVIEW

The final step of the systems approach recognizes that an implemented solution can fail to solve the problem for which it was developed. The real world has a way of confounding even the most well designed solutions. Therefore the results of implementing a solution should be monitored and evaluated. This is called postimplementation review process, since the success of a solution is reviewed after it is implemented. The focus of this is to determine if the implemented solution has indeed helped the firm and selected subsystems meet their objectives. If not the systems approach assumes you will cycle back to a previous step and make another attempt to find a workable solution (O'Brien, 1993). A comparison should be made of objectives and original cost benefit submissions against actual performance and actual value. This review is important so that any unforeseen problems may be solved and to confirm that it is achieving and will continue to achieve the desired results. The techniques used in project evaluation mirror the techniques used in earlier stages of the development process hence a cost benefit review can be used

2.3.8 OTHER FACTORS

Commitment implies an organisation determination to carry its endeavors to a successful conclusion. In a sense, it is about the ability of those who work in the organisation to have to resolve to carry through a decision and live with its consequences. Because installation of IS has many consequences, many involving non trivial changes to work practice and organizational structure a high degree of commitment is necessary.

The nature of the implementation process taken reflect the overall management style and the importance they attach to an IS. Successful implementation requires clear plan, the timing of the project, the training of users. The organisational familiarity and experience with standardised ways of working determines level of implementation success. Land (1992), is of the view that the main cause of failure is lack of managerial competence.

IS helps the organisation achieve its objectives. If the objective are not known it becomes difficult to prioritize and review IS contribution to the organisation. A survey should be undertaken to prioritize both the organisation's information related problems and information related opportunities presented by technological developments. One should establish organisational information requirements required to support the organisation key activities (Heeks, 1995). A large number of variables associated with perceived failure center about poor coordination and human relations patterns. Therefore, in order to minimise the chances of perceived failures IS managers should be advised to put heavy emphasis on establishing good, effective patterns of coordination and human relations (Taylor, 1991).

Other major issues affecting IS are finance and skill constraints; Sociocultural constraints including political pressure; conflicting forces of centralisation, standardisation and decentralization; technical issues such as downsizing, access to and attitude of IS vendors and developers.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 RESEARCH FRAMEWORK

The objective of the study is to come up with the factors considered important in successful implementation of information systems. A cross sectional descriptive study will be undertaken to provide details of the variables of interest at a single point in time. A descriptive study is ideal since it allows inferences to be made about the relationship of the variables. Descriptive studies are used when the researcher intends to describe the characteristic of certain groups, to estimate the proportion of people who behave in a certain way or to make specific predictions (Churchill, 1991).

3.2 POPULATION OF THE STUDY

The population of the study will consist of all registered commercial banks in Kenya see appendix II obtained from Central Bank of Kenya dated September 1997, branches of the banks will not be considered as separate entities. Given the size of the population a census study will be done. The rationale behind the selection is that the commercial banking sector is the most computerised in the industry and information technology systems have become a strategic tool critical to their survival. Many of the banks are spending a large proportion of their budgets on the state of the art information systems to be able to compete effectively.

3.3 DATA SPECIFICATION AND COLLECTION

Primary data was collected using questionnaires personally administered by the researcher where the interviewee could not get time, the questionnaire was dropped and picked at an agreed date. The questions have been developed from the study of pertinent literature. The data is non causal since no cause and effect can be made since they describe the relationship among variables.

The questionnaires contains statements that reflect the research problem and comprises different sections to simplify the work of the respondents and for clarification purposes. A five (5) point Likert Scale was constructed to test the differences between the various factors. The questionnaire was addressed to the information technology managers who were seen to have the necessary information.

3.4 DATA ANALYSIS AND PRESENTATION

The data collected was analysed using descriptive statistics and Factor Analysis. Factor Analysis summarizes important information contained in the data by a few number of factors and the identification of the constructs or dimensions that underlie the observed variables. It isolates and eliminates variables that do not seem to belong with the rest of the variables, as well as to name the dimension captured by a measure. Thus the principal component analysis reveals how several measures of a domain can be combined in a single measure. To improve interpretation, the principal component solutions will be orthogonal rotated using varimax rotation, empirical evidence indicates that varimax tends to produce loading that are more interpretable resulting to isolation of factors underlying a set of observable variables

Principal component analysis is used to transform a set of interrelated variables into a set of unrelated linear combinations of these variables. Thus the principal component analysis reveals how several measures of a domain can be combined in a single measure, the first component, to produce maximum discrimination among objects along a single dimension. The variation accounted for by each component also indicates when independent dimensions, or components are needed to adequately define the domain under investigation.

To perform the factor analysis SPSS package will be used.

CHAPTER 4

RESULTS AND DATA ANALYSIS

Fifty three questionnaires were issued to commercial banks listed in appendix II. Thirty five (35) questionnaires out of the fifty three distributed were successfully completed representing 60% of the respondents, these was used as the basis for data analysis and was considered successful to facilitate the completion of the study.

4.1 CHARACTERISTICS OF RESPONDENTS

Table 4.1 Number of Branches Operated Countrywide

Branches	Frequency	Percentage
Less than 5	25	71
Between 6 to 10	7	20
Between 11 to 15	0	0
Greater than 15	3	9
Total	35	100

Table 4.2 Number of Branches Computerised Countrywide

Branches	Frequency	Percentage
Less than 5	25	71
Between 6 to 10	7	20
Between 11 to 15	0	0
Greater than 15	3	9
Total	35	35

From table 4.1 and 4.2 the number of branches operated and the number of branches computerised are the same hence one can conclude that all branches are computerised. Majority of the respondents (71%) operated less than 5 branches, 20% operated 6 to 9 branches, none of them operated between 11 to 15 branches while the remaining 9% operated more than 15 branches countrywide.

Table 4.3 Duration Of Utilization Of Computers

Years	Frequency	Percentage
Less than 5	9	26
Between 6 to 10	11	31
Between 11 to 15	2	6
Greater than 15	13	37
Total	35	100

From analysis of Table 4.3 majority of the respondents (37%) have used computers for more than 15 years. This shows most of the respondents first utilised computers in the early eighties which coincides with the arrival of the first personal computers. This observation is consistent with the findings of Richu (1991) and Nyambane (1996). 26% of the respondents have used computers for less than 5 years, 32% between 6 to 10 years and the remaining 6% have used computers for a duration of 11 to 15 years.

Table 4.4 Organisations With Information Technology Managers

	Frequency	Percentage
Organisations with IT Managers	27	77
Organisations without IT Managers	8	23
Total	35	35

Table 4.5 Reporting Structures For Organisations With IT Managers

	Frequency	Percentage
Managing/Executive Director	13	48
General Manager	6	22
Operations Manager	8	30
Total	27	100

Table 4.6 Reporting Structures For Organisations Without IT Managers

	Frequency	Percentage
Finance Manager	8	100

From table 4.4 majority of the respondents currently have IT managers in charge of the computer operations (77%) within the organisation. IT managers in most of these organisations report to the managing director (48%), 22% report to the general manager with 30% reporting to the operations manager, none of the respondents had an IT director. This is

consistent with observations made in other sectors where information technology is not given the adequate attention it deserves like the traditional accounting, marketing and production department who in most cases have a representative at the board level. Despite not having a director at the board level the reporting structures on table 4.5 clearly shows that IT managers reports to the top management because of the high stakes the technology holds in the survival of the business.

For all respondents who did not have IT managers the finance manager was in charge of the computer operations. This is common in many sectors with IT operations being started as part of the finance department and later growing into an independent department.

Table 4.7 Information Systems Activities Outsourced

	Frequency	Percentage
Training	20	57
Systems Development	17	48
Systems Maintenance	22	62

Table 4.8 Reasons For Outsourcing Information Systems Activities

Cost benefit factors
Value for money
Lack of adequate skills locally
Use of standard applications within the banking sector
Availability of support locally
Vendors have better exposure dealing directly with the suppliers of the products
Inadequate training facilities
Development is a one time occurrence hence no need for permanent people
Rapid changes in Technology in the computer industry

From analysis of table 4.7 majority of the respondents are outsourcing their IS activities covering training, development and system maintenance. Systems development covers up to the implementation phase, hence one can conclude systems implementation in most cases is done in conjunction with vendors. The reasons given for outsourcing information systems activities are given in table 4.8 with majority of respondents indicating that it is more cost

effective for activities to be done by third parties instead of engaging staff in activities which are time consuming and of no value to the business.

Table 4.9 Hardware Platform

Platform	Frequency	Percentage
Mainframe	0	0
Minicomputers	6	17
Microcomputers	35	100

From table 4.9 none of the respondents currently uses a mainframe system with all the respondents using microcomputers and 17% using minicomputers. With the current growth in the power of microprocessors within the computers, many organisations are opting to go for microcomputers with the same functionalities or more powerful than the old mainframe but at a lower cost.

Table 4.10 Network Platform

Network Environment	Frequency	Percentage
Yes	32	91
No	3	9
Total	35	100

Table 4.11 Organisations With IS Steering Committees

Steering Committees	Frequency	Percentage
Yes	26	74
No	9	26
Total	35	100

From table 4.10 majority of the banks have information systems operating in a network environment this can be attributed to increased functionalities and cost reductions attributed to networked systems. Implementation on a network platform is more complex having to incorporate the usage of a network operating systems and other accessories associated with a network, an example of a network application is the information system supporting the automated teller machines currently being used by many banks to improve customer service and reduce the queues on the banking hall, these systems rely heavily on reliable information systems. Only 9% of the respondents are not on a network environment, this can be attributed to the financial capital

outlay required to implement information systems on the network environment.

From table 4.11 majority of the respondents have a steering committee to spearhead IT projects (74%) this ensures user involvement during information systems implementation.

Table 4.12 Application Packages Used

	Frequency	Percentage
Customised	9	24
Off -the - shelf	2	5
Both	35	100

From table 4.12 majority of the respondents are using both customised and off-the-shelf applications. Applications bought off-the-shelf have to be customised to meet local needs given their generality in order to meet different customers needs in different markets. Currently banks have the options of using applications developed locally or using applications developed from abroad. Respondents noted that applications developed locally are much cheaper to support while those from abroad are quite expensive and difficult to maintain.

Table 4.13 Success Rate For Information Systems

	Frequency	Percentage
Less than 25%	0	0
Between 25 to 50%	3	9
Between 51 to 75%	17	48
Greater than 75%	15	43

The success rate for various IT projects is shown in table 4.13. 9% of the respondents indicated a success of 25 to 50%, 48% indicated a success of 51 to 75% while 43% indicated a success rate of above 75%. Hence a total of 91% of the respondents had a success rate of above 50%. The decision on whether systems were successful or not was left on the IT managers with different managers having different views on criteria to use to determine success of systems implementation. Majority of the IT managers noted

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success as the level of implementation of the promised deliverables and user satisfaction with installed systems.

Table 4.14 Services Offered By Suppliers During System Development

Testing
Implementation
Selection of Information systems
Technical and software support
Backup systems
Training
Standby support personnel

Table 4.15 Steps Taken To Ensure Smooth Transition During Implementation

Parallel runs
User involvement
System simulation
Involvement of consultants
Training
Documentation

Table 4.16 Difficulties Faced During Initial Implementation

Inadequate time schedules
Input errors from the users
Fear of new systems
Poor planning
Inadequate training
Delays before implementation
User resistance
Vendors unreliability
Inadequate systems testing
Lack of adequate funding
Inadequate personnel

From table 4.14 suppliers offer different services during the implementation phase - they assist the organisation in selecting systems based on organisations specifications, test the new systems in conjunction with the organisation, provide technical expertise and training. During the actual implementation some organisations use parallel runs and system simulation before fully embarking into a new system, they provide adequate documentation and involve the users in the implementation process. With

proper planning and coordination some difficulties shown on table 4.16 experienced during the implementation process can be overcome.

Table 4.17 Statements Used In The Questionnaire

1. The Organisation sets clearly established success criteria and objectives known to all project participants
2. There are adequate planning, control and reporting procedures in place
3. Business/Administrative skills apart from technical skills are essential for IT managers
4. Staff movement in the IT department disrupts the implementation processes
5. The organisation uses new untested technology
6. There is a clear acquisition policy for information systems
7. The organisation has a strategic policy for IT
8. Understanding the relative importance of cost, schedule and technical performance goals is made clear to all project participants
9. User training on information systems is an ongoing process
10. The organisation suppliers offer facilities for emergency backup purposes
11. The organisation considers the suppliers financial position and industry market prospects
12. Suppliers offer adequate after sales services
13. The organisation ensures new Information systems are compatible with current systems
14. Adequate change procedures are put in place before the implementation is started
15. The IT manager has sufficient influence and authority
16. Continuous communication between all project participants is maintained
17. There is active participation during decision making and problem solving by all participants
18. Emphasis is placed on proper coordination between IT staff, the users and the management during the implementation process
19. The organisation sets realistic schedules
20. New systems pose legal implications during the implementation
21. The organisation makes accurate initial cost estimates for the new information systems
22. IT projects get adequate funding
23. Management are committed to established schedules, and technical performance goals
24. Users are committed to established schedules and technical performance goals
25. The organisation conducts a postimplementation review to monitor performance
26. Systems are user friendly, designed to be safe, comfortable and easy to use
27. Ability for new systems to connect to existing networks
28. Environmental requirements like power
29. Availability of systems that can best utilize new resource
30. Support and maintenance services provided locally
31. Duration for Installation of new systems
32. Emergency backup facilities for new systems
33. Control procedures for errors, malfunction and improper use
34. Documentation with user friendly instructions
35. Ability to Integrate with the current systems
36. Processing Speed
37. Capacity to accommodate growth in volumes
38. Cost for information systems
39. Expandability/Upgradability
40. Availability of substitute products in the market
41. User resistance to new Information system is very common.

Table 4.18 Descriptive Statistics

Variable	Mean	Std Deviation	Variance
1	2.12	1.01	1.027
2	1.96	0.79	0.623
3	1.48	0.87	0.76
4	2.64	1.50	2.240
5	3.84	1.31	1.723
6	2.16	1.28	1.640
7	2.08	1.08	1.160
8	2.2	1.22	1.500
9	1.92	1.04	1.077
10	2.00	1.12	1.250
11	1.96	0.93	0.873
12	2.20	0.91	0.833
13	2.04	0.89	0.790
14	2.16	1.11	1.223
15	2.12	1.09	1.193
16	2.08	1.04	1.077
17	2.24	1.09	1.190
18	2.04	0.89	0.790
19	2.36	1.08	1.157
20	2.64	1.29	1.657
21	2.16	1.07	1.140
22	2.08	1.10	1.210
23	2.12	0.88	0.777
24	2.32	0.80	0.643
25	2.40	1.26	1.583
26	1.64	0.81	0.657
27	1.88	1.01	1.027
28	1.80	0.71	0.500
29	1.76	0.66	0.44
30	1.36	0.49	0.240
31	1.88	0.67	0.443
32	1.44	0.58	0.340
33	1.56	0.58	0.340
34	1.72	0.89	0.793
35	1.60	0.76	0.583
36	1.76	1.98	3.940
37	1.44	0.51	0.257
38	1.72	0.84	0.710
39	1.52	0.51	0.26
40	2.04	1.27	1.6232.
41	2.40	1.19	1.417

Table 4.19 Factor Analysis Communality and Eigen values

Variable	Communality	Factor	Eigen Value	Percent of Variance	Cumulative Percent
1	0.88197	1	14.16244	34.5	34.5
2	0.94316	2	5.56537	13.6	48.1
3	0.90064	3	3.76763	9.2	57.3
4	0.87791	4	3.16213	7.7	65.0
5	0.77153	5	2.32621	5.7	70.7
6	0.89474	6	2.04659	5.0	75.7
7	0.91277	7	1.65982	4.0	79.7
8	0.88460	8	1.33221	3.2	83.0
9	0.80836	9	1.19803	2.9	85.9
10	0.90164	10	1.11925	2.7	88.6
11	0.84469				
12	0.89064				
13	0.97388				
14	0.71625				
15	0.97653				
16	0.95334				
17	0.92031				
18	0.92351				
19	0.76099				
20	0.63807				
21	0.91788				
22	0.96495				
23	0.96270				
24	0.86475				
25	0.92522				
26	0.93222				
27	0.95156				
28	0.87925				
29	0.84873				
30	0.80127				
31	0.85430				
32	0.85179				
33	0.97430				
34	0.95549				
35	0.95847				
36	0.85464				
37	0.85619				
38	0.93163				
39	0.95760				
40	0.89271				
41	0.82848				

4.2 FACTOR ANALYSIS

In reducing the number of variables, factor analysis procedures was used to retain as much of the information as possible and to make the remaining variables meaningful and as easy to work with as possible. The respondents were asked for their opinion on a 1 to 5, agree disagree Likert scale on the statements listed in table 4.17

Table 4.19 indicates the communality and the Eigen values extracted through factor analysis. The eigen values extracted 10 factors, the ten factors explained 88.6 percent of the variation. Each of the original input variables has associated with it a variance reflecting the variation of the 35 respondents. The amount of variance for each variable that is explained or accounted for by the factor is the communality of the variable. Communality is the percentage of a variable variance that contributes to the correlation with other variables or is common to other variables. The percentage of variance (Pct of Var) explained is the summary measure indicating how much of the total original variance of all the 41 variables is explained by the factor. From the above table Factor 1 explains 14.16244 percent while factor 2 explains 5.56537 percent. The achieved communalities were high with only one variable having a value of less than 70 percent thus the factors explain most of the variation.

Table 4.20 Final Varimax Rotated Factor Matrix (Factor Loadings)

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
V1	0.54889	0.58721	0.37937	-0.07091	-0.04165
V2	0.50696	0.51183	0.59217	-0.12355	-0.00323
V3	0.14880	-0.02640	0.13502	0.20404	0.34392
V4	0.07081	0.39039	0.15400	0.47027	0.63440
V5	-0.59786	0.00480	-0.12905	0.00896	-0.56253
V6	0.44150	0.38162	0.62330	0.08254	0.13378
V7	0.33166	0.17785	0.72427	0.15647	0.30465
V8	0.88522	0.05738	0.27339	0.00783	0.04198
V9	0.28085	0.38127	0.52085	0.25857	0.39365
V10	0.27281	-0.13619	0.48109	0.31001	-.009191
V11	0.13200	0.02027	0.41386	0.63303	-0.16768
V12	0.63566	0.16269	-0.05823	0.17677	-0.06881
V13	0.47203	0-.04658	0.08740	0.11509	-0.15840
V14	0.35902	0.20244	0.62045	-0.23590	0.21208
V15	0.83807	0.16652	0.11719	-0.07118	0.32193
V16	0.95371	0.03054	0.14422	0.04373	0.07428
V17	0.90224	0.13163	0.19668	-0.00640	-0.04412
V18	0.89532	-0.09100	0.06953	0.20003	0.07238
V19	0.71548	0.07544	0.10927	0.02479	0.14971
V20	0.36605	0.15022	0.00499	-0.24815	0.15617
V21	0.70124	-0.16638	0.11073	0.19817	-0.52249
V22	0.71095	0.27978	0.07754	-0.10469	0.43621
V23	0.70772	0.23832	0.21746	-0.13849	0.45123
V24	0.09622	0.13572	0.86670	0.11923	0.06147
V25	0.78556	0.23964	0.31551	0.13632	0.05707
V26	0.02276	0.43181	0.44875	0.25721	0.35419
V27	0.64708	0.54123	-0.07467	0.02630	0.29453
V28	-0.01233	0.77117	0.33091	0.12334	-0.08390
V29	-0.04564	0.04586	0.16711	0.15165	-0.26863
V30	0.00837	0.08575	0.02067	0.86483	-0.04938
V31	-0.19039	0.29636	0.16082	0.60170	-0.01004
V32	0.10602	0.26712	-0.09780	0.80498	0.11372
V33	0.05670	0.85115	0.05694	0.38633	0.19432
V34	0.23299	0.80815	0.24545	0.09514	0.17453
V35	0.61660	0-.00170	-0.40393	0.44130	-0.10660
V36	0.06398	0.04037	0.06607	0.29472	-0.03800
V37	0.09215	0.51157	0.13767	0.20540	-0.01172
V38	0.33984	-0.24565	-0.08708	0.46607	-0.07403
V39	0.05689	0.09891	0.19160	0.71406	0.44424
V40	0.47103	0.18362	-0.04760	0.00986	-0.01225
V41	0.18581	0.03754	0.20178	0.00627	0.85793

Variable	Factor	Factor 7	Factor 8	Factor 9	Factor 10
V1	.18572	.09519	.14623	-.13210	-.05286
V2	.07185	.19503	-.09566	-.06944	-.03282
V3	.00299	.80858	-.05685	-.06689	-.19529
V4	-.12038	.18631	.13868	-.05415	-.04230
V5	-.07912	.18797	-.18674	.06476	-.01559
V6	-.17072	.15256	.22100	-.19925	-.00458
V7	-.08504	.01139	.28614	-.18100	-.08540
V8	.02692	.13038	-.00459	-.05799	.00407
V9	-.04417	-.03808	.14630	-.02821	-.25576
V10	-.41289	.10635	-.36392	.16646	.36155
V11	-.13323	.43251	-.01453	.13719	-.05372
V12	.06500	-.10159	-.62980	.05108	.08327
V13	.16956	.09100	.01572	.81244	-.07480
V14	.15801	.03264	-.12043	.11879	.07839
V15	.03655	.07783	-.07629	.33041	.04014
V16	-.01072	.06826	-.02168	-.00332	.09674
V17	.13766	-.07230	.02950	-.00187	.15242
V18	.01405	.22234	.04313	.09530	-.05460
V19	.21167	-.08886	-.11341	.28513	-.24810
V20	.56329	.19463	-.01378	.19535	.04464
V21	.09681	.00917	.18013	.10016	-.14830
V22	.20068	-.19667	-.09828	.29131	.02217
V23	.06426	.05712	.09379	.27148	-.21232
V24	.00529	.13380	-.00159	.17525	.13880
V25	.12361	-.00252	-.09079	-.32038	.05594
V26	.32249	-.39670	.23339	-.18790	.03341
V27	.26630	-.24255	.03020	.10641	.07016
V28	.20547	.16082	.23139	.17156	.03981
V29	.05201	.72098	.37466	.15862	.18282
V30	-.03468	-.00311	-.03003	.03065	.20000
V31	.45963	.19088	-.23069	.16479	-.11897
V32	-.22533	.08905	.15636	.00431	.12464
V33	.04331	-.06262	-.07556	.12312	.17236
V34	.03107	-.14662	-.00509	-.33694	-.11098
V35	.15128	-.13528	-.10583	.08841	-.38574
V36	.02250	-.07979	.00244	-.04348	.86457
V37	-.01839	.12630	.71134	.04407	.02192
V38	.48070	-.27293	.19103	.11342	-.41302
V39	.30050	.15240	.08688	-.24998	.13067
V40	.78820	-.09935	-.04747	.02483	.02484
V41	.06903	.03956	-.07240	-.05464	-.03453

Each solution is generated by a factor rotation scheme, a varimax rotation scheme was done on the initial factor matrix. The logic is that the interpretation is easiest when the variable factor correlation are either close to +1 or -1 indicating a clear association between the variables and the factor, or close to zero indicating a clear lack of association. Interpretation is based

upon factor loadings which are the correlation between the factors and the original variables. Table 4.20 above indicates the factor loadings of the finally rotated matrix. For example the correlation between variable 1 and factor 1 is 0.054889 showing no correlation between the factor and the variable. The factor loading provides an indication of which original variables are correlated with each factor and the extent of the correlation. The coefficients represented in the table indicate both the regression weights and correlation coefficients.

Table 4.21 Statements Loading heavily on Factor 1

Understanding the relative importance of cost, schedule and technical performance goals is made clear to all project participants
There is active participation during decision making and problem solving by all participants
Emphasis is placed on proper coordination between IT staff, the users and the management during the implementation process
Continuous communication between all project participants is maintained
The IT manager has sufficient influence and authority
The organisation sets realistic schedules
The organisation makes accurate initial cost estimates for the new information systems
The organisation conducts a postimplementation review to monitor performance
Management are committed to established schedules, and technical performance goals
IT projects get adequate funding

Statements loading heavily on Factor 1 are shown in table 4.21. Factor 1 can be named participation of all key players in the implementation process. Management must be committed to established standards and schedules with continous coordination and communication between all project participants throughout the implementation process. When IT management have adequate authority to implement decisions, coordination between project participants is much easier to achieve.

Table 4.22 Statements Loading heavily on Factor 2

The organisation sets clearly established success criteria and objectives known to all project participants
Environmental requirements like power influence systems reliability
Control procedures for errors, malfunction and improper use must be in place
Documentation with user friendly instruction

Statements loading heavily on Factor 2 are shown in table 4.22. Factor 2 can be named adequate control procedures during IS implementation. Before systems are implemented clear success criteria and objective must be in place to provide a feedback mechanism to monitor implementation of the systems. Physical and logical controls to protect information systems from errors, fraud and environmental variables are all required to ensure systems are implemented successfully. Documentation for referral purposes should be in place during the implementation of new systems.

Table 4.23 Statements Loading heavily on Factor 3

The organisation has a strategic policy for IT
There is a clear acquisition policy
There are adequate planning, control and reporting procedures in place
User training on information systems is an ongoing process
Users are committed to established schedules and technical performance goals
Adequate change procedures are put in place before the implementation is started
Systems are user friendly, designed to be safe, comfortable and easy to use

Statements loading heavily on Factor 3 are shown in table 4.23. Factor 3 can be named strategic planing for information systems implementation. Organisation should have clear policies and reporting procedures guiding implementation of new systems. The strategies should take into consideration the users who will use the system, they should be adequately trained to use the new systems, these systems should be user friendly. Adequate change procedures must be in place to ensure new systems do not disrupt the current setup and are easily accepted by the users.

Table 4.24 Statements Loading heavily on Factor 4

Support and maintenance services provided locally
The organisation suppliers offer facilities for emergency backup purposes
The organisation considers the suppliers financial position and industry market prospects
Duration for Installation of new equipment
Emergency backup facilities
Expandability/Upgradability

Statements loading heavily on Factor 4 are shown in table 4.24. Factor 4 can be named suppliers reliability. Suppliers should offer reliable services during the implementation phase with the ability to offer backup facilities and expertise to fall back to when difficulties are encountered. Suppliers play an important role during the implementation since they are in direct contact with the main suppliers of the systems being used hence they have a wider experience on the new systems being implemented. They should be committed to established time schedules to ensure new information systems are implemented on time. The facilities chosen should be upgradable to accommodate growth in the business.

Table 4.25 Statements Loading heavily on Factor 5

Staff movement in the IT department disrupts the implementation processes
User resistance to new Information system is very common.

Statements loading heavily on Factor 5 are shown in table 4.25. Factor 5 can be labeled disruption in the current organisation setup. New systems are likely to disrupt the current organisational setup with users likely to resist new systems. Staff movements especially during the implementation of new systems creates a lot of reorganisation forcing people to readjust to new setups all the time.

Table 4.26 Statements Loading heavily on Factor 6

New systems pose legal implications during the implementation
Availability of substitute products in the market

Statements loading heavily on Factor 6 are shown in table 4.26. Factor 6 can be labeled availability for alternative products. Organisation should have alternative sources which they can turn back to when they encounter problems with the current suppliers for example when your supplier ceases operation, the organisation should get support from other suppliers.

Table 4.27 Statements Loading heavily on Factor 7

Availability of systems that can best utilize new resources
Business/Administrative skills apart from technical skills are essential for IT managers

Statements loading heavily on Factor 7 are shown in table 4.27. Factor 7 can be labeled business understanding. For information systems to work effectively for the business you need to align IT strategies with the business strategies. IT managers should receive training on administrative and business administration skills to understand new systems.

Table 4.28 Statements Loading heavily on Factor 8

Suppliers offers adequate after sales services
Capacity

Statements loading heavily on Factor 8 are shown in table 4.28. Factor 8 can be labeled adequate capacity for the new system to support growth in the business.

Table 4.29 Statement Loading heavily on to Factor 9

The organisation ensures new Information systems are compatible with current systems

Statements loading heavily on Factor 9 are shown in table 4.29. Factor 9 can be labeled compatibility of new systems with existing systems. The organisation needs to consider the whole information system from an organisational perspective and not concentrate on a single unit since all the information systems are meant to work together.

Table 4.30 Statement Loading heavily on to Factor 10

Processing Speed

Statements loading heavily on Factor 10 are shown in table 4.30. Factor 10 can be labeled speed of operation of the information system. The processing speed determines the amount of time spent during processing, when the system is slow users tend to resist the systems.

CHAPTER 5

SUMMARY AND CONCLUSION

This section will summarize the findings of the study in relation to the objective of the study, the conclusions, limitation of the study and suggestions for further research.

5.1 SUMMARY

The objective of the study was to determine factors considered important in the successful implementation of information technology systems. The literature reviewed gave some suggestions on variables which leads to successful implementation of information system projects in developed countries. From the findings of the study there is a clear relationships in the factors observed locally and those in developed countries.

The study indicates that majority of the organisations have achieved a high level of computerisation with all respondents having computerised majority of the banking operations in all their branches. From the study 91% of the respondents had a success rate in systems implementation greater than 50 percent.

From the study the following factors were determined to be important during the implementation of information systems. Participation of all key players in the implementation process this includes top management, systems staff, users and the suppliers. Adequate control procedures should be in place to monitor the process. Strategic planing for information systems ensures alignment of systems strategy with business strategies thus helping in streamlining issues arising during implementation. Suppliers reliability is

crucial given the role they play during and after the implementation. During the actual implementation phase the organisation structures tends to be adjusted and care has to be taken to prepare people well in advance for them to be more receptive to new systems. Availability for alternative products should be in place in case of systems breakdown or vendors ceasing operations. Organisations should not rely on the vendors this ensures continuity in operations. The IT managers should have some business understanding for them to utilise new system more effectively. There should be adequate capacity for the new system to support growth in business with the new systems being compatible with the current existing systems. The speed of operation of the information system should be acceptable to improve performance of current operations.

5.2 CONCLUSION

With the tremendous improvements in information technology and communications, information systems have become essential components of implementation of virtually all corporate strategies. The increasing emphasis on the competitiveness has led to a new emphasis on the competitive advantage through effective utilisation of information systems hence information systems should address fundamental requirements of the business to gain competitive advantage. Organisations are focusing on buying solutions to the business problems rather than on buying the newest and fastest systems. Organisations must carefully identify the systems they will use and what benefits they can expect to realize from them and carefully plan for their implementation.

The foregoing findings lead to a number of conclusions. First the banking sector is highly computerised and this can be attributed to the large number of banks in the country which was brought about by liberasation of the economy which in turn has

led to stiff competition for survival in the market with many banks having to use information systems to enable them compete more effectively.

Second there is a high rate of success in implementation of information systems in the banking sector with many organisations being left with little option but to do the right thing the first time because of the high financial implications of systems failing.

Thirdly, the factors considered important in the successful implementation of information systems in Kenya show a lot of similarity with the variables which have been observed in developed countries. The extent to which certain factors are dominant that is they are sufficient in themselves to determine the outcome of the implementation and how the factors are linked together is difficult to determine at this stage but association between the factors is very possible.

What is needed given the present state of knowledge are a set of guidelines which list the relevant factors pertinent to the process of installation of information systems. This enables management better prepare the organisation and to select systems which can best achieve the results. This study has successfully contributed in providing such a guideline and will help many organisations during the implementation of new systems.

5.3 LIMITATIONS

Few studies have been done in the area of information systems implementation with the focus mainly being on the approaches to different types of systems development. As a result information in this area was very limited.

The criteria used to determine the success rate for the implementation for information systems was left solely on the information technology managers. This can lead to subjective and biased responses.

Some of the organisations considered the information being sought to sensitive to divulge to the public as a result they may not give a true picture for fear the information could be used by their competitors.

The amount of time for the study was too short as a result the research concentrated only on the commercial banks, with more time the study could have captured the views from other sectors.

5.4 SUGGESTIONS FOR FURTHER RESEARCH

From the findings of the study further research is recommended in the following areas:

Research should be done to determine how different organisation measure their success criteria for information systems implementation.

Further research should be done in strategic planning for information technology systems to see how information systems strategies can be aligned with business strategies to achieve a competitive edge in Kenya.

Replicate studies should be carried out in different sectors to see the correlation of these findings with those obtained in other sectors.

APPENDIX I

Dear Sir/Madam

RE: ANALYSIS OF FACTORS CONSIDERED IMPORTANT IN THE SUCCESSFUL IMPLEMENTATION OF INFORMATION SYSTEMS: A CASE FOR COMMERCIAL BANKS IN KENYA

I am a postgraduate student at the faculty of commerce, University of Nairobi. As part of my MBA course requirements I am undertaking a research project that seeks to establish factors considered important in successful implementation of information systems with a special emphasis in the commercial banks in Kenya.

To satisfy the information requirement for this research I am administering a questionnaire to people in the industry involved in the implementation of Information technology systems.

I would like your assistance in completing the attached questionnaire. I would be most grateful if you can spare sometime to answer these questions to the best of your knowledge and ability. The information requested is needed for purely academic purposes and will be treated in strict confidence and will not be used for any other purpose other than for my research.

Any additional information you might think is necessary for this study is most welcome and can be written on the back side of the questionnaire. Please let me know if you need a summary of the final report.

Your assistance in completing the questionnaire is greatly appreciated.

Yours Sincerely

Baptista J. O.

Supervisor
Julius Kipngetich
Management Science
University of Nairobi

QUESTIONNAIRE

Please answer the following questions by placing a tick (√) in the space provided and/or giving details as may be necessary

SECTION 1 GENERAL

1. How many branches are you operating in Kenya?
   ( ) Less than 5 ( ) Between 6 to 10
   ( ) Between 11 to 15 ( ) Greater than 15

2. How many of your business units have installed computers?
   ( ) Less than 5 ( ) Between 6 to 10
   ( ) Between 11 to 15 ( ) Greater than 15

3. How long has the organisation been using computers?
   ( ) Less than 5 years ( ) Between 6 to 10 years
   ( ) Between 11 to 15 years ( ) Greater than 15 years

4. How many computer systems personnel are working in your organisation?

   ---

5. Do you have an IT manager?
   ( ) Yes ( ) No

   If the answer above is no, who is incharge of Computer facilities?

   ---

6. Who does the IT manager report to?

   ---

7. What operations have been computerized (you may tick more than one)?

Savings Account System		()
Current Account System		()
Standing Orders	"	()
Fixed Deposit	"	()
Fixed Assets	"	()
Personnel records	"	()
Foreign Exchange	"	()
Loan Accounts	"	()
Mortgage	"	()
General Ledger	"	()
Inquiries	"	()
Others (specify)		----------

8. Does the organisation outsource any of the following IT operations (you may tick more than one)?

Training () Systems Development ()
Systems Maintenance ()
Others (Specify) ----------

B. What factors led to these operations being outsourced?

---

9. What type of Hardware platform does the organisation use (you may tick more than one)?
( )Mainframe ( ) Minicomputers ( )Microcomputers

10. Does the organisation operate in a network environment?
( ) Yes ( ) No

11. Are computers users within the organisation conversant with the Information systems they are currently using?
( ) Yes ( ) No

12 Does the organisation have a steering committee to undertake new IT project?
( ) Yes ( ) No

13 What type of applications are used within the organization?
( ). Customised ( ) Off the shelf ( ) Both ( )

SECTION 2

Listed below are statements dealing with various issues in the implementation of information technology systems . Please tick in the bracket to specify the extent to which you agree with each statement

5 Strongly Disagree 4 Disagree 3. Indifferent 2. Agree 1. Strongly Agree

	5	4	3	2	1
14. The organisation sets clearly established success criteria and objectives known to all project participants	()	()	()	()	()
15. There is adequate planning, control and reporting procedures in place	()	()	()	()	()
16. Business/Administrative skills apart from technical skills is essential for IT managers	()	()	()	()	()
17. Staff movement in the IT department disrupts the implementation processes	()	()	()	()	()

18. The organisation uses new untested technology	( )	( )	( )	( )	( )
19. There is a clear acquisition policy for IT products	( )	( )	( )	( )	( )
20. The organisation has a strategic policy for IT	( )	( )	( )	( )	( )
21. Understanding the relative importance of cost, schedule and technical performance goals is made clear to all project participants	( )	( )	( )	( )	( )
22. User training is an ongoing process	( )	( )	( )	( )	( )
23. The organisation suppliers offer facilities for emergency backup purposes	( )	( )	( )	( )	( )
24. The organisation considers the suppliers financial position and industry market prospects	( )	( )	( )	( )	( )
25. Suppliers offers adequate after sales services	( )	( )	( )	( )	( )
26. The organisation ensure new Information systems are compatible with current systems	( )	( )	( )	( )	( )
27. Adequate change procedures are put in place before the implementation is started	( )	( )	( )	( )	( )
28. The IT manager has sufficient influence and authority	( )	( )	( )	( )	( )
29. Continuous communication between all project participants is maintained	( )	( )	( )	( )	( )
30. There is active participation during decision making and problem solving by all participants	( )	( )	( )	( )	( )
31. Emphasis is placed on proper coordination between IT staff, the users and the management during the implementation process	( )	( )	( )	( )	( )
32. The organisation sets realistic schedules	( )	( )	( )	( )	( )
33. New systems pose legal implications during the implementation	( )	( )	( )	( )	( )
34. The organisation makes accurate initial costs estimates for the new information systems	( )	( )	( )	( )	( )
35. IT projects get adequate funding	( )	( )	( )	( )	( )

36. Management are committed to established schedules, and technical performance goals ( ) ( ) ( ) ( ) ( )

37. Users are committed to established schedules and technical performance goals ( ) ( ) ( ) ( ) ( )

38. The organisation conducts a postimplementation review to monitor performance of IS ( ) ( ) ( ) ( ) ( )

39. The success rate of IT projects in your organisation

( ) Less than 25% ( ) Between 26 to 50 %

( ) Between 51 to 75 % ( ) Greater than 75%

40. To what extent do you consider the following factors in the in the selection of Information systems

A.	User friendly, designed to be safe, comfortable and easy to use	( )	( )	( )	( )	( )
B.	Ability to connect to existing networks	( )	( )	( )	( )	( )
C.	Environmental requirements like power	( )	( )	( )	( )	( )
D.	Availability of systems that can best utilize new resource	( )	( )	( )	( )	( )
E.	Support and maintenance services provided locally	( )	( )	( )	( )	( )
F.	Duration for Installation of new equipment	( )	( )	( )	( )	( )
G.	Emergency backup facilities	( )	( )	( )	( )	( )
H.	Control procedures for errors, malfunction and improper use	( )	( )	( )	( )	( )
I.	Documentation with user friendly instruction	( )	( )	( )	( )	( )
J.	Ability to Integrate with the current systems	( )	( )	( )	( )	( )
K.	Processing Speed	( )	( )	( )	( )	( )
L.	Capacity	( )	( )	( )	( )	( )
M.	Cost	( )	( )	( )	( )	( )
N.	Expandability/Upgradability	( )	( )	( )	( )	( )
O.	Availability of substitute products in the market	( )	( )	( )	( )	( )

41. User resistance to new Information system is very common. To what extent can you attribute this to

A.	Lack of know-how	( )	( )	( )	( )	( )
B.	Fear of loss of jobs	( )	( )	( )	( )	( )
C.	Loss of career progression	( )	( )	( )	( )	( )
D.	Loss of prestige and power	( )	( )	( )	( )	( )
E.	Changes in working procedures	( )	( )	( )	( )	( )
F.	Poor communication	( )	( )	( )	( )	( )

42. During the systems development period what services do your supplier offer?

---

43. What steps does the organisation take to ensure a smooth transition during implementation due to changes brought about by the new systems?

---

44. What difficulties have you faced during the initial implementation process?

---

45. Does the organisation see IT in the light of new business opportunities, cutting operational costs, utilization of data more efficiently and Improving IS human resource?

THANK YOU FOR YOUR COOPERATION

APPENDIX II

COMMERCIAL BANKS OPERATING IN KENYA AS AT SEPT 1997

ABN - AMRO BANK N.V
Box 30262
NAIROBI

AFRICAN BANKING CORP LTD
PO Box 46452
Nairobi

Akiba Bank Ltd
PO Box 49584
Nairobi

Bank of Baroda (K) Ltd
PO Box 30033
Nairobi

Bank of India
PO Box 30246
Nairobi

Barclays Bank of Kenya
PO Box 30120
Nairobi

Biashara Bank of Kenya Ltd
PO Box 30831
Nairobi

Bullion Bank
PO Box 11666
Nairobi

CFC Bank Ltd
PO Box 72833
Nairobi

Chase Bank (Kenya) LTD
PO Box 28987
NAIROBI

Citibank
PO Box 30711
Nairobi

City Finance Bank Ltd
PO Box 22741
Nairobi

Commerce Bank Ltd
PO Box 46739
Nairobi

Commercial Bank of Africa Ltd
PO Box 30437
Nairobi

Consolidated Bank of Kenya LTD
PO Box 51133
NAIROBI

CO-OPERATIVE Bank of Kenya Ltd
PO Box 48231
NAIROBI

Credit Agricole Indosuez
PO Box 69562
NAIROBI

Credit Bank LTD
PO Box 61064
NAIROBI

Daima Bank LTD
PO Box 54319
NAIROBI

Development Bank of Kenya Ltd
PO Box 30483
NAIROBI

Diamond Trust Bank Kenya Ltd
PO Box 61711
NAIROBI

Equatorial Commercial Bank Ltd
PO Box 52467
Nairobi

Euro Bank Ltd
PO Box 43071
Nairobi

Fidelity Commercial Bank
PO Box 48445
Nairobi

Fina Bank
PO Box 20613
Nairobi

First National Finance Bank Ltd
PO Box 67681
Nairobi

First American Bank of Kenya Ltd
PO Box 30691
Nairobi

Guardian Bank Ltd
PO Box 46983
Nairobi

Giro Bank Limited
PO Box 40263
Nairobi

Guilders International Bank Ltd
PO Box 57437
Nairobi

Habib African Bank Ltd
PO Box 23361
Nairobi

Habib Bank A.G Zurich
PO Box 32584
Nairobi

Habib Bank Ltd
PO Box 6906
Nairobi

Imperial Bank Ltd
PO Box 44905
Nairobi

Investment & Mortages Bank Limited
PO Box 30038
Nairobi

Kenya Commercial Bank Ltd
PO Box 43400
Nairobi

Mashreq Bank P.S.C
PO Box 11129
Nairobi

Middle East Bank (K) Ltd
PO Box 47357
Nairobi

National Bank of Kenya Ltd
PO Box72866
Nairobi

National Industrial Credit Bank
PO Box 44599
Nairobi

Paramount Bank Limited
PO Box 14001
Nairobi

Prime Bank LTD
PO Box 43825
Nairobi

Prudential Bank Limited
PO Box 60024
Nairobi

Reliance Bank Ltd
PO Box 403
Kisumu

Southern Credit Banking CORP
PO Box 66171
Nairobi

Stanbic Bank Kenya LTD
PO Box 30550
Nairobi

Standard Chartered Bank(K) LTD
PO Box 30003
Nairobi

The African Mercantile Banking Co.
LTD
PO Box 30090
Nairobi

The Delphis Bank Limited
PO Box 44080
Nairobi

Trans-National Bank Ltd
PO Box 34353
Nairobi

Trust Bank Limited
PO Box 46342
Nairobi

Universal Bank Ltd
PO Box 46307
Nairobi

Victoria Commercial
PO Box 41114
Nairobi

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