

DETERMINATION OF FACTORS INFLUENCING PROJECT DELAYS IN

WATER PROJECTS IN KENYA:

THE CASE OF GOVERNMENT FUNDED PROJECTS.

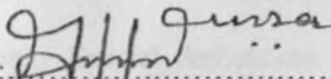
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**A MANAGEMENT SCIENCE RESEARCH PROJECT SUBMITTED IN
PARTIAL FULFILLMENT FOR THE REQUIREMENTS OF THE DEGREE OF
MASTER OF BUSINESS AND ADMINISTRATION, FACULTY OF COMMERCE,
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DECLARATION

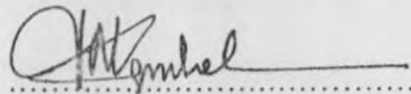
This management project is my original research work and has not been presented for the award of any diploma or any degree in any University.

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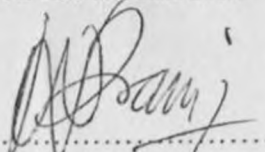
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DEDICATION

Dedicated to my mother Mrs. Nibora Garashie for shaping me into what I am, to my eldest brother Hamisi Garashie, for his unlimited financial support throughout my education. Special dedications go to special friends, Asha Rashid for being very understanding and Halima Hamad, for her silent encouragement and inspiration when she was still in her mother's womb. Welcome to the world dear friend. Finally this work is dedicated to Loise Simba, for being more than just a friend.

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ABSTRACT

This report presents the findings of a case study on factors influencing project delays in water projects in the Ministry of Water Resources. The research was conducted at the Ministry Headquarters in the period between May 21st and July 23rd 1999. The Principal objectives of the study were to identify factors that influence project delays in water projects and to formulate strategies to address this problem. A census of all the projects known to have been completed between January 1st 1993 and December 31st 1998 was carried out.

The findings revealed the following factors to be influential in water project delays. These, in order of their degree of influence are:- quality of project management, operating environment, motivation of workers, infrastructure, inadequate resources, and organization of the project team. From the contents of the cluster of statements from which the factors were derived, definition of each of these factors was established. This is found in the summary section of the report.

From the analysis of the responses, the following strategies were recommended:- restructuring of the Ministry of Water Resources; establishment of a special committee responsible for all water projects in the Ministry ensuring resource requirements for the project will be availed when needed before project managers begin the implementation process, privatization of water projects in the country, establishment of an anti-corruption unit within the Ministry, sensitizing project teams on importance of time, enhancing training for project managers and providing project officers in the field with mobile phones. It was recommended by the researcher that a rational professional body of project management should be launched to facilitate good project management practices and instill discipline and professionalism in the management of projects.

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

Projects, whether in the public or private sector, are the backbone of any nations economy. They are the basis of any development agenda such as industrialization and they are evident in every sector of the economy. Public projects are identified, planned and implemented by the government in the relevant Ministries in order to solve problems affecting the citizens . They are geared towards improving the citizens welfare and the country's economy as a whole (Public Investment Programmes 1998/99 - 2000/01, 1997).

Successful execution of projects throughout their life cycle from conception to terminal evaluation is, therefore, something to be desired by all stakeholders. However, for one reason or another, project success is hardly achieved. Most projects planned and implemented are accomplished, long after their estimated completion time is over. Others get completed in time but with colossal cost overruns, while some don't perform as expected after their completion.

Statistics from the Project Management Department, Ministry of Planning and National Development indicate that there are over 1500 projects in the public sector that have stalled for one reason or another. Further, out of the 1226 on-going projects, over 90% of them are running behind schedule (Public Investment Programme 1998/99 - 2000/01 1997).

Time and cost overruns are a clear manifestation of project failure. However, the two are very often in public projects. Grool et. al. (1986) observed that such overruns, unfortunately are the norm in public projects, especially in developing countries, rather than the exceptions they ought to be. In the end, it is the tax-payer who suffers most. He or she is delayed in receiving the services of the project and at the same time, he has to meet the extra cost. It was for this reason that the public investments committee in 1997 recommended that no future projects should be initiated without proper identification of sources of funds and proper coordination between the parent Ministry and the treasury.

1.2 PROJECTS IN THE MINISTRY OF WATER RESOURCES

The Ministry is charged with the responsibilities of planning, assessment, conservation, and protection of water resources, development of water supplies, control of the catchment areas, water quality and pollution control among others.

According to the Public Investment Programme (1997), the policy objective of the water and sanitation sector of the Ministry is to create an enabling environment for orderly, coordinated and sustainable development of water resources in line with the above responsibilities. In order to meet this objective, several projects are identified, planned and executed by the Ministry in conjunction with other stakeholders. Although the Daily Nation (March 23rd, 1998) reported that the Ministry of Water Resources required over Ksh. 8.5 billion to rehabilitate 584 water projects country wide which had stalled since 1992, statistics from the Ministry reveal that a total of 266 on-going projects, funded by different organizations including the government of Kenya, Japan, France, Italy, Netherlands and other organizations such as CIDA, JICA, IFAD, IDA, and ADB among

others are not moving according to plan. However, most of these on going projects are government funded. Indeed out of the 266 on-going projects, 221 are government funded and only 45 (16.9%) of them are financed externally. For this reason, the research focused on the government funded projects.

Attainment of the policy objective is only feasible if supporting services associated with water projects are efficiently and effectively carried out. This calls for the identification, planning and execution of projects in the Ministry of Water resources that do not qualify as water projects. Such projects include construction of residential and office buildings, sanitation, among others. However, most of the projects in the Ministry are basically water projects - their ultimate objective is to foster the provision and supply of water. All projects in the Ministry of Water resources known to have been completed within the period of five years (from 1st Jan. 1993 to 31st Dec. 1998) were considered for this research.

1.3 DEFINITION OF TERMS

1.3.1 PROJECT

Although projects have been planned and implemented since the biblical times and almost every adult has had some experience with projects in one way or the other, scholars and managers alike do not seem to agree to the definition of a project. Karimi (1988) argues that "any definition of a project must be general enough to include examples of the wide variety of organizational activities which managers consider to be project functions but at the same time it should be narrow enough to include only those

specific activities which researchers and practitioners can meaningfully describe as project oriented".

Going by this framework, Cleland's and Kerzer's (1985) definition seems to be most appropriate. They defined a project as "a combination of human and non-human resources pulled together in a temporary organization to achieve a specific purpose". A Deputy Director of planning in the Ministry of Planning and National Development, Project Management Department, Mr. Were, defines a project as "a sequence of activities with a definite beginning and end that utilize public resources to improve the welfare of the citizens". Being a civil servant, his definition is based on experience with projects financed through public funds by the government, World Bank, IMF and other Public bodies.

Solomon (1976) defined a project as "a unit of purposeful activity with a beginning and ending point in time that is chosen to be separately planned, analyzed and administratively implemented". Such a unit can be the construction of a new steel plant or the drilling of a borehole.

A project is a complex of activities where resources are used in expectation of returns and which lends itself to planning, financing and implementing as a unit. A project usually has a specific starting point and a specific ending point, intending to accomplish specific objectives. Little and Mirlees (1974) observed that "a project has a well-defined

sequence of investment and production activities and a specific group of benefits that can be identified, quantified and valued either socially or monetarily".

Projects and programmes are closely related and can easily be confused and used interchangeably. A programme is generally a collection of related projects which are being executed. A project on the other hand refers to an investment involving more commitment and involves a clear vision which provides direction over time. A project is proper which has a definite beginning and ending. A programme is an on-going developmental effort or plan. A programme is something which cannot finish a project is a task.

1.3 PROJECT MANAGEMENT

Reddy and Srinivas (1988) observed that "a project is any task which has a goal". Similarly, the management and administration of such task is called as "Project Management". Reddy and Srinivas (1988) further stated that project management involves the coordination of people activities, which are designed to achieve project goals. Project management is used to improve or identify as well as manage the time, cost and quality.

1.4 PROJECT DESCRIPTION

Reddy (1988) defined the project description as the most critical stage of any project. At this stage, purpose of the project has already started and goal have been defined by different stakeholders. Reddy and Srinivas (1988) agree that project description

1.3.2 PROJECTS AND PROGRAMMES

Projects and programmes are closely related and can easily be confused and used interchangeably. A programme is generally a combination of related projects and/or on going activities. A project, on the other hand, refers to an investment activity where resources are used to create capital assets which produce benefits over time. Unlike a project which has a definite beginning and ending, a programme is an on going development effort or plan. A programme is therefore a wider concept which a project is a part.

1.3.3 PROJECT MANAGEMENT:

Stallworthy and Kharbanda (1983) observed that "a project is any plan, scheme, task or work. Naturally, the management and accomplishment of such a task is termed as "project Management". Pinto and Slevin (1988) further noted that project management involves the coordination of group activities where the manager organizes, plans, staffs, directs and control in order to achieve an objective with constraints on time, cost and quality.

1.3.4 PROJECT IMPLEMENTATION

Benjamin (1985) suggested that project implementation is the most crucial stage of any project. At this stage, activities of the project are actually carried out and funds are disbursed to facilitate the activities. Little and Mirlees (1974) argue that indeed project

implementation is a process of refinement and can actually be considered to be a mini cycle within the larger project cycle.

1.3.5 PROJECT SUCCESS

Several scholars and practitioners have defined project success. Baker, Murphy and Fisher (1988) defined success as "if the project meets the technical performance specification and/or mission to be performed, and if there is a high level of satisfaction concerning the project outcome among key people in the parent and client organization, key people on the project team and key users or clientele of the project effort, then the project is considered an overall success".

Jeffrey and Dennis (1987) had earlier identified four basic criteria that if satisfied, the project can generally be considered to be successful. They include:

1. A successful project comes in on schedule (i.e. time criterion)
2. It comes in on budget (monetary criterion)
3. It achieves basically all the goals originally set for it (effectiveness criterion)
4. It is accepted and used by the clients for whom the project is intended.
(client satisfaction criterion)

1.4 STATEMENT OF THE PROBLEM

Talukhaba (1988) observed that some projects take longer than scheduled to accomplish thereby resulting in cost overruns of millions of shillings. For example, the National

Social Security Fund complex scheduled to be completed in two years took five years and cost Ksh 2.5 billion compared to the estimated cost of Ksh.600 million. The Migori District Headquarters was planned to take two years but upto date, ten years since it was started, the project has not been completed.

Similar cases are common in the public sector, where projects have continued to experience huge cost and time overruns. These are manifestations of serious problems of cost and time management in projects. Mbatha (1986) and Talukhaba (1988) have established that time and cost performance of construction projects in Kenya are poor to the extent that over 70% of the projects are likely to escalate in time with a magnitude of over 50%.

The seemingly poor control of project is commonly reported in the media. The Daily Nation (Feb. 17th 1999) reported that the Langata dual carriage way project is behind schedule by two months now.

For a developing country such as Kenya, project delays frustrate development efforts. Those factors influencing project delays need to be addressed urgently. Although several studies have been done in construction projects in Kenya, very little has been done on water projects despite its importance as a basic need. Those few studies done on Water projects (e.g. Karimi 1998) focused on other aspects of project management (eg cost overruns) other than time management. There is need therefore to address the causes of such delays and what needs to be done in order to improve the situation. But we cannot achieve this without first knowing what the implementors had already done to address

this issue and how successful their strategies had been. There is also need to understand the drawbacks faced during the implementation of such strategies in order to come up with better strategies to address this problem. It is for this reason that the study seeks to answer the following questions.

1. What are the significant factors influencing water project delays in Kenya?
2. What management strategies should be employed to effectively address the significant factors which influence water project delays?

1.5 OBJECTIVES OF THE STUDY

The study seeks to

1. Identify factors which significantly influence the water project delays in Kenya.
2. Identify what strategies have been used by the implementors to address and minimize the problem of project delay.
3. Identify the major drawbacks encountered in implementing these strategies.
4. Formulate management strategies to be employed to address the problem of project delays.

1.6 IMPORTANCE OF THE STUDY

Both the social and economic benefits derived from this study are enormous. First the general public will benefit greatly if the critical factors influencing project delays are identified and strategies formulated to minimize this problem. Successful completion of water projects ensures better provision of the water resource to the public for the different

needs. Wastage of public resources will also be minimized. The economy of the country as a whole will be improved if such project delays are minimized not only in the ministry of water resources but in all other ministries and sectors of the economy.

Indeed water is a crucial resource for any country's development. The private sector cannot operate without this resource and its by-products like hydro-electricity. It is therefore a major beneficiary in this study too.

1.7 SCOPE OF THE STUDY

Although the issue of project delays is evident in both the private and public sectors, earlier researches (e.g. Talukhaba, 1988) indicate that it is more rampant in the public sector than in the private sector. The research therefore focused on projects in the ministry of water resources with a view to generalize the findings to the whole public sector. This ministry was chosen due to the social and economic importance of the water resource.

Due to time and other resource constraints, it was not possible to study all the projects in the ministry. A case study research design was therefore employed. Government funded projects were considered due to the systematic documentation of records in government offices. Key project officers involved in the implementation of government projects are employees of the government and could thus be easily found. All projects completed within the period between January 1st 1993 and December 31st 1998 were considered.

1.8 LIMITATIONS OF THE STUDY:

The main limitation of this study was the degree of none response observed in data collection. Better findings were possible with improved response. Another limitation was the lack of proper documentation system found at the Ministry's library. The record keeping system is not systematic and records on different aspects of projects were not easily accessible.. Such records (e.g. progress reports, costs, personnel, etc) could have greatly helped the researcher not only in checking authenticity of the primary data but would also have provided a basis for making better judgement and generalizations on the projects.

Time and budget constraints also limited travelling to personally contact those project officers working in different provinces in the country. As a result, sending the questionnaire by mail was adopted which resulted in some cases of none response.

CHAPTER TWO LITERATURE REVIEW

2.1 A BRIEF HISTORICAL BACKGROUND OF PROJECTS

Projects have been identified, planned and implemented by man since time immemorial. Some of the greatest and earliest projects undertaken include the construction of pyramids. Pyramids were built at various times in history in Egypt, Greece, South America, Italy and other countries in the world. However, the most famous and greatest pyramid projects were those undertaken in Egypt between 2686 - 2345 BC (New Encyclopaedia Britannica, 1974). The biggest of them include the Step pyramid at Saqqarah and the North stone pyramid at Dahshur. Others include those of Pharaohs Khufu, Khafre and Menkure at Giza.

The great wall of China is one of the biggest building construction projects ever carried out. It runs 6,400 kilometers long and stands nine metres high. The construction of the wall was started in 214 BC by the first emperor of a United China, Shih Huang-ti. The wall was substantially rebuilt in later years especially in the fifteenth and sixteenth centuries.

In May 1961, the National Aeronautics and Space Administration (NASA) of the US started a moon-landing project - the Apollo space program. The project took more than ten years. It was not until October 1966 that the first Apollo flight, Apollo seven, made a successful full earth - orbit flight with three astronauts on board. In 1969, the Apollo project made a historical and successful landing on the moon. Apollo XIIV, the final flight of the project took place in December 1972.

Another great project with a place in history is the construction of the Eurotunnel, a rail tunnel between England and France that runs beneath the English channel. The project was started in 1986 and completed in 1993. The tunnel consists of three sub-tunnels running side by side and it is fifty kilometers long (Newsweek, March 24th, 1996).

All these projects had one thing in common - mobilization of both human and non-human resources to achieve specific objectives. Project management was a key success factor in all these projects. Good project planning, implementation and control are key to successful project completion.

2.2 A BRIEF HISTORY OF PUBLIC PROJECTS IN KENYA

Records at the National Archives show that identification, planning and implementation of public projects in Kenya started in the colonial era. Some of the major projects undertaken by the colonial government include building of schools and dispensaries in the country, construction of the Kenya - Uganda railway line, building of provincial administration offices among others. Since then, the post colonial government has continued to undertake public projects with a view to improving the welfare of its citizens. Currently, every Ministry in the government has a number of both stalled and on going projects. (Public Investment Programme 1998/99 --2000/01, 1997).

2.3 CURRENT STATE OF PUBLIC PROJECTS IN KENYA.

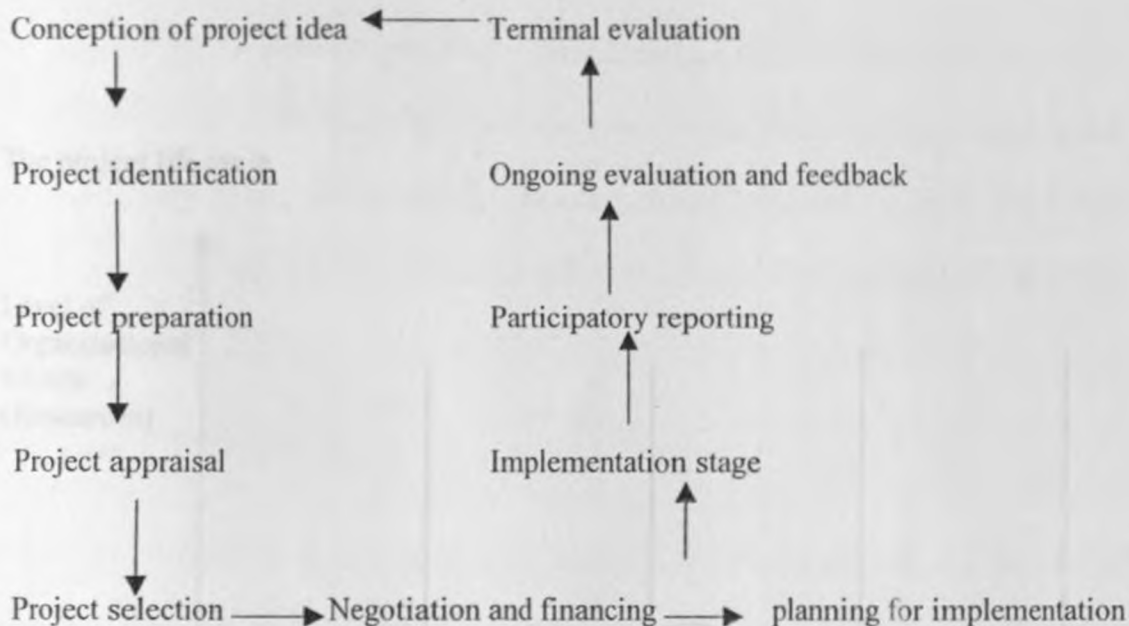
Whereas Kenya's private sector seems to do well on project implementation, all is not well in the public sector. More public concern recently on the poor performance during implementation of public projects is a clear signal of a worsening situation. Indeed the

fact that there have been complaints about delays of government projects and the fact that some of the complaining parties are a part of the government shows that something is very wrong with the performance of public projects. Statistics from the department of public project management, Ministry of Planning and National Development reveal that currently, there are 1226 ongoing projects in the public sector, most of which are behind schedule while others have completely stalled. Are these delays intentional? Are the causes of these delays known? If so, why are not corrective measures put in place? What hinders the implementation of these corrective measures?

This study hoped to improve the time performance of public projects. By identifying the factors responsible for the delay and what has been done, what hindered what ought to have been done, the study recommended what should be done in order to curb such delays. This is because the importance of avoiding delays and savings on contract period (project time) mean real monetary savings to both the implementers and the client. A shorter period saves daily wage payments to the workers and also saves the opportunity cost of not using the project.

2.4 PROJECT LIFE CYCLE

The life of a project is cyclic in nature. It follows a sequence of activities right from the conception of the project idea to terminal evaluation of the project after its completion. Leech and Turner (1990) identified eleven stages through which a Project passes. They include:



Kerzner (1995) used the product life approach and identified four main phases. These are the conceptual phase, planning phase, execution phase, and the terminal phase.

2.1.1 CONCEPTUAL PHASE

All projects are envisaged from their start. These ideas are then translated into objectives.

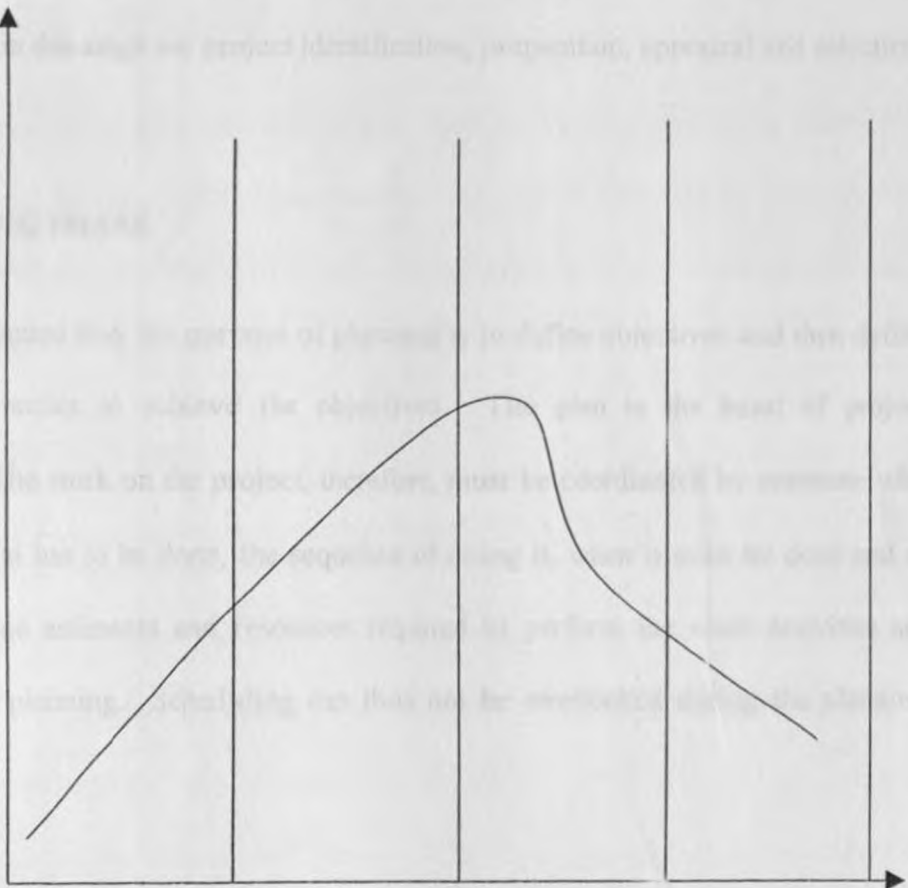
Carroll and King (1986) noted that such ideas can evolve from research, observation,

The project life cycle

and informal needs among others. The other phases identified by Lynch and Turner

(1990) include identification, conceptualization, appraisal and selection.

Level of
Organizational
Efforts
(Resources)



Time (t)

2.1.2 PROJECT EXECUTION

Conceptual
Phase

Planning
phase

Execution
phase

Termination
phase

the range of project phases are identified and defined as either the project. Lynch and Turner (1990) observed that as the project

phases are defined by the project, the sequence of activities. This phase also involves

evaluation and feedback. The research focuses on this stage of a project life

cycle. The importance of this phase cannot be over-emphasized. Good project

2.4.1 CONCEPTUAL PHASE

All projects are developed from ideas. These ideas are then translated into objectives. Cleland and King (1988) noted that such ideas can evolve from research, organizational needs, customer needs, among others. The other phases identified by Leach and Turner (1990) implied in this stage are project identification, preparation, appraisal and selection.

2.4.2 PLANNING PHASE

Miller (1978) argued that, the purpose of planning is to define objectives and then define strategies and tactics to achieve the objectives. The plan is the heart of project management. The work on the project, therefore, must be coordinated by someone who understands what has to be done, the sequence of doing it, when it must be done and at what cost. Time estimates and resources required to perform the work activities are forecast during planning. Scheduling can thus not be overlooked during the planning phase.

2.4.3 PROJECT EXECUTION

At this stage, the project plans developed are implemented. Individual tasks are performed to realize the project. Leech and Turner (1990) observed that at this stage, resources are disbursed to facilitate the execution of activities. This phase also involves on going evaluation and feedback. The research focuses on this stage of a projects life cycle. The importance of this phase cannot be over emphasized. Good project

conception and planning is useless without successful execution of the project. Project implementation is the most difficult stage and it is here that most problems are faced that result in project delays.

2.4.4 PROJECT TERMINATION

This involves concluding the project execution. Roman (1986) argues that a project may be concluded because the project objectives were met, the project may be terminated for convenience or because of default of failure. Terminal evaluation is carried out to assess how well the project realized the objectives it was intended for.

2.5 THE PROJECT TEAM:

The project team is an important determinant of project success. The teams composition, organizational structure, expertise and commitment to project success are very important aspects. Projects in general are sensitive to the nature of the organizational structure of the implementation team. This, according to Talukhaba (1988) "is so because many different autonomous and fragmented institutions are brought together to combine their various expertise with a common objective of producing a project to the satisfaction of the client". It is the efficiency of combining their various activities that determines the success of the project.

Accusations leveled at the project team have continued to appear in the local newspapers, electronic media, professional journals and even in meetings and public rallies. But totally laying the blame on the project team for the poor time performance of public

projects is unfair. Other forces beyond the control of the project team are also responsible for the delays. For this reason, the questionnaire was exhaustively constructed to include such forces as politics, corruption, harsh weather, among others. However, several statements in the questionnaire addressed the issue of the project team in terms of its organizational structure, qualification and expertise among others.

2.6 PROJECT DELAYS

In most projects, the client fixes the contract time (project completion time) and the contractors compete on the contract sum only. After the award of the contract, the contractor ought to work towards achieving the set time (and quality) objective. The time allocated to the project initially is the most accurate approximation - as far as the estimator is concerned, and considering all other circumstances - otherwise future events that may affect time should be provided for.

Mbatha (1986) noted that theoretically, the time estimate should include time spent on everything predictable that may effect the project's critical path and for which nothing can be done to avoid it. But the predictability of future events depends on measures of perfect knowledge which is very lacking in man. The estimator mainly depends on his own past experience.

If, at the end of the project, the estimated completion time is extended, we talk of a project delay; meaning that the project actually took longer to accomplish than originally planned. This delay is not desirable to both the contractor and the client. But more often

than not, it is there because of some occurrences during implementation that had not been foreseen during the planning phase.

Sometimes the delay may not only result from unforeseen events. The estimator is sometimes lacking in competence. If the time allocated for the project was obviously insufficient, that would be a fundamental error in estimation. Such a delay (error) disapproves the accuracy of the assumptions that were made when initially deciding on time, and it shows how misguided and erroneous the estimator was.

The delays (time overruns) implied in this study are those that occur during the implementation period. Time overruns before this period (e.g. during feasibility study and designing, planning stages) are not included in the study.

2.7 ESTIMATION OF PROJECT LIFE

Several studies have been done in developed countries to model a relationship between the construction time and the other aspects of the project (i.e. cost, quality, location, etc). One such study was by Bromilow (1969) who formulated a relationship between construction time and the estimated construction cost of the project. He argued that the construction time, T , is given by

$$T = K \cdot C^B$$

Where T = construction time in working days

C = Estimated construction cost in million of US dollars

K and B are constants that depend on the other aspects.

(quality, location of projects, etc.)

Such a model was proved useful in developed countries where location of the project does not play a major role in time and cost performance.

In Kenya however, there is no rule to estimate construction time. The decision is left to the Quantity surveyor (estimator) who operates by intuition. Mbatha (1986) argues that the Quantity surveyors bases the calculation of time on the performance of a previous contractor on a similar project in type, size and location, a method he argues to be faulty and self-defeating. This is because projects, particularly in the public sector, are known to be mostly delayed and thus the estimate based on previous performance (which was already poor) is likely to be very poor.

Even though there is no practical model for time estimation (such as the one developed by Bromilow) in developing countries, the use of management science techniques has proved effective in time estimation. Burgess and White (1979) observed that "the starting point of project control is to prepare a production programme. The programme shows what work will be done, when, and the resources of men, machines and materials required to accomplish it". Sears (1979) and Lock (1979), acknowledge the use of Critical Path Method (CPM) and the Programme Evaluation and Review Technique (PERT) as powerful tools in scheduling. Both CPM and PERT are essentially the presentation of the project plan by a schematic diagram or network. The network depicts the sequence and interrelation of all the component parts of the project. CPM and PERT

enables a logical analysis and manipulation of this network in order to determine the best overall programme of operation.

Network analysis therefore improves the estimation of time through the use of CPM/PERT. Once the network for the project is fully understood, the time and cost estimates of each activity can be established with improved accuracy. The control of time and cost can also be enhanced by observing the trend of actual progress, comparing the progress with the desired standard (in the plan/network) and taking corrective measures to keep costs and time within acceptable bounds for each activity. Antill and Woodhead (1970) observe that when using CPM/PERT for planning, the accuracy of the estimates depend on information available concerning:-

- the nature and extent of the work (quantity of work);
- working conditions;
- availability and cost of labour both human and machine;
- availability and cost of materials;
- currency fluctuation trend.

If no information (or estimates) on these is available, or if the estimates are wrong, then CPM/PERT cannot serve its useful purpose in planning.

The main assumption in CPM/PERT network analysis is that the resource requirements for each activity can be met when required. This implies that for the estimates realized by CPM/PERT to be valid, the resources required to execute the plan must be available

when needed (i.e. labour, plant and equipment, materials, utilities etc). The greatest limitation of CPM/PERT is that it does not allow for shortages evident in real situations.

Project management involves the organization, planning, starting, coordinating and controlling various activities in the project. During the project life, the project manager encounters problems which may adversely affect the progress of the project in terms of cost, budget and resource availability.

The aim of this study was that Nyongoti (1996) undertook research to investigate the issues that affect project management in Kenya Railways Project. The main objectives were to identify the significant factors affecting project management and to determine the level of using project management techniques in the management of the Kenya Railways project.

The findings revealed that the factors that affect project management in Kenya Railways Project were: lack of communication, lack of experience of the project manager, the involvement of the project, lack of training for project manager, ineffective team work and team working, lack of personnel involvement and slow project decision making. The study found that the top management support for the project was 70%, which was not adequate for effective management of large projects. Also, the level of project management skills used to be used in the management of projects.

The study also identified several factors critical to project cost effectiveness in the Kenya Railways Project. The main objectives were to identify the critical factors which contribute to cost overruns and to identify what needs to be done to the

2.8 FACTORS AFFECTING PROJECT MANAGEMENT.

Project management involves the organization, planning, staffing, coordinating and controlling various activities in the project. During the project life, the project manager encounters problems which may adversely affect the progress of the project in terms of time, budget and expected quality.

It was for this reason that Mwadali (1996) undertook research to investigate the major factors that affect Project Management in Kenya Railways Projects. His main objectives were to identify the significant factors affecting project management and to determine the extent of using project management techniques in the management of the Kenya Railways projects.

His findings revealed that the factors that affect project management at Kenya Railways are: Poor communication, little experience of the project manager, late procurement of equipment, lack of training for project managers, ineffective monitoring and controlling systems, lack of personnel motivation and slow project selection methods. He also found out that top management support for the projects was 50%, which was not adequate for the efficient management of these projects. Also, the use of project management tools was found to be rare in the management of projects.

Karimi (1998) on the other hand studied factors critical in project cost overruns in the Ministry of Water Resources Projects. Her major objectives were to identify the critical factors which contribute to cost overruns and to identify what needs to be done in the

light of the critical factors to minimize cost overruns. The results indicated that five factors emerged as the critical factors contributing to project cost overruns in the ministry of water projects. They include the project organization, environmental conditions, quality of project management, project definition and infrastructure and logistics.

In view of her findings, she recommended improvements on personnel policy, organization structure, better communication, external auditing, environmental sensitivity better project management, complete definition of project requirements and provision of better infrastructure facilities.

Pinto and Slevin (1988) researched on critical success factors in effective project implementation. They found communication to be the most critical factor. Adequate communication channels are extremely important in creating an atmosphere for successful project implementation. The communication factor identified refers not only to feedback mechanisms, but the necessity of exchanging information with both clients and the rest of the organization concerning project goals, changes in procedures, progress reports among others.

Another critical factor in project management is that of personnel issues. Adams (1990) argued that lack of trained operators and mechanics led to repeated breakdowns in 1983-84 in the Bura project. This resulted in shortage of water 25% of the time and this led to delays and loss in production.

Hans (1990) identified several environmental variables that affect project management. These include the natural environmental conditions, politics, monetary inflation, and pressure from interest groups among others. He thus concluded that environmental sensitivity is an integral part of all good project management. Environmental sensitivity is central to competent design, construction and operation of most engineering works.

Inadequate use of project management tools during project planning and execution was identified to be a critical factor in project management by several studies (e.g. Mwadali (1996), Grool et, al, (1986). Such tools include milestone bar charts, gantt charts, network analysis (PERT, CPM, GERT), models such as assignment model, transportation models, among others.

Mbatha (1986) carried out a study on building contract performance in government projects in Kenya. His objectives were to establish cost and time performance in relation to size, to investigate the adequacy and reliability of initial contract periods and to investigate the effect of location and size of the project on time and cost performance. He observed that the majority of government building projects suffer major cost and time overruns. He also established that time overruns are more frequent than cost overruns and that there is no linear relationship between the two. Big projects were shown to be more prone to both time and cost overruns than the smaller ones although project delays were found to bear no relationship to project size.

Mbatha argued that one cause of poor time performance was the inadequacy of initial contract periods. Inconsistent and erroneous estimation of the periods lead to time overruns during implementation. Time and cost performance were also found to be related to the type of projects and for this reason, he noted that some Ministries suffered more than others in terms of time and cost performance. He also established that there is no linear relationship between size and time performance. Other causes for time overrun in the building industry identified by Mbatha include late payments, bad weather, sub-contracting, material shortage and work additions and variations.

Two years later Talukhaba (1988) researched on time and cost performance of construction projects. His population of study included all projects (government, private and parastatal) which were initiated in Nairobi and constructed and accomplished between 1978 and 1987.

The objectives of his study were to investigate and establish the influence of clients, design teams, type of projects, contractors and tendering methods on time and cost performance. He also wanted to establish the effect of the number of variations on the initial design and the effect of delayed payment on time and cost performance. Investigation of adequacy of contract periods estimation as a factor affecting time performance of construction projects was another key objective of his study.

Talukhaba observed that time performance is very poor in construction projects to the extent that about 70% of projects initiated are likely to overrun in time with a magnitude

of about 53% above the original contract time. He also established that government projects perform poorer than parastatal and private projects both in terms of time and cost. Contract periods were demonstrated to be inadequate, while variations in initial design and delayed payment to contractors are other influential factors that significantly affect time and cost performance.

Kayongo (1981) carried out a study on managing a project by network analysis, a case for a UNIDO project - MACP, UGANDA. He undertook this research due to the fact that earlier observations had indicated that some United Nations Development Program (UNDP) projects implemented in Uganda took longer to accomplish than the estimated time. In some cases, the projects were completely abandoned before they were completed. His research was therefore based on the assumption that lack of technical and adequate planning was the major factor responsible for the project's delay. His main objective of the study was to determine whether one of the UNIDO projects in Uganda, the Management Accountancy Consultancy Project (MACP), could be managed more efficiently by applying network analysis techniques; and whether, through the use of a network analysis model the project could be completed in a predetermined time interval.

He found out that by using network analysis, the earliest possible time the project (MACP) could be completed was in five years and nine months instead of the estimated period of two years that was estimated by the planners - UNIDO. In view of this, he recommended for improvement in the planning methods and management of the projects by adequate use of scientific methods like network analysis. Kanyongo also observed

that with network analysis, a better system of feedback controls is possible, hence corrective measures can be implemented whenever actual time overruns the estimated time interval.

World Banks reports also identified several causes of project failure (in terms of cost, time and quality performance). They include inefficient technical/economic project appraisal, poor estimates by client/ consultant, lack of contract strategy, badly written conditions of contract, wrong type of contract, bad industrial relations, poor assessment and inappropriate allocation of risk, excessive variation, disruption, poor contract/project management and control, and lack of competence by contractors and suppliers. For government projects, political interference and influence was found to affect both time and cost performance. Laxity on the part of civil servants has not passed unnoticed. The reports indicate that civil servants are not impartial in their duties because they have intentions of making their own personal deals.

Whether or not these factors identified by different researchers are also responsible for influencing project delays in water projects will be determined by the findings of this research paper. On the other hand, different factors may be identified.

2.9 THE NATIONAL MASTER WATER PLAN

The government of Kenya recognized that the national water resource is limited and is of uneven distribution throughout the country, although water is a necessary ingredient in all forms of development. There are many potential demands upon this limited resource and the government recognized the need for a National Master Water Plan to guide in the

allocation, supply, conservation and development of the water resource. Some of the demands for the resource include;

- a) domestic and livestock
- b) industrial
- c) power generation
- d) irrigation
- e) wildlife and recreation among others

Initially, before the National Master Water Plan was launched in 1975, water resources planning in Kenya had been primarily concerned with individual developments which were either rural or urban domestic water supplies, irrigation schemes or power generation the Tana River Basin. The aim of the National Master Water Plan was to provide for the development of all water resources to satisfy as far as possible the needs of the rapidly growing population upto the turn of the century. Basically, the plan focused on satisfaction of the above five needs while at the same time focusing on controlling problems resulting from flooding and pollution and other environmental and ecological effects. Thus the plan also focused on procedures for water and soil conservation, waste water and sewage disposal processes and the conservation of water catchment areas.

Since then, the government, through the Ministry of Water Resources has embarked on identification, planning, and implementation of projects that are geared towards meeting the above demands. In some cases, especially for projects funded and implemented by other bodies, the government (Ministry of Water Resources) acts as a facilitator. It

facilitates planning and implementation of the project by identifying and liaising with the other stakeholders.

Currently, there are 266 on going projects in the Ministry, of which 221 are funded and implemented by the government of Kenya (some with some support from the local communities) and 45 of them are funded by external governments and organizations like Japan, Italy, France, Netherlands, CIDA, JICA, IFAD, IDA and ADB, among others. This research focused on those water projects that were completed between January 1st, 1993 and December 31st, 1998 and which were funded by the government of Kenya.

CHAPTER THREE RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

The study employed the case study design. This research design was found to be most appropriate for the study for various reasons. Although a survey study, where all projects in the Ministry of Water Resources are considered would have produced more general findings, it was not possible. This is because the projects in the Ministry of Water resources are initiated and implemented by various parties other than the government. Such parties include the Local Community, external governments and bodies (e.g. CIDA, JICA, IDA ETC), Non governmental organizations (e.g. USAID, PLAN international, etc). Documentation of projects implemented by such bodies may not be systematic, formal or easily found. Further, the probability of getting the key participants in such projects was very low and it would have required the researcher to travel widely throughout the country to find some of the participants, an exercise constrained by both time and money. The case of the government-funded projects was, therefore, chosen in order to overcome this difficulty since in most of these projects, the key implementors are permanent employees of the Ministry. Records on all the projects are also readily available in the Ministry's library. Most of the information sort by the researcher could thus easily be found.

3.2 POPULATION OF STUDY

The study focused on all the water projects in the Ministry of Water resources that were financed by the government of Kenya and were completed in the period between January 1st 1993 and December 31st 1998. Projects accomplished prior to this period were not considered because those who participated in the implementation of such projects were

likely not to be found still working in the Ministry. Retirement or death of key participants of projects completed long ago could not be overruled.

The five year period was strategically chosen to ensure that enough projects whose key implementers could still be working in the Ministry were included in the population to warrant generalization of the findings to all water projects in the ministry. A total of 57 projects known to have been completed within this period formed the population of the study.

These projects were implemented in the eight provinces as show in the table below: -

Table 3.2.1: Distribution of Projects by Province

Provinces	No. Of Projects Implemented	Percentage
Nairobi	4	7.02
Central	2	3.51
Coast	7	12.28
Eastern	17	29.82
North-Eastern	9	15.79
Rift Valley	11	19.30
Nyanza	4	7.02
Western	3	5.26
TOTAL	57	100

Source: Ministry of Water Resources

All these projects were funded by the government of Kenya. Some of them were implemented wholly by the government through the ministry of water resuorces while others were implemented through a joint effort between the government and the local communities.

3.3 THE SAMPLE

Sampling of the population is usually undertaken if studying the whole population proves impossible due to constraints on time, finance and accessibility, among others. For a small population such as the one in this study, none of the above was a constraining factor. A census of the whole population was therefore carried out. The nature of the statistical method used for the analysis of the data, factor analysis, also required a large number of study units for good analysis.

3.4 DATA COLLECTION

Basically, primary data was collected for the study. However, in some cases secondary data from progress reports and other reports on the projects was also collected in order to confirm the responses. Secondary data also helped the researcher in making recommendations.

Primary data was collected through questionnaires administered personally by the researcher. The targeted respondents were the senior officers in charge of the project's implementation. In the Ministry, they are called field engineers (or field officers). For big projects the two project managers in the Ministry, the Deputy Director in charge of construction and the Deputy Director in charge of maintenance or their deputies were issued with a copy of the questionnaire. Where no officer (or Engineer) in charge of a project in question or his deputy was available within the Ministry headquarters or

Nairobi Province, internal mailing was used by the Ministry to send the questionnaire to the respondent. The researcher also had a chance to discuss issues in the questionnaire with those respondents he personally administered the questionnaire to.

3.5 DATA COLLECTION TOOL

The type of respondents targeted in this study made the use of a questionnaire very ideal as opposed to other methods of primary data collection. Whereas personal interview is the best method of data collection because the interviewer is able to collect both verbal and non-verbal information, it was not feasible for this study because some of the targeted respondents were out in the field and could not all be personally contacted by the researcher because of time constraint. However, because all the respondents were highly experienced officers in the government and since factor analysis was to be used for identification of the factors influencing project delays, using a questionnaire for data collection was the most ideal method. This is because the questionnaire would provide a standard response, which would be analyzed using the factor analysis technique.

The questionnaire was developed from an extensive review of the relevant literature. The researchers personal experience in interacting with the stakeholders of the water projects, notably the public, officers in the Ministry of Water Resources, Non-governmental Organizations and the media (both press and electronic media) greatly helped in developing the questionnaire.

The data collection instrument consisted of three parts A, B, and C. Undisguised questions were used throughout the questionnaire. Parts A and C were made up of

unstructured open-ended questions while Part B was made up of structured ones. Part A of the questionnaire gathered general information about the project. Specifically information regarding estimated and actual cost, estimated and actual project life, management science tools used during planning, and others were sort in this part. Part C sort to gather information regarding remedial measures by respondents to address the issue of project delays, limitations and drawbacks faced during implementation of such measures and what out to be done to improve the situation.

Part B consisted of 49 statements addressing among others, the following possible factors:- bureaucracy in public sector, inadequate resources, infrastructure, operating environment, professionalism, use of management science tools and motivation of workers. The statements contained in this part of the questionnaire were randomly sequenced to avoid guessing of the underlying factor implied in a cluster of the statements.

In this part, Likert's five point scale was used to rank the score of each statement. The respondents were required to indicate the degree to which each of the statements influenced the project delay in the projects they participated in implementing by circling 1 to 5 where "not much at all" scored 1 and "very much" scored 5.

3.6 DATA ANALYSIS

Parts A and C of the questionnaire were analyzed using descriptive statistics with a view to summarize the response data in terms of proportions, frequencies and percentages.

This explained the proportion, frequency or percentage of the respondents with similar responses.

Most studies done on project management (e.g. Mwadali 1996, Karimi 1998, etc) used factor analysis for identification of factors. For this reason, factor analysis was used to analyse Part B of the questionnaire. The content of the statements in this part of the questionnaire were such that the factors determined by this method of analysis are those that influenced project delays during the implementation stage of the project's life cycle. To perform factor analysis, the statistical package for social sciences (SPSS) for micro soft windows (Release 6.0) was used.

3.6.1 FACTOR ANALYSIS

This method of analysis aims at reproducing as accurately as possible, the original interrelation matrix from a small number of hypothetical factors to which the original statements in the questionnaire are linearly related. This displays the initial factor matrix. In order to improve interpretability and accuracy of the output rotation of the initial factor matrix is essential.

Varimax rotation was used to rotate the initial factor matrix. The rotation converged after 16 iterations producing the final factor matrix. In summary, factor analysis first identifies a set of correlation's for all combinations of the statements. It then extracts a set of initial factors from the correlation matrix developed and then rotates this set of initial factors to find a final solution.

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

In order to establish which statement belongs to which factor, the researcher singles out responses that have the highest loading in absolute value. For this analysis, loading greater than $/0.5/$ were considered high.

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 RESPONSE RATE:

All the projects in the population , 57 in total, were considered in the study. However, participants in six out of the 57 projects could not be traced. Some of them were retired while others are dead. A total of 51 questionnaires were therefore distributed to key participants in the implementation of each of the 51 projects. Most of the respondents contacted personally by the researcher filled and returned the questionnaire. For the officers in the field whose questionnaires were sent to them by mail, most of them did not return the questionnaires. In short, a total of 32 questionnaires were returned, some of which were not fully filled. This gave a response rate of about 63%. This response rate is a good one given that most researches done in the public sector yield low rates of response. (eg. Kang'ori 1998).

However, response to part C of the questionnaire was poor. Respondents left several questions unanswered. This part dealt with what the respondents did to address this problem of project delays and the drawbacks encountered. By not filling anything, the respondents actually admitted that they did nothing - although other reasons for not answering the questions (e.g. laziness to fill the questionnaire) could not be ruled out.

4.2 DESCRIPTIVE STATISTICS

TABLE 4.2.1: RESPONDENTS' EXPERIENCE

Experience	No. of Respondents	Percentage
1 year and less	3	9.375%
1 - 5 years	17	53.125%
5- 10 years	7	21.875%
10 year and more	5	15.625%
TOTAL	32	100.000%

Source: Primary Data

Judging from the table above it seems most of the respondents had some experience of more than one year working with water projects prior to their assignments. Only 3 out of the 32 respondents (9.375%) had little experience of less than a year. 12 out of the 32 (37.5%) had more than five years experience. The mean experience of the officers stood at 6.81 years. Lack of experience of the officers in charge of project implementation could thus be ruled out as an influential factor to project delays.

TABLE 4.2.2: TIME OVERRUNS

% Time overruns	No. of Projects	Proportion	Percentage
0 - 25%	5	5/32	15.625%
25 - 50%	7	7/32	21.875%
50 - 75%	11	11/32	34.375%
75 - 100%	5	5/32	15.625%
Over 100%	4	4/32	12.5%
TOTAL	32	1	100%

Source: Primary Data

Only 5 out of the 32 projects had their project lives extended by less than 25%. A total of 20 project (62.5%) escalated in time by more than 50%, while 12.5% of the respondents had their projects overrun in time by more than 100% of the initial estimated time. This high degree of poor time performance in projects is rampant in the public sector not just in the Ministry of Water Resources. Talukhaba (1988) observed that time performance in the public sector projects was so poor that about 70% of projects initiated were likely to overrun in time by more than 50% of the initial estimated time.

TABLE 4.2.3: CAUSES FOR ACTIVITY DELAYS

REASON	frequency	percentages
Bureaucracy in the Government	17	53.125
Scarce Resources (funds, raw materials, etc)	11	34.375
Corruption and Political Interference	6	18.75
Others	7	21.875
No- response	5	15.625.

Source: Primary Data

Out of the 32 questionnaires received from the respondents, five did not address this issue. They did not give reasons for delayed activities in their projects although they had indicated what activities had been delayed. The other 27 gave different reasons for this. These reasons differed both in content and number. 17 of them (53.125%) indicated that bureaucracy in government offices (or statements to this effect) was one of the causes of the delays. 11 respondents (34.375%) identified scarcity of resources (including funds, raw materials, labour, time etc), while 18.75% indicated corruption and political

interference to cause activity delays. Seven respondents (21.875%) gave reasons other than those listed above.

Table 4.2.4: COST OVERRUNS

	No. of Projects	Percentage
Completed on Budget	4	12.5%
Budget exceeded	28	87.5%
Total	32	100%

Source: Primary Data

Only 12.5% of the respondents indicated that their projects were executed with no cost overruns while 28 of them agreed that the actual costs of the projects exceeded the estimated costs. Of these, 28 respondents, only 7 respondents attributed the cost overruns to genuine delays in activities. The rest, 21 in total, indicated that even without the delays, cost overruns could not have been avoided. Most of them cited corruption, rising prices of raw materials and poor cost estimation to be major causes of cost overruns. Karimi (1998) had identified project organization, environment, project management, project definition, and infrastructure and logistics to be critical factor influencing cost overruns.

TABLE 4.2.5: TOOLS IN PROJECT MANAGEMENT

M/S Tools	Frequency	Percentages
Charts (Pie, Bar, Gaunt, etc)	23	71.875
Critical Path Method (CPM)	16	50.000
Program Evaluation and Review	13	40.625
Technique (PERT)	9	28.125
Milestone	2	6.250
Others	7	21.785
No Response		

Source: Primary Data

Seven out of 32 respondents did not indicate using any management science tools in their projects. Whether or not they were even aware of the existence of such tools that improve project management cannot be concluded here. However, most of them (71.875%) indicated that they had used some form of a chart or another. These included Pie charts, Gauntt charts and bar charts. Critical Path Method (CPM) was the second most popular tool used by 50% of the respondents followed by PERT with 13 respondents (40.625%) acknowledging its use. Nine respondents indicated the use of milestone, while two other respondents used tools other than those listed above. Most officer in charge of water projects, favour the use of charts over other tools. Mwadali (1996) confirmed lack of use of management science tools in project management in Kenya Railways projects. Whether or not the managers were aware of such tools is an issue to be investigated. All in all, there is need to sensitize the use of management science tools in projects.

TABLE 4.2.6: TIME ESTIMATE

	No. of Respondents	Percentage
REALISTIC	15	46.875%
NOT REALISTIC	17	53.125%
TOTAL	32	100%

Source: Primary Data

In several occasions, the estimated time for the projects have been found inadequate by project implementers. The study found out that 53.125% of the respondents confirmed that the time allocated for their projects was not realistic under the prevailing circumstances. Most of the respondents who found the time estimates inadequate cited the following reasons for this.

TABLE 4.2.7: REASONS FOR UNREALISTIC TIME ESTIMATES

Reason	Frequency	Percentage
Incompetence of estimators	7	41.18
Scarce Resources	5	29.41
No response	5	29.41

Source: Primary Data

Whereas 41.18% of the respondents blamed the estimators for incompetence, 5 defended the estimators by citing scarcity of resources to be responsible for this. Another 5 did not know why estimators set unrealistic time. Estimation of time periods is a sensitive issue that needs to be addressed urgently. Time estimators have often cited lack of time estimation models, remoteness of project locations and poor technology as the major causes of poor time estimation.

TABLE 4.2.8: INVOLVEMENT OF PROJECT MANAGERS IN PLANNING.

	No. of Respondents	Percentage
Involved	11	34.375%
Not involved	21	65.625%
Total	32	100%

Source: Primary Data

Only 11 out of the 32 project participants who responded were involved in the planning stage of the project. Compared to the 65.625% who were not involved, it can be concluded that the degree of involvement of project implementors in planning is very low. Most of those who were not involved (18 out of the 21 respondents) could not establish why they were not involved. Two were not within reach during the planning stage while one blamed the planners for sidelining him intentionally.

However, all the 32 respondents confirmed that it was important to involve some of the implementors in the planning of water projects and vice versa. Indeed involvement of key participants in projects should not just begin in the planning stage, but in the early stages. Preferably all the key participants in project implementation should be involved in the feasibility study.

4.3 STRATEGIES TO MINIMIZE PROJECT DELAYS:

TABLE 4.3.1: STRATEGIES USED

	STRATEGY	Frequency	Percentage
1	Re- organization of the project team	9	28.125
2	Reporting shortages of resources to authorities	8	25.000
3	Withdrawal of non performers from the project team and replacing them with new members	6	18.750
4	Briefing authorities of causes of possible delays in advance.	4	12.500
5	Closer supervision of individual tasks execution	3	9.375
6	Requested for undelayed payment of wages for causal labourers	3	9.375
7	No response.	7	21.875

Source: Primary Data

21.875% of the respondents did not indicate what they did to address the problem of project delays. For those who filled, some gave as many as three strategies while others gave just one. Nine out of the 25 project officers who responded indicated that they re-organized their teams to improve the pace of job execution (or gave statements to this

effect). 25% of the respondents reported shortages of raw materials, labour, equipment and others indicated that they withdrew those who could not perform as expected from the team and replaced them with other members.

Four respondents (12.5%) indicated that whenever they noticed anything that could possibly cause a delay in any activity's execution, they briefed the authorities well in advance, while 9.375% stated that they put closer supervision measures during execution of each activity. Another 9.375% of the respondents stated that they requested for undelayed payments to the causal labourers in order to boost their morale.

Out of the 25 respondents, 19 (75%) indicated that they had encountered some problems during implementation of some of the above strategies. Only 24% did not face any drawbacks, and these were those who cited reporting, briefing and requesting the authorities for one thing or the other. The 19 respondents cited several major drawbacks that include:-

TABLE 4.3.2: MAJOR DRAWBACKS FACED IN IMPLEMENTING STRATEGIES TO MINIMIZE PROJECT DELAYS.

Drawback	Frequency	Percentage
Inadequate project officers authority	8	42.11
Interference, both political and from within the Ministry of water Resources	7	36.84
Bureaucracy in the Ministry	5	26.32
Scarcity of funds	2	10.53
Corruption	2	10.53

Source: Primary Data

Out of the 19 respondents who indicated they encountered problems in implementing the strategies, 8 (42.11%) cited lack of adequate authority bestowed on them to be the major draw back.. Seven indicated that too much interference affected implementation of the strategies while 26.32% stated that there was a lot of bureaucracy in the Ministry of Water resources such that the strategies took longer than necessary to be approved. Scarcity of funds was raised by 10.53% of the respondents while another 10.53% raised corruption to have been a major drawback.

Project managers ought to be given enough authority to run the project effectively. This is one area which the government has failed. The government has oftenly been accused of interfering with the smooth execution of projects not only in the Ministry of Water Resources, but in other ministries as well. This interference should stop if the set objectives of each and every project are to be met.

TABLE 4.3.3: PERCEPTION OF THE STRATEGIES

	No. of Respondents	Proportion	Percentage
BEST	13	13/25	52%
NOT BEST	11	11/25	44%
NEUTRAL	1	1/25	4%

Source: Primary Data

Out of the 25 respondents who cited the use of several strategies to address the problem of project delays, 52% of them perceived the strategies they had employed to be the best strategies that could address the problem given the prevailing circumstances. However, 44% of them indicated that the strategies were not the best while one respondent did not know whether or not his strategies were the best under the circumstances. Several other

strategies that were perceived to be better by the respondents were suggested. These include:-

TABLE 4.3.4: SUGGESTED STRATEGIES

Strategy	Frequency	Percentage
- Restructuring of the Ministry of Water Resources.	8	25
- Establishment of a special committee responsible for all water projects in the Ministry.	7	21.875
- Ensuring resource requirements for the project will be availed when needed before the project's implementation begins	7	21.875
- Privatization of water projects in the country	5	15.625
- Establishment of an anti-corruption unit within the Ministry	4	12.500
- Sensitizing the project teams on the importance of working within the scheduled time periods.	4	12.500
- Enhancing training for officers in charge of the projects (project managers) to equip them with better project management skills	4	12.500
- Providing project officers with mobile phones for faster communication	2	6.250
- No response	3	9.375

Source: primary Data

Response to this question was good. Even those respondents who had not answered the proceeding questions suggested strategies that could possibly improve the situation. A total of 29 respondents answered this part. Out of these, 8 respondents (25%) gave suggestions to the effect that there was need to restructure the whole Ministry of Water Resources if the pace at which water projects are executed should improve. Interviews with those that the researcher personally contacted revealed that most of the reasons that

cause the delays are deeply rooted within the Ministry that it has become a culture. They reported that in order to eradicate this culture, there is need to change the way things are done within the ministry, retiring some top officers and replacing them with fresh blood and most of all, improving the remuneration of the Ministry employees and public servants in general, they noted, might change the culture and improve the situation.

21.875% of the respondents suggested that a committee which will be responsible for overseeing the planning and execution of all water projects to be establish within the Ministry. When interviewed, the respondents revealed that the duties of such a committee would be to identify sources of finance for the projects, liaise with all the stakeholders and to ensure that no external interference affects the pace of execution of the projects.

Another 21.875% wanted all engineers in charge of water projects to ensure that all the resources for the project can be availed when needed before any project execution begins. Five were of the view that privatization of the water projects in the country will greatly improve their pace of execution and the efficiency of water provision within the country. Privatization, they noted, will bring about competition that will help improve the provision of the water resource.

Four (12.5%) of the respondents wanted a section of the Kenya Anti-corruption Authority (KACA) to be permanently established within the Ministry to deal with the issue of corruption. This unit would ensure that all the resources intended for the projects are

indeed utilized for the projects. Another 12.5% noted that sensitizing the engineers in particular and the project team in general on the importance of time is necessary. Interviews with the respondents indicated that the engineers are in most cases concerned about cost and quality of the project and not time.

Out of the 29 respondents, four confirmed the need for training of the officers in charge of the projects. The four noted that most of the officers were either mechanical, civil, chemical or pavement engineers or architects who lacked any formal training in Project Management. All the four agreed that they did not undergo any training in Project Management and that they were not aware of any tools such as CPM, PERT, GERT and others that help them in the management of projects. Only 6.25% of the respondents suggested that the project engineers should be provided with mobile phones in order to improve communication with the Ministry headquarters, suppliers and other stakeholders of the projects.

In addition to the suggested strategies, the researcher recommends that project management should be given a more prominent role in every ministry. This is because projects are evident in all ministries and over 50% of every ministry's efforts are geared towards successful completion of the projects. Indeed every ministry deserves a project management department responsible for all the projects in that ministry.

FACTOR ANALYSIS

TABLE 4.3.5: PRIVATIZATION OF WATER PROJECTS

	No. of Respondents	Percentages
FEASIBLE	23	71.875%
NOT FEASIBLE	9	28.125%
TOTAL	32	100%

Source: Primary Data

About 72% of the respondents agreed that privatization of water projects in the near future is very feasible compared to only 28% who did not see this possible. However, 30 out of the 32 respondents (i.e. over 93%) indicated that the provision of water to the citizens would greatly improve if this were to happen.

4.4 FACTOR ANALYSIS

Table 4.4.1-Means and standard deviations

Table 4.4.1 (in appendix II) shows the means and standard deviations of the response to each and every question. Since the response to each statement varied from 1 to 5, a mean score of 3 and above is considered influential. Going by this, statements,1,2,3,4,5,6,10,11,12,13,15,18,19,21,23,28,31,35,39,42,43,44,46,47,48 and 49 are very influential statements. Statements 39, seems to be the most influential to project delays - with a mean score of 4.5000 while statement 7, with a mean score of 2.93125, is the least influential.

The standard deviations indicate a measure of dispersion from the mean score. Due to the nature of the response alternatives (varying from 1 to 5), a standard deviation of more than 1.0 is rather high. However, in some of the statements, the responses displayed high deviation. For instance statements 3,5,8,10,12,16,19,22,24,25,28,34,37,38,41,43,45, and 47 had standard deviations of more than 1.0. This is because of the variation in projects (in terms of design, size, composition of projects teams, etc) the respondents participated in implementing and also variation in experience, qualification and designation of the respondents. For instance, for statement 19: shortage of raw materials resulted in time escalation, responses may vary from 1 to 5 depending on personal experience of the respondent during execution of the project he participated in.

Table 4.4.2:Correlation Matrix

The correlation matrix (table 4.4.2 in appendix II) shows the intercorrelation among the forty nine variables contained in Part B of the questionnaire. For example, question 12 is correlated to question 7 by 0.00869. This is a very weak positive correlation. The correlation between one variable and another is as perceived by the respondents (from their responses). The responses indicate that some of the statements are negatively correlated. For instance question 46 is correlated to question 43 by -0.45069. On average, the matrix displays low correlation (both positive and negative) between the variables. Zero implies no correlation between the variables while any figure between 0.7 and -0.7 indicates a weak correlation. For high correlation the number should be either close to 1 or -1.

The essence of the correlation matrix is that it forms the basis for generating the factors from the variables contained in the questionnaire. Secondly the matrix helps us to determine how well the questionnaire was set. High and positive correlation between the variables is highly undesirable. This is because when two variables are highly and positively correlated, the implication is that the two variables (questions) are actually seeking the same response. For instance the questions; What is your age? and How old are you?. The two questions are essentially the same question asked differently. On analysis of the responses, the two would be highly and positively correlated. As evident from the correlation matrix, no two variables in the questionnaire were highly correlated.

Indeed most of the variables displayed very weak correlation of between 0.1 and - 0.1, showing that on average, the statements were not seeking the same response.

Table 4.4.3: Communalities, Eigen Values and Percentage of Variance

Table 4.4.3 in appendix II shows the initial statistics of the communalities, eigenvalues and the percentage variance of each factor. The percentage variance shows the proportion of the variance in the entire set of standardized response scores which is explained by the factor. For instance, factor 1 explains 13.6% of the variance of the standardized response scores from all the respondents on all the 49 variables. The cumulative percentage gives the percentage variance for all the n factors. For instance, the first ten factors explain 70.7% of the variance while the identified fifteen factors explain 85.0% of the variance. These factors have eigen values greater than unity.

Eigen values indicate how well any given factor fits the data from all the respondents on all the statements. An eigen value greater than 1 is considered a good fit. For this reason the first fifteen factors are a good fit for the data from the respondents. The initial analysis, as clearly seen from these statistics, has therefore extracted a total of 15 factors.

The communality of a statement is the sum of the squares of its factor loadings. Because all the factors (including those with eigen values less than 1) are considered in the initial analysis, all variables have a good contribution to all the factors. This is why the communality of each variable is 1 or 100%.

Since the 15 factors identified explain 85.0% of the total variance, these factors are a good fit for the data. This is because a factor analysis that accounts for more than 60% of the total variance is a good fit.(Mwadali, 1996).

Table 4.4.4: Initial Factor Matrix

Table 4.4.4 in appendix II shows the initial factor matrix after the initial running of the factor analysis program. Correlation coefficients that indicate the correlation between the identified factors and the statement's standardized response scores are displayed for every factor. As shown, a total of 15 factors were extracted by the initial analysis. Each factor is highly correlated to at least one of the statements. Any correlation coefficient of between 0.5 and 1.0 or -0.5 and -1.0 is considered high. For instance, factor 1 is highly correlated to statements 5,8,20,26,27,34,40 and 41. It is also highly but negatively correlated to statements 12 and 43.

In order to improve the identification of the factors, there is need to rotate the initial factor matrix. Varimax rotation was performed on the initial factor matrix to obtain a final factor matrix. The varimax rotation converged after 16 iterations to produce the final factor matrix. The coefficients in the terminal solution (final factor matrix) represent both regression weights and coefficients of correlation.

Table 4.4.5: Final (Rotated) Factor Matrix

Table 4.4.5 in appendix II shows the final factor matrix after varimax was performed on the initial factor matrix. The varimax rotation covered in 16 iterations as indicated. This final factor matrix represents the terminal solution and gives an improved identification of factors from the responses than the initial factor matrix.

As seen from the table, a total of six factors were finally extracted after the varimax rotation. The table shows that factor 1 is a good fit on response data from statements 2,4,9,10,13,18,21,31 and 48 but a poor fit on responses form other statements. The implication of this is that these statements probably measure the same factor, at least in the minds of the respondents. It is this cluster of statements that enabled the researcher to conclude that at least a common factor exists that can be inferred from this cluster . Judging from the contents of these statements, the researcher concluded that **quality of project management** was the factor that clustered these statements together in the minds of the respondents.

Similarly, the table shows that factor 2 is a good fit on response data from statements 8,11,20,28,30,33 and 34 but a poor fit on other variables. Judging by the contents of these statements the researcher inferred that **operating environment** was the most evident factor that tied these statements together. The table also indicate that statements 5,15,29,42,43,46 and 47 load heavily on factor 3. From the contents of these statements, it was concluded that **motivation of workers** was the most possible factor responsible for clustering these statements together.

Factor 4 is a good fit on response data from statements 12,35,40 and 41. Scrutiny of the contents of these statements revealed **infrastructure** to most probably be the factor addressed. Statements 19,23,25,26,27,37 and 38 load heavily on factors 5. Observation of the contents of these statements enabled the researcher to conclude that the issue of **inadequate resources** was being addressed here. Factor 6 is a good fit on response data from only two statements, 3 and 14. From the contents of these statements, it was evident that **organization of the project team** was being addressed.

Factors identified

Factor 1: Quality of Project Management

This factor was derived from the cluster of the following statements.

2. Insufficient use of progress reports contributed to time overruns.
4. There was lack of proper time control systems
- 9 Lack of use of management science tools during project planning and execution resulted in schedule overruns
10. Poor implementation strategies led to project delay
13. There was poor decision - making by senior officers in the project team which affected the project's completion time.
18. Poor allocation of resources caused unnecessary shortages that affected the completion time of the project.

21. Senior officers in the project team were not committed to meet time specifications.

31. There was lack of qualified and experienced manpower.

48. Poor assignment and coordination of activities resulted in time overruns.

Factor 2: Operating Environment

It was derived from the following cluster of statements.

8. Political interference affected execution of the project

11. Corrupt practices among officers slowed down the execution of most tasks.

20. There were physical obstacles on site that made it impossible to meet deadlines.

28. Harsh weather conditions did not allow smooth execution of the project, thus prolonging its completion time.

30. Lack of privatization of water projects in the country affected the pace at which the project was executed.

33. Tradition of not recognizing time as a limited resource contributed to project delay.

34. There was lack of prompt reaction to the needs of the project team from authorities in the ministry

Factor 3: Motivation of Workers

This factor was concluded from the cluster of the following statements.

- 5. Delayed payment of wages to workers contributed to time overruns.
- 15. The relationship between management and workers in the project team was poor, hence affecting the execution pace.
- 29. Poor remuneration of the workers contributed to schedule overruns.
- 42. There was more often revision of the project design and specifications during execution that contributed to time overruns.
- 43. Poor policy guidelines by the authorities contributed to time escalation.
- 46. Lack of participation of the project team in planning contributed to the delay.
- 47. Poor supervision of workers contributed to project delay.

Factor 4: Infrastructure

This was derived from the contents of the following cluster of statements.

- 12. There was poor communication between the site people and head office that influenced time overruns.
- 35. The poor state of roads contributed to delayed transportation of materials hence influencing project delay.
- 40. Lack of access to internet delayed ordering and procurement of raw materials.
- 41. Poor technology used during project execution contributed to activity delays.

Factor 5: Inadequate Resources

This factor was concluded to be inadequate resources from the contents of the following cluster.

19. Shortage of raw materials resulted in time escalation.
23. Plant and equipment on site were not sufficient to facilitate execution of the Project within the estimated time period.
25. There was insufficient manpower for the project.
26. Lack of funds needed to execute and complete each activity resulted to overall project delay
27. Failure to replace members of the project team in case of dropout affected the completion time of the project.
37. Lack of time estimation models in developing countries resulted in time underestimates.

Factor 6: Organization of the Project Team

Although this factor is a good fit on response data from only two statements, the contents of these statements clearly address the problem of organization of the team.

These are

3. There was lack of direction during a crisis resulting to time wastage.
14. Lack of alternative back-up strategies contributed to time wastage.

4.5 DISCUSSION OF FINDINGS

4.5.1: FACTORS IDENTIFIED

In total, six factors were identified to influence project delays in water projects in the Ministry of Water Resources. These in the order of their degree of influence are:-

1. Quality of project management
2. Operating environment
3. Motivation of workers
4. Infrastructure
5. Inadequate resources
6. Organization of the project team.

These factors should not be viewed as the only factors responsible for project delays in water projects, but rather, they should be seen as the critical ones. As seen from the contents of the statements from which the factors were derived, there is no clear boundary between one factor and the other in terms of definition. Indeed some of them can be considered to be apart of the other. For instance, the sixth factor, organization of the project team, can be viewed to result from quality of project management. If the latter is good, so will be the former. However, a definition of each of these factors was arrived at after a close scrutiny of the contents of the cluster of statements from which the factors were derived.

4.5.2 DEFINITION AND DISCUSSION OF THE FACTORS

Factor 1: Quality of project management

Looking at the statements from which this factor was derived, the contents of the statements confine the definition of this factor to include the use of project management techniques that include management science tools, progress reports, time control systems, project implementation strategies, decision making, allocation of resources, commitment

to time schedules, assignment and coordination of activities. It also includes the qualifications, skills, expertise and experience of the officer incharge of the project.

Interviews with these officers had earlier shown that most of them were either civil, mechanical, chemical or pavement engineers who were given the responsibility of heading the project team. Although most of them were fairly competent in their areas of specialization, they lacked the necessary skills and expertise to enable them to manage the projects efficiently and effectively. In order to improve the quality of management in water projects, there is need for the government to recruit professional project managers or to train the existing officers in order to equip them with the necessary project management skills. But training alone may not provide a lasting solution to this problem if the existing systems of governance do not change or refrain from interfering with the management of the water projects.

The same factor, Project management was also identified by Karimi (1998) as the third critical factor in influencing cost overruns in water projects. However, both the contents and the cluster of the statements that led her to conclude this factor were quite different from those in this analysis. The results thus confirm that quality of project management influence both cost overruns and project's delays.

Factor 2: Operating environment:

The contents of the statements clearly dictate the definition of this factor to include only those aspects of the environment external to the project (as an organization). Operating Environment is defined to include political interference and influence, corruption,

physical obstacles, weather/climatic conditions, privatization of water projects, traditional beliefs, and insensitivity to the needs of the Project Team.

Some of these environmental factors had earlier been mentioned by the respondents. Political interference and corruption, for instance, were acknowledged to be major drawbacks in implementing corrective measures. Most project officers do not look at the projects in totality during planning. As a result, harsh weather conditions and obstacles on site have oftenly been blamed to cause poor time performance. Both the project planners and implementors need to assess the practicability of implementing each and every activity so that every difficulty is foreseen and provided for.

Identification of this factor also confirmed Karimi's (1998) findings who determined the same factor (environment) to be the second most critical factor in causing cost overruns in water projects. The importance of addressing this factor cannot therefore be over-emphasized.

Factor 3: Motivation of workers

Interviews revealed that most of the workers in the project teams were casual labourers or volunteer workers from within the beneficiary communities. Casual labourers were poorly remunerated and poorly supervised by the management. Their wages were always delayed and their relationship with the management was never the best. Most of the project workers operate in harsh conditions, living in poor make shift structures on site

without proper sanitation or electricity. All this negatively affect the motivation of the workers, and this in turn influences project delays. Unfortunately, this factor was not revealed in Karimi's findings.

Motivation could be improved by improving living conditions of the workers, their remuneration and by recognizing and rewarding exceptional efforts by workers. Relationship between workers and management could also be improved by organizing get-togethers or parties to celebrate success in order to foster free interaction, association and expression among the project team members. Both workers and management could also be given a chance for capacity building by establishing different training programmes for different personnel.

Factor 4: Infrastructure:

Infrastructure is defined to include all communication and transportation channels including telephones, internet, radio calls, fax, newsletters, postal services, pagers, road network, railroad network, sea and air traffic among others. It is also defined to include the technology used during the implementation phase of the project.

Project officers interviewed by the researcher indicated that communication between the site people and other stakeholders of the project was very poor. Most of them confirmed that they never used any form of electro-magnetic medium on sites to communicate with others. No pagers, telephones or computers were used/available on site. Maybe this was due to the fact that most of the projects were located in very remote locations, a factor

that also limited transportation to the use of roads. But Kenya's road network is pathetic, delaying transportation of material.

In order to address this factor, both the communication and transportation infrastructure need to be improved. Specifically, the road network needs to be rehabilitated urgently. Project officers should also be equipped with pagers or mobile phones when on site to enhance communication with suppliers, head office and other stakeholders.

Factor 5: Inadequate resources:

The essence of management is to economically but successfully utilize the existing resources (usually very scarce) in order to attain certain set objectives. In a developing country such as Kenya, the issue of scarce resources is a major factor constraining most development efforts. Contrary to this belief though, this research found out that this factor ranked fifth in influencing project delays. Indeed Karimi (1998) did not find it a critical factor at all in contributing to cost overruns.

In this study, project officers confirmed shortages of raw materials, plant and equipment, manpower, time estimation models and other resources to significantly influence project delays. As such, inadequate resources are therefore defined to include scarcity or unsuitability of all resource requirements of the project- physical or non-physical.

In order to address this issue, availability of resources (particularly funds) and their sources must be ascertained before project implementation starts. There is also need to enhance monitoring and control of funds and other resources throughout the projects' life

cycle. Every activity should be supervised effectively to ensure minimal wastage of time and other resources.

Factor 6: Organization of project teams:

Interviews revealed that during a crisis, there were no clear instructions to guide the project team in what it should do. No backups in case of machinery breakdowns, personnel dropouts, supplier failure and other emergencies. This revealed that there was poor organization of the team by the project leaders. This factor is therefore defined to mean the ability of the project leader(s) to organize and arrange the members of the project team in a way that they would know exactly what to do in case of a crisis or emergency. As a managerial function, organization is a complex task that calls for both the leaders' expertise and his natural abilities. Experience also plays a major role in improving organization abilities. There is therefore need for younger, inexperienced project officers to work together with their older and more experienced colleagues in their assignments in order to gain the necessary experience. All possible emergencies should be evaluated and counter procedures developed for them.

CHAPTER FIVE: SUMMARY AND CONCLUSIONS

5.1 SUMMARY OF RESEARCH FINDINGS.

The importance of the water resource cannot be overemphasized. It is one of the most vital natural resources, yet over two billion people around the world lack access to drinkable supplies of it within reasonable walking distance from their homes. The situation is even worse in the Middle East and Sub-Saharan African. Women and children spend most of their time travelling long distances from their homes in search of water. In Kenya, the situation is not any better, particularly in the arid and semi arid regions. Even in the big towns, water supply is not reliable. It is characterized by persistent shortages. Indeed citizens are tired of the daily excuses and promises by both the local authorities and the government (through the Ministry of Water Resources). All that people are asking for is for something to be done to improve the supply of this vital resource. The study was therefore carried out with an overall objective of improving the situation. By meeting the objectives in chapter one of this report, the study hopes to enhance the supply of water in Kenya.

The findings of this research indicate that on average, 62.5% of the projects studied escalated in time by more than 50% of their initial time estimates while 12.5% had their time estimates overrun by more than 100%. By any standards, this indicates very poor time performance in water projects.

The following factors were perceived by the respondents to be influential in causing project delays in water projects. Quality of project management was perceived to be the

most influential factor. The contents of the statements from which the factor was derived dictates the definition of quality of project management to include the use of Project Management techniques including progress reports, time controls, management science tools, implementation strategies, decision making, resource allocation, time commitment, assignment and coordination of activities. The definition also includes qualifications and experience of the Project Managers.

Operating environment was found to be the second most influential factor on project delays in water projects. Contents of the statements indicated the definition of this factor is mostly confined to the external environment of the project team. It includes political interference and influence, corruption, physical obstacles, weather, privatization, tradition of community, and authorities' reaction to the needs of the project team.

The third influential factor is that of motivation of the workers. The research findings showed lack of motivation on the part of workers. The following negatively affected workers motivation. Remuneration, relationship with management, delayed payments, often revision of project design policy guidelines and supervision of workers. All these aspects were poor contributing to poor motivation that in turn affected the projects' completion time.

Infrastructure, the fourth influential factor, is defined to include all communication channels: telephones, internet, radio calls, fax, postal services and pagers among others. The definition also includes transportation channels:- road network, railroad network, sea

and air traffic among others. Lastly, infrastructure is also defined to include the technology used during the project's implementation.

The fifth influential factor, inadequate resources, is defined to include all resource requirements including raw materials, plant and equipment, manpower, funds, models and expertise. Finally, organization of the project team is restricted to mean how well the project team is organized in terms of its structure, ability to tackle a crisis, and back-up strategies among others.

The research also revealed that the following strategies had been employed to address the problem of project delays in water projects:-

- Re-organization of the project team
- Reporting shortages of resources to authorities
- Withdrawal of non performers from the project team and replacing them with other members.
- Briefing authorities on causes of possible delays well in advance
- Putting closer supervision on individual task execution.

CONCLUSIONS

However, some of these strategies faced several difficulties during implementation. These drawbacks faced, as revealed by the research findings, included.

- Inadequate Project Officers authority.
- Political interference and interference within the Ministry of Water Resources.
- Bureaucracy on the Ministry restricted the pace of implementation of the strategies hence causing more delay.
- Scarcity of funds.

Most of the respondents, over 90%, suggested several strategies that should be employed to address this problem. These included:

- Restructuring the Ministry of Water Resources.
- Establishment of a special committee responsible for all water projects in the Ministry.
- Ensuring all resources will be availed when needed before the project's implementation begins.
- Privatization of water projects in the country.
- Establishment of an anti-corruption unit within the Ministry.
- Sensitizing project teams on importance of time
- Enhancing training for project managers in the Ministry to improve their project management skills.
- Provision of field project officers with mobile phones.

5.2 CONCLUSIONS

From the above findings, it is apparent that something positive can and should be done to improve the provision of water by minimizing project delays. The suggested strategies may not provide a final solution to the problem, but at least they provide a good start in addressing the problem. Specifically the following should be given due consideration: -

1) Restructuring

As part of the structural adjustment programs (SAPs), the government embarked of civil servants retrenchment program in all ministries through the early retirement in a bid to minimize government expenditure. This alone however does not constitute restructuring. A complete change of the ministry of water resources in terms of composition and structure is desirable if performance of water projects should improve.

Project management should be given a more prominent role in the ministry in order to boost the performance of water projects. Fresh professionals should be employed in the ministry to replace non-performing officers. Office automation and networking should be enhanced in order to facilitate faster communication and decision making. Ceremonial positions within the ministry should be done away with. Lastly, project leaders should be given enough authority to enable them perform effectively without fear nor influence from other quarters.

2) Re-organization:

Project officer indicate that the whole process of project conception, feasibility study, planning and implementation was basically undertaken by the government, with little participation of the beneficiary communities. The whole process need to be reorganized

such that more involvement of the beneficiary communities is realized at the early stages of the project. Participation of the beneficiary communities should indeed begin at the conception stage of the project because it is actually the beneficiaries who know what projects they want. As project life progresses, there should be more involvement of the community and less participation of the government until finally, the maintenance and management of the project is fully left in the hands of the benefiting community after its completion. This will create a sense of responsibility and independence on the part of the community and hence improve the performance of projects.

3) Recruitment and Training

Recruitment into the civil service in general and the ministry of water resources in particular should be based on ones professional qualifications and availability of vacancies as opposed to the current mode of employment which is political. More and more competent professionals should be recruited into the service to improve its performance. Training of the existing personnel in order to equip them with the necessary skills in their respective areas of operation is also necessary. Employees should be given a chance to build their professional capacity to the fullest. This may be done through in house training or provision of scholarships to pursue further training or studies elsewhere.

4) Motivation;

Poor salaries in the civil services have been cited to be the major cause of corruption in the government. Further still, civil servants are poorly housed, with lack of proper medical schemes or any other insurance covers. All these negatively affect performance. The employees are not well motivated. There should be efforts to improve the living conditions and standards of these civil servants by increasing their salaries, improving their housing or house allowances etc. medical schemes and other insurance covers need to be improved or even better ones introduced. Rewarding of exceptional performers based purely on merit should also be encouraged.

Although some of the strategies suggested could only be effected by the government, the project managers can facilitate this by constantly reminding the government and pressing for their implementation. However, this is only possible if the Project Managers within the Ministry of Water Resources share the same perceptions regarding the situation. This calls for unity among the project managers, and this should not be limited to within the Ministry alone. A professional body in project management (like the one for Accountants, Architects, Marketers, etc) to be called Kenya association of project managers should be established to press for the necessary changes required by project managers to operate freely without any interference or influence from other quarters. The same body will also observe that good project management practices are observed thus instilling discipline and professionalism in the management of projects.

5.3 RECOMMENDATIONS FOR FURTHER RESEARCH

First a study to test a hypothesis as to whether or not the same factors responsible for cost overruns also influence time overruns is necessary. This will give good conclusions on the subject of project performance. Research should also be carried out on other aspects of project success the public sector. Specifically, a study to address the quality aspect of project success is highly recommended.

Since basically time, cost and quality are the major determinants of project success, the influence of each of these on client satisfaction should also be investigated. This study should not be restricted to the ministry of water resources alone. All other ministries should be studied and a comparison between private and public sector project performance be carried out.

BIBLIOGRAPHY

- Adams, W.M., "How Beautiful is small? Scale, Control and Success in Kenyan Irrigation" World Development Vol. 18, No. 10 1990.
- Antill, J.M. and Woodhead R.W., Critical Path Methods in Construction Practice 2nd Ed. John Wiley and Sons, New York, 1970.
- Baker, B.N., Murphy D.C. and Fisher, D., "Project Management in the Public Sector: Success and Failure Patterns compared to Private Sector". In Cleland D.I. and King W.R. (Eds) Project Management Handbook Van Nostrand Reinhold, New York, 1988.
- Benjamin, M.P., Investment Projects in Agriculture: Principles and Case Studies, Homlaw, Essex 1985.
- Bromilow F.J., "Contract Time Performance: Expectations and Reality" Building Forum Vol. 1 No.3 1969.
- Burgess R.A., and White, G., Building Production and Project Management, The Construction Press, Lancaster, 1979.
- Cleland, D.I. and Kerzer H. Project Management Dictionary of Terms, Van Nostrand Reinhold, New York, 1985.
- Daily Nation, Wednesday, February 17th, 1999.
- Grool M.C., et al., Project Management in Progress Elsevier Science Publishers B.V. North Holland. 1986.
- Hans B., "Consideration of the Environment in Planning and Design of Dams" Journal of Applied Geography and Development. Vol. 38 1987.

Karimi R.B., "Factor which are critical in Project Cost overruns: A case study of Ministry of Water Resources Projects". Unpublished MBA Thesis, University of Nairobi, 1998.

Kerzner H. Project Management: A systems Approach to Planning, Scheduling and Controlling. Van Nostrand Reinhold New York, 1995.

Little, I.M.D., and Mirlees, J.A., Project Appraisal and Planning for Developing Countries Heinman Education Books, London, 1976.

Lock, D., Project Management, 2nd Ed. Gower Publishers, Hampshire, 1979.

Mbatha, C.M., "Building Contract Performance: A case study of Government Projects in Kenya". Unpublished M.A. Thesis, University of Nairobi, 1986.

Mwadali, D.N., "Analysis of major factors that affect project management: A case of Kenya Railways Projects" Unpublished MBA Thesis, University of Nairobi, 1996.

Newsweek "Fire in the Tunnel" March 24th, 1996.

Pinto, J.K., and Slevin O.P., "Critical Success factors in Effective Project Implementation" In Cleland, D.I., and King W.R., (Eds) Project Management Handbook, Van Nostrand, Reinhold, New York, 1988.

Public Investment Programme 1998/99 - 2000/2001, Ministry of Planning and National Development, 1997.

Republic of Kenya, Ministry of Public Works and Housing, Cost Control Planning Unit - "Matching of contract values with contract periods". Government Printers,

Nairobi, 1979.

Republic of Kenya Ministry of Water Development, National Water Master Plan
Government Printers, Nairobi, May 1975.

Republic of Kenya, National Assembly, Seventh Report of the Public Investment
Committee, Vol. 1. Government Printers, Nairobi 1997.

Roman, D.D., Managing Projects: A systems Approach. Elsevier Science Publishing
Co, Inc. North Holland 1986.

Stallworthy, E.A. and Kharbanda, O.P., Total Project Management: From Conception to
Completion. Gower Publishing Co. Ltd., Aldershot, England 1983.

Sear, C., Construction Project Management John Wiley and Sons, New York, 1979.

Solomon M.J. "Elements of Project Management"
Development Project Management Centre, US.
Department of Agriculture, June 3rd, 1976.

Talukhaba, A.A., "Time and Cost Performance of Construction Projects", Unpublished
M.A. Thesis, University of Nairobi, 1988.

World Bank Report "Review of Project Performance" 1979.



UNIVERSITY OF NAIROBI
FACULTY OF COMMERCE
MBA — PROGRAMME

(CHIEF EXECUTIVE OFFICER)

Ref: 225
Date: 14/03/2014
To: Mr. [Name]

Mr. [Name]
[Address]

14/03/2014

APPENDIX I

TO WHOM IT MAY CONCERN

Reference is made to your letter of the 14th March 2014, regarding the above-captioned subject.

The University of Nairobi, Faculty of Commerce, MBA Programme, is pleased to inform you that the University has approved the admission of students to the MBA Programme for the year 2014/2015.

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MAURITIA OCHIAI

Chief Executive Officer of the MBA Programme





UNIVERSITY OF NAIROBI
FACULTY OF COMMERCE
MBA — PROGRAMME

LOWER KABETE CAMPUS

Telephone: 732160 Ext. 225
Telegrams: "Varsity", Nairobi
Telex: 22095 Varsity Nairobi

P.O. Box 30197
Nairobi, Kenya.

Date ... 24/03/99 ...

TO WHOM IT MAY CONCERN

The bearer of this letter ... GARASHI, HAMAD MUSA ...

Registration No ... D61/7083/97 ...

is a Master of Business and Administration student of the University of Nairobi.

He/She is required to submit as part of his/her coursework assessment a research project report on some management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would therefore, appreciate if you assist him/her by allowing him/her to collect data in your organisation for the research.

Thank you.

Sincerely,

DR. MARTIN OGUTU

Lecturer, and Co-ordinator of the MBA Programme





OFFICE OF THE PRESIDENT

Telegraphic Address: "RAIS"

Telephone: Nairobi 227411

When replying please quote

Ref. No. OP 13/001/29 74/3
and date

PERSONNEL DIVISION

P.O. Box 30510

NAIROBI

8th June 1999

Hamed Musa Garashi

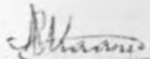
Dear Sir,

RESEARCH AUTHORIZATION

Following your application for authority to conduct research on "Determination of factors influencing project delays in water projects: the case of Government funded projects, I am pleased to let you know that your application has been considered and approved and accordingly you are authorised to conduct research in Nairobi as from 7th June 1999 to 1st October 1999.

You are advised to pay a courtesy call on the Provincial Commissioner Nairobi before embarking on your research project. You are further advised to avail two copies of your final research report to this office upon completion of your research project.

Yours faithfully,


A. G. KAARIA
for: PERMANENT SECRETARY/
PROVINCIAL ADMINISTRATION

cc.

Provincial Commissioner
NAIROBI

QUESTIONNAIRE

PART A: GENERAL INFORMATION.

- 1.a) Name of Project
2. a) Designation of Respondent
- b) Experience of Respondent prior to this Project Assignment
3. Estimated Time duration for the project (in weeks).....
- 4 Actual Time duration for the project (in weeks)
5. Number of critical activities
6. Which critical activities took more time to accomplish than the scheduled time (delayed)?

Activity	Approximate Time Delay (in weeks).
i)	
ii)	
iii)	
iv)	

7 Why were these activities delayed?

- i).....
- ii)
- iii)
- iv)
- v)

8. Was the cost (initial estimated cost) of the project exceeded? Yes/No

.....

9. If YES, do you think the major cause for this was the escalation of project time?

YES/NO

.....

10. What else caused the cost overrun?

.....
.....
.....

11. What project management tools were used in planning schedules?

- i)
- ii)
- iii)
- iv)
- v)

12. Was the time allocated to the project realistic? YES/NO

.....

13. If YES, what was the major cause of the delay?

.....
.....

14. Were you involved in the planning phase of the project?

YES/No

.....

There was lack of direction during a while

.....

15. If No, Why not?

.....

.....

16. Do you think it is important to involve the implementors in the planning of water projects and vice versa?

.....

.....

lack of political awareness (eg. delay

in design) - water projects to start construction

1 2 3 4 5

insufficient political involvement authority

not a priority contributed to projects delay

1 2 3 4 5

political involvement affected construction

in the project

1 2 3 4 5

PART B:

Please indicate by circling 1 to 5 the degree to which each of the following evidently influenced project delay in the project you participated in implementing in the Ministry of Water Resources Projects.

	Not much at all				Very much
1. Late procurement of plant and equipment contributed to overall project delay	1	2	3	4	5
2. Insufficient use of progress reports contributed to time overruns	1	2	3	4	5
3. There was lack of direction during a crisis resulting to time wastage	1	2	3	4	5
4. There was lack of proper time control systems	1	2	3	4	5
5. Delayed payment of wages to workers contributed to time escalation	1	2	3	4	5
6. Lack of punitive measures (eg delay surcharge) contributed to time escalation	1	2	3	4	5
7. Insufficient project managers authority and influence contributed to projects delay	1	2	3	4	5
8. Political interference affected execution of the project	1	2	3	4	5

9. Lack of use of Management Science tools during project planning and execution resulted in schedule overruns	1	2	3	4	5
10. Poor implementation strategies led to project delay	1	2	3	4	5
11. Corrupt practices among officers slowed down the execution of most tasks	1	2	3	4	5
12. There was poor communication between the site people and head office that influenced time overruns	1	2	3	4	5
13. There was poor decision making by senior officers in the project team which affected the project's completion time.	1	2	3	4	5
14. Lack of alternative back-up strategies contributed to time wastage	1	2	3	4	5
15. The relationship between management and workers in the project team was poor, hence affecting the execution pace.	1	2	3	4	5
16. Poor cooperation between officers of the concerned organizations contributed to time overruns	1	2	3	4	5

- | | | | | | |
|---|---|---|---|---|---|
| 17. There was lack of emphasis on time throughout the execution of the project. | 1 | 2 | 3 | 4 | 5 |
| 18. Poor allocation of resources caused unnecessary shortages that affected the completion time of the project. | 1 | 2 | 3 | 4 | 5 |
| 19. Shortage of raw materials resulted in time escalation. | 1 | 2 | 3 | 4 | 5 |
| 20. There were physical obstacles on site that made it impossible to meet deadlines. | 1 | 2 | 3 | 4 | 5 |
| 21. Senior officers in the project team were not committed to meet time specifications | 1 | 2 | 3 | 4 | 5 |
| 22. The project team was more concerned with meeting the cost and/or quality specifications of the project. | 1 | 2 | 3 | 4 | 5 |
| 23. Plant and equipment on site were not sufficient to facilitate execution of the project within the estimated time period | 1 | 2 | 3 | 4 | 5 |
| 24. Show decision making process contributed to time overruns. | 1 | 2 | 3 | 4 | 5 |
| 25. There was insufficient manpower for the project. | 1 | 2 | 3 | 4 | 5 |

26. Lack of funds needed to execute and complete each activity resulted to overall project delay.	1	2	3	4	5
27. Failure to replace members of the project team in case of dropout affected the completion time of the project.	1	2	3	4	5
28. Harsh weather conditions did not allow smooth execution of the project thus prolonging its completion time	1	2	3	4	5
29. Poor remuneration of the workers contributed to schedule overruns	1	2	3	4	5
30. Lack of privatization of water projects in the country affected the pace at which the project was executed	1	2	3	4	5
31. There was lack of qualified and experienced manpower	1	2	3	4	5
32. The time estimator was over-optimistic resulting in time underestimates for the project.	1	2	3	4	5
33. Tradition of not recognizing time as a limited resource contributed to project delay.	1	2	3	4	5

34. There was lack of prompt reaction to the needs of the project team from the authorities in the Ministry.	1	2	3	4	5
35. The poor state of roads contributed to delayed transportation of materials hence influencing project delay.	1	2	3	4	5
36. The reworks in project activities led to time escalation.	1	2	3	4	5
37. Lack of time estimation models in developing countries resulted in time underestimates.	1	2	3	4	5
38. Lack of elaborate plans contributed to time overruns.	1	2	3	4	5
39. Project team's lack of experience in similar projects contributed to project delay.	1	2	3	4	5
40. Lack of access to internet delayed ordering and procurement of raw materials.	1	2	3	4	5
Poor technology used during project execution contributed to activity delays.	1	2	3	4	5

42. There was more often revision of the project design and specifications during execution that contributed to time overruns. 1 2 3 4 5

43. Poor policy guidelines by the authorities contributed to time escalation 1 2 3 4 5

44. The project teams failure to learn from past mistakes contributed to the delay. 1 2 3 4 5

45. Lack of elaborate plans and job description caused project delay. 1 2 3 4 5

46. Lack of participation of the project team in planning contributed to the delay. 1 2 3 4 5

47. Poor supervision of workers contributed to project delay. 1 2 3 4 5

48. Poor assignment and coordination of of activities resulted in time overruns. 1 2 3 4 5

49. Incorrect design drawings contributed to time overruns. 1 2 3 4 5

PART C

1. What strategies did you employ to try and address the delays in the water projects you implemented?

(a)

(b)

(c)

(d)

(e)

(f)

2. Did you encounter any drawbacks in implementing the strategies above?

YES/NO

.....

3. If YES, what were the major drawbacks?

.....

.....

.....

4. Were the strategies you employed to address the delays the best under the circumstances? YES/NO

.....

.....

.....

7. Please suggest the best possible strategies to be employed so as to address and minimize the problem of project delays in water projects

.....

.....

.....

.....

.....

8. Do you think privatization of water projects in the country is feasible in the near future? YES/NO

.....
.....
.....

9. If YES, do you think this will improve the provision of the service? YES/NO.

.....
.....
.....

Thank You.

APPENDIX II

REYNOLDS ANALYSIS

REYNOLDS ANALYSIS OF THE DATA OF THE REYNOLDS ANALYSIS

REYNOLDS ANALYSIS OF THE DATA OF THE REYNOLDS ANALYSIS

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APPENDIX II

REYNOLDS ANALYSIS OF THE DATA OF THE REYNOLDS ANALYSIS

4.4 FACTOR ANALYSIS

TABLE 4.4.1: MEANS AND STANDARD DEVIATIONS.

05 Jul 99 SPSS for MS WINDOWS Release 6.0

----- FACTOR ANALYSIS -----

Analysis number 1 Listwise deletion of cases with missing values

	Mean	Std Dev	Label
Q1	3.00000	.41814	
Q2	3.71875	.45040	
Q3	3.75000	1.01600	
Q4	3.56250	.38977	
Q5	2.90625	1.02735	
Q6	3.81250	.63505	
Q7	2.03125	.86077	
Q8	2.37500	1.09985	
Q9	2.78125	.36155	
Q10	3.15625	1.19432	
Q11	3.90625	.70106	
Q12	3.75000	1.07763	
Q13	3.40625	.70306	
Q14	2.59375	.70306	
Q15	3.31250	.96512	
Q16	2.40625	1.04293	
Q18	3.56250	.81649	
Q19	4.31250	1.02980	
Q20	2.43750	.81649	
Q21	3.84375	.32249	
Q22	2.25000	1.13592	
Q23	3.59375	.94560	
Q24	2.96875	1.20441	
Q25	2.12500	1.03954	
Q26	2.65625	.97085	
Q27	2.31250	.20315	
Q28	3.15625	1.05063	
Q29	2.93750	.81649	
Q30	2.56250	.86841	
Q31	3.96875	.96668	
Q32	2.59375	.71208	
Q33	2.56250	.78967	
Q34	2.50000	1.10716	
Q35	4.25000	.84242	
Q36	2.06250	.76224	
Q37	2.40625	1.07341	
Q38	2.71875	1.02342	
Q39	4.50000	.87988	
Q40	2.34375	.83417	

Q41	2.31250	1.14828
Q42	3.84375	.80760
Q43	3.65625	1.09572
Q44	3.65625	.86004
Q45	2.53125	1.24394
Q46	3.34375	.62478
Q47	3.31250	1.14828
Q48	3.34375	.23417
Q49	3.12500	.94186

Number of Cases = 32

TABLE 4.4.2 CORRELATION MATRIX

Correlation Matrix:

	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Q1	1.00000						
Q2	.06353	1.00000					
Q3	-.13032	-.00635	1.00000				
Q4	-.15244	.59517	.17134	1.00000			
Q5	-.33509	-.04630	-.36313	.21887	1.00000		
Q6	.22674	-.08974	-.08738	-.36377	-.31806	1.00000	
Q7	.21535	-.08148	-.28586	.03876	.22229	.21058	1.00000
Q8	-.19262	.24336	-.34641	.25852	.37470	-.31840	.05537
Q9	.13615	-.20783	-.55383	-.34202	.10017	.06792	.22621
Q10	-.15521	-.44484	-.25919	-.46278	.03861	.19720	-.03628
Q11	-.02205	-.27588	.13878	-.27660	-.03350	.20430	.09653
Q12	.04915	-.48478	.38302	-.24770	-.10927	.17392	.00869
Q13	-.12004	.08551	.03598	.30906	.34782	-.17103	-.11573
Q14	-.24007	-.15568	.42456	.02762	-.17702	-.20457	-.02017
Q15	-.43902	-.19213	-.18094	-.37578	.22571	-.04344	-.12863
Q16	-.27930	-.23113	.22071	.01530	.09691	-.31331	-.12240
Q18	-.21769	.06495	.50895	.15026	.06937	-.20475	-.20217
Q19	-.28287	.14561	.16957	.21131	-.09338	.05508	-.26611
Q20	.10884	.46523	-.24795	.30767	.08550	-.13583	.04814
Q21	.04005	.20665	-.05402	.41793	.32127	-.08858	.23113
Q22	-.25644	.00568	-.11180	.33716	.26951	-.49500	-.00825
Q23	.02800	-.31801	.15949	-.18870	-.10688	-.13431	.09536
Q24	.04397	.05823	-.05931	-.04697	.20612	-.05221	.15655
Q25	-.05095	.00310	-.21380	.12839	.37379	-.06168	.21180
Q26	-.13638	-.02906	-.54778	.07621	.35475	.12066	.32208
Q27	-.24211	.01742	-.14514	.14228	.25934	-.36280	.08371
Q28	.10082	.30463	-.02266	.22507	-.13542	.03638	-.04124
Q29	-.28299	-.16038	.03915	-.16934	.20165	-.11961	-.05969
Q30	-.25053	.30635	-.16270	.14411	.14079	.00583	-.04616
Q31	.05479	-.32775	-.07390	-.32265	-.16545	.26149	.00121
Q32	.03719	.22983	-.14491	.20576	.21083	.29265	.07401
Q33	-.08904	.17484	-.01334	.21218	.12372	-.06012	.01378
Q34	-.07175	.31457	-.17206	.16772	.29778	-.17820	.01692
Q35	.37722	-.08422	.07538	.01378	-.00932	.03513	-.01112

- - - - - F A C T O R A N A L Y S I S - - - - -

	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Q36	-.11392	-.20948	-.28684	-.16226	.32926	-.04456	.12696
Q37	.12335	.03981	.09613	-.17975	-.25687	-.08386	-.11892
Q38	-.23288	-.11422	-.16287	-.08930	.12752	.08314	-.20941
Q39	.09029	-.33718	.18042	-.10552	-.19627	.31391	.23425
Q40	-.34331	.14828	-.00643	.20335	.33154	-.33470	-.01044
Q41	-.16143	.24292	-.09678	.08844	.13501	-.03651	.15298
Q42	.06558	.17869	.18674	.08083	-.17374	.14810	.05365
Q43	.29002	.23324	.09417	-.03839	-.28746	.39500	.21697
Q44	-.06305	.01855	.25828	.02187	-.02570	.04599	-.01952
Q45	-.23417	.07842	.00638	.28805	.31789	-.23493	-.13651
Q46	-.16481	-.06666	.27522	-.04514	.05670	-.29709	-.14473
Q47	-.04612	.08565	.15208	.08844	.18970	-.19114	-.10811
Q48	-.15020	.25280	.19937	.41023	.30609	-.43061	-.13190
Q49	.05623	.05821	.00000	-.12938	.11251	.03666	.03482

	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Q8	1.00000						
Q9	.40120	1.00000					
Q10	.17497	.53746	1.00000				
Q11	-.41208	-.21021	-.01195	1.00000			
Q12	-.40825	-.10443	.08146	.20562	1.00000		
Q13	-.15621	-.41145	-.27011	.22446	.00678	1.00000	
Q14	.10303	-.06108	.07422	-.00533	.31887	-.28418	1.00000
Q15	.15954	.15189	.20814	-.16871	.13957	-.03220	-.05871
Q16	.11600	-.07170	-.18209	.10864	.06458	-.14809	.31633
Q18	-.37973	-.70235	-.35108	.32428	.35680	.25693	.15175
Q19	-.24921	-.45582	-.06721	.05053	-.24708	.16861	-.14022
Q20	.45206	-.03773	-.18179	-.43467	-.30759	-.11269	-.12771
Q21	.10811	-.34206	-.35166	.03110	-.11883	.35450	-.46506
Q22	.20656	-.31807	-.29127	-.02956	-.36893	.30250	.10942
Q23	-.09693	.07908	.20084	.02219	.15037	-.11501	.17686
Q24	-.11263	.09405	.02593	.17631	.01864	.13127	-.39836
Q25	.38089	.15669	-.04222	-.22284	-.11518	.06681	.15824
Q26	.39651	.23412	.18692	-.27751	-.30062	-.10637	.01600
Q27	.42051	.33845	.03227	-.20230	-.21148	-.00152	.39042
Q28	.14307	.13742	-.02008	-.49929	-.10684	-.25138	-.05480
Q29	.28329	.30309	.14016	-.35739	-.03691	-.14875	.07663
Q30	.42199	.18562	.15305	-.30306	-.08260	-.00720	.03026
Q31	-.38305	.11718	.22789	.05296	-.00774	-.38099	-.16355
Q32	.11842	.10501	-.03675	-.27228	.07357	-.02952	-.29903
Q33	.17874	-.02116	-.06385	-.36827	.21387	.23814	.22892
Q34	.47683	.24609	.08538	-.47304	-.16222	-.09245	.01321
Q35	-.20889	-.06328	-.07214	-.03985	.35533	.06075	.04339
Q36	.15772	.39623	.10893	-.04188	-.27043	-.14625	-.28150
Q37	.08539	.26141	-.02595	-.26976	.03486	-.41632	.33459
Q38	.21136	.23222	.14268	-.12712	-.06581	.13305	-.01875

- - - - - F A C T O R A N A L Y S I S - - - - -

	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Q39	-.20000	-.09424	.13813	.01526	.30619	.04985	.24927
Q40	.37726	-.06899	-.10327	-.04284	-.56392	-.01111	.17698
Q41	.33843	.00387	-.17788	-.09502	-.56048	-.12893	-.02388
Q42	.06809	.14393	.15990	-.04885	.10193	-.10750	.25235
Q43	-.29109	.09933	.16562	.26886	.14343	-.09425	.01418
Q44	-.27641	-.30848	-.41330	.25512	.21975	.15013	.15158
Q45	-.07958	-.25296	-.31823	-.13832	-.11430	.00220	.04481
Q46	.12712	-.07570	-.35344	.09626	-.03327	-.03819	.24619
Q47	.00639	-.05803	-.27197	-.02485	-.01303	.17668	.05253
Q48	.16338	-.24176	-.30023	-.06461	-.07883	.46280	-.01259
Q49	-.04671	-.05345	.01075	-.04634	-.19069	-.11255	-.13584

	Q15	Q16	Q18	Q19	Q20	Q21	Q22
Q15	1.00000						
Q16	.12619	1.00000					
Q18	.06526	.14461	1.00000				
Q19	-.13388	-.06195	.24141	1.00000			
Q20	-.01030	.00795	-.14986	-.00966	1.00000		
Q21	-.13742	-.18637	.17670	.10807	.26442	1.00000	
Q22	-.04414	.18380	.03502	-.04136	.19843	.22010	1.00000
Q23	.03756	.04191	.09289	.00207	-.37332	-.23296	-.02252
Q24	.11968	-.16933	.05642	-.35599	.00963	.34112	-.06484
Q25	.08842	.24919	-.28697	-.24860	.31248	-.03226	.13659
Q26	.04949	-.01693	-.48653	-.14721	.43190	.10756	.31445
Q27	.16321	.28118	-.23417	-.21154	.12397	-.31297	.20063
Q28	-.04971	.08740	-.09623	.28138	.39910	.01814	-.30408
Q29	.53921	.24949	-.04087	-.06116	-.15531	-.28698	-.10505
Q30	.27339	-.05639	-.06533	-.08952	.35801	-.09976	.03358
Q31	.04538	-.08299	-.09430	.33417	-.28974	-.18057	-.31580
Q32	.14375	-.03122	-.06284	-.21720	.21180	-.10383	-.18943
Q33	.12292	.01787	-.15881	-.25343	.33713	-.16787	.17903
Q34	.21132	-.01397	-.02395	-.05659	.45507	.05508	-.02565
Q35	-.17854	-.04589	.20460	-.09296	-.17313	-.19544	-.20226
Q36	.26961	.13805	-.27664	.06401	-.13404	-.09838	.03665
Q37	.06033	.16478	-.15594	-.32283	-.09110	-.29470	-.21826
Q38	.28781	.08028	-.36113	-.06695	.05020	.01415	.00694
Q39	.07597	-.19334	.06027	-.07120	-.27124	-.12475	.00000
Q40	-.01185	.33911	-.02551	.03966	.02551	.19208	.53498
Q41	.02547	.21381	-.24536	.13299	.49939	.03319	.33387
Q42	-.14227	-.26690	.05951	-.24969	.03899	-.05380	-.30768
Q43	-.29170	-.32551	.05294	-.21620	-.24655	-.17183	-.49891
Q44	.17076	.08515	.38275	-.28744	-.25648	-.01391	.10705
Q45	.12595	.05206	.17986	-.00787	.01199	.11091	.35956
Q46	.13558	.39960	.01916	-.06788	-.01916	.08064	.20829
Q47	.14190	.15993	.05485	-.11253	-.07794	-.00929	.13602
Q48	-.03893	.01331	.25380	.11580	.26186	.40948	.21284

- - - - - F A C T O R A N A L Y S I S - - - - -

	Q15	Q16	Q18	Q19	Q20	Q21	Q22
Q49	-.04436	.04515	-.06335	.12472	.17596	.01619	.21106
	Q23	Q24	Q25	Q26	Q27	Q28	Q29
Q23	1.00000						
Q24	-.32307	1.00000					
Q25	-.14357	-.04831	1.00000				
Q26	-.40299	.12845	.61928	1.00000			
Q27	-.16835	-.05983	.48359	.34348	1.00000		
Q28	-.09640	-.17446	.01108	.05436	.06220	1.00000	
Q29	.34177	-.26558	.23596	-.12803	.30029	.20980	1.00000
Q30	-.34123	.03299	.18960	.24067	.30385	.41604	.31620
Q31	.30327	-.08398	.00401	-.01182	-.10227	.13201	.10801
Q32	-.30092	.24801	.24513	.21144	.04001	.08758	.11870
Q33	-.16309	-.09990	.30648	.22867	.32396	.03065	.04737
Q34	.10784	-.06048	.05606	.07503	.19373	.45757	.26346
Q35	.21260	-.11922	.03684	-.24651	-.14322	-.08200	.04722
Q36	.11190	.18580	-.03337	.07683	.17013	.04458	.32227
Q37	-.21353	.10994	.27102	.10737	.19826	.02771	.16829
Q38	-.42188	.25434	.36764	.48395	.30946	.16219	.16680
Q39	.40710	-.38050	.07053	-.05664	.00000	-.01745	.30137
Q40	.01296	-.01424	.16657	.20949	.22946	.00700	.18666
Q41	.03157	-.22596	.20944	.27308	.13718	.11865	.12990
Q42	-.21253	.09431	-.09126	-.11186	.11827	-.04633	-.07593
Q43	-.07686	.18715	-.18762	-.23596	-.18505	-.03590	-.21025
Q44	-.14806	.14148	.05849	-.09971	-.03325	-.34799	.09076
Q45	-.27681	.14062	.04677	.20951	.14414	-.13961	-.10525
Q46	.25685	-.06325	.12760	-.12463	.13259	-.12881	.18124
Q47	.41778	-.13266	.23646	-.27670	-.04962	-.30917	.24536
Q48	.04060	.05086	.14143	-.08666	-.07468	.10651	.10072
Q49	.16752	-.05332	-.11531	-.05733	-.32025	.11002	.11966
	Q30	Q31	Q32	Q33	Q34	Q35	Q36
Q30	1.00000						
Q31	-.32721	1.00000					
Q32	.43974	-.06590	1.00000				
Q33	.46763	-.43302	.39269	1.00000			
Q34	.48238	-.25619	.18412	.31838	1.00000		
Q35	.01509	.04951	.38987	.30578	.13834	1.00000	
Q36	-.06838	.31762	.14860	-.23622	.05014	-.21415	1.00000
Q37	-.03110	-.04955	-.03033	-.13420	-.17643	-.04459	-.07272
Q38	.20035	-.04178	.01522	.08114	-.15658	-.36480	.23222
Q39	-.02890	.17066	-.12871	.06163	-.09934	.13056	-.28390
Q40	.05796	-.15293	-.27644	-.17988	.20066	-.33353	.23192
Q41	.03045	-.10716	-.11589	-.03837	.25373	-.51688	.25077

----- FACTOR ANALYSIS -----

	Q30	Q31	Q32	Q33	Q34	Q35	Q36
Q42	.02559	-.21306	-.00175	.09443	.05412	-.03556	-.26420
Q43	-.06528	.01999	.10465	-.09435	-.30579	.06116	-.28655
Q44	-.09713	-.16800	.09100	.00403	-.26591	.20513	-.33729
Q45	-.23639	.17521	.10584	-.09945	-.19909	-.19239	.22173
Q46	-.38862	-.04914	-.42415	-.14916	.03886	-.26384	.20512
Q47	-.32391	-.01998	-.03699	.12692	.17761	.18341	.15409
Q48	-.04508	-.42332	-.27644	-.04806	.17706	-.17840	-.15039
Q49	.02025	-.06643	-.06613	-.03599	.18561	-.16262	.31679

	Q37	Q38	Q39	Q40	Q41	Q42	Q43
Q37	1.00000						
Q38	.31291	1.00000					
Q39	-.18785	-.08956	1.00000				
Q40	.08599	.15563	-.22279	1.00000			
Q41	-.21100	-.00515	-.12771	.44529	1.00000		
Q42	.18722	-.05488	.15889	-.20329	-.18914	1.00000	
Q43	.12256	-.17530	.18402	-.33917	-.32208	.62997	1.00000
Q44	.20198	.07270	.33460	-.04602	-.19090	.16741	.21539
Q45	.05058	.14649	-.13263	.25542	.08328	-.01104	-.12203
Q46	.17450	.22681	-.11408	.44660	.38869	-.25857	-.45069
Q47	-.00164	-.16985	-.03193	.24043	.21713	-.05000	-.19389
Q48	-.06011	.20671	-.07426	.25877	.28595	-.00910	-.19605
Q49	-.08376	-.12968	-.15570	.37811	.43994	-.31277	-.17582

	Q44	Q45	Q46	Q47	Q48	Q49
Q44	1.00000					
Q45	.32607	1.00000				
Q46	.15435	.16499	1.00000			
Q47	.12123	.10586	.56352	1.00000		
Q48	.14067	.06632	.42336	.33147	1.00000	
Q49	-.31598	-.08604	.23218	.29081	.15610	1.00000

Extraction 1 for analysis 1, Principal Components Analysis (PC)

TABLE 4.4.3 COMMUNALITIES, EIGEN VALUES AND PERCENTAGE OF VARIANCE

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----- FACTOR ANALYSIS -----

Initial Statistics:

INITIAL FACTOR MATRIX

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
Q1	1.00000	*	1	6.52216	13.6	13.6
Q2	1.00000	*	2	5.20031	10.8	24.4
Q3	1.00000	*	3	4.30993	9.0	33.4
Q4	1.00000	*	4	3.69077	7.7	41.1
Q5	1.00000	*	5	3.24095	6.8	47.8
Q6	1.00000	*	6	2.70323	5.6	53.5
Q7	1.00000	*	7	2.39553	5.0	58.5
Q8	1.00000	*	8	2.17088	4.5	63.0
Q9	1.00000	*	9	1.97356	4.1	67.1
Q10	1.00000	*	10	1.72209	3.6	70.7
Q11	1.00000	*	11	1.67274	3.5	74.2
Q12	1.00000	*	12	1.54743	3.2	77.4
Q13	1.00000	*	13	1.35482	2.8	80.2
Q14	1.00000	*	14	1.21408	2.5	82.7
Q15	1.00000	*	15	1.09040	2.3	85.0
Q16	1.00000	*	16	.99553	2.1	87.1
Q18	1.00000	*	17	.91850	1.9	89.0
Q19	1.00000	*	18	.71478	1.5	90.5
Q20	1.00000	*	19	.65601	1.4	91.9
Q21	1.00000	*	20	.64246	1.3	93.2
Q22	1.00000	*	21	.57250	1.2	94.4
Q23	1.00000	*	22	.51906	1.1	95.5
Q24	1.00000	*	23	.45226	.9	96.4
Q25	1.00000	*	24	.37755	.8	97.2
Q26	1.00000	*	25	.30054	.6	97.8
Q27	1.00000	*	26	.29105	.6	98.4
Q28	1.00000	*	27	.24580	.5	98.9
Q29	1.00000	*	28	.17577	.4	99.3
Q30	1.00000	*	29	.16206	.3	99.7
Q31	1.00000	*	30	.10784	.2	99.9
Q32	1.00000	*	31	.05944	.1	100.0
Q33	1.00000	*	32	.00000	.0	100.0
Q34	1.00000	*	33	.00000	.0	100.0
Q35	1.00000	*	34	.00000	.0	100.0
Q36	1.00000	*	35	.00000	.0	100.0
Q37	1.00000	*	36	.00000	.0	100.0
Q38	1.00000	*	37	.00000	.0	100.0
Q39	1.00000	*	38	.00000	.0	100.0
Q40	1.00000	*	39	.00000	.0	100.0
Q41	1.00000	*	40	.00000	.0	100.0
Q42	1.00000	*	41	.00000	.0	100.0

Q43	1.00000	*	42	.00000	.0	100.0
Q44	1.00000	*	43	.00000	.0	100.0
Q45	1.00000	*	44	.00000	.0	100.0
Q46	1.00000	*	45	.00000	.0	100.0
Q47	1.00000	*	46	.00000	.0	100.0
Q48	1.00000	*	47	.00000	.0	100.0
Q49	1.00000	*	48	.00000	.0	100.0

PC extracted 15 factors.

TABLE 4.4.4 INITIAL FACTOR MATRIX

Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Q1	-.33389	-.21735	-.27733	-.20638	-.13109
Q2	.32826	.18208	-.62551	-.03924	-.27928
Q3	-.36825	.51197	.07283	.37270	-.23560
Q4	.37732	.42498	-.52713	.11978	-.13656
Q5	.53874	.09913	.01773	.00069	.31565
Q6	-.42694	-.42522	-.14133	-.22613	.03886
Q7	.03222	-.23898	-.10600	-.14000	.15434
Q8	.74575	-.25010	-.01157	.13236	-.10371
Q9	.19599	-.78314	.26181	-.04556	.04305
Q10	-.10900	-.63592	.27905	-.08576	-.01855
Q11	-.48307	.29152	.13245	-.17663	.38457
Q12	-.56912	-.02462	.05884	.46697	.04247
Q13	.04979	.48326	-.30116	.04859	.23663
Q14	-.02951	.07038	.30172	.65696	-.14196
Q15	.21896	-.18014	.36283	.23359	.14356
Q16	.24219	.21664	.43367	.28447	.00399
Q18	-.32410	.63423	-.11027	.24403	-.07034
Q19	-.05461	.32888	-.00218	-.41814	-.33918
Q20	.60084	-.06554	-.45381	-.07672	-.24237
Q21	.19838	.41407	-.41550	-.35792	.19994
Q22	.49222	.47448	.05851	.00170	.20020
Q23	-.25096	.10728	.57181	-.01367	-.44969
Q24	.01065	-.05545	-.27058	-.14869	.58126
Q25	.49728	-.19122	.04218	.33653	.22758
Q26	.56874	-.38376	-.12826	-.05881	.40872
Q27	.50396	-.22963	.15938	.44580	.15889
Q28	.25194	-.24626	-.18753	-.09190	-.54499
Q29	.25904	-.19243	.50584	.33067	-.26654
Q30	.42019	-.37097	-.33351	.29379	-.21730
Q31	-.32399	-.23432	.40358	-.37460	-.00658
Q32	.12714	-.36474	-.41336	.18100	.05092
Q33	.27660	-.15100	-.32318	.54404	-.14667
Q34	.50219	-.15137	-.12001	.11296	-.54668
Q35	-.35478	-.06551	-.16907	.33989	-.23839
Q36	.30394	-.18844	.46229	-.41161	.14296

F A C T O R A N A L Y S I S

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Q37	.01769	-.23703	.16204	.34940	.18525
Q38	.36328	-.22119	.11287	.09828	.48194
Q39	-.35190	-.07939	.14549	.30580	-.13483
Q40	.58786	.33911	.30918	-.11040	.05368
Q41	.58590	.15872	.18414	-.30543	-.20420
Q42	-.21491	-.19545	-.33333	.33567	.01884
Q43	-.55260	-.25362	-.36888	.06786	.08371
Q44	-.24276	.31160	-.06937	.50494	.40877
Q45	.21124	.31469	.02104	.02662	.44389
Q46	.27471	.47479	.56030	.06757	.03974
Q47	.14055	.38798	.33305	.14856	-.14467
Q48	.34857	.57151	-.09472	.07683	-.06691
Q49	.21731	.14732	.21676	-.40468	-.31762

	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
Q1	-.12577	.51162	.22208	.26596	.01152
Q2	-.26587	-.02549	.27126	.05021	.07023
Q3	-.23564	-.18271	.08611	-.01262	.08420
Q4	-.06347	.01520	-.09525	.11005	-.05861
Q5	.53566	.07489	.03829	-.12130	-.05766
Q6	.02035	-.01845	-.11275	.15207	.48347
Q7	.11840	.56830	-.17346	.00729	.19711
Q8	-.07104	.13805	.00884	-.25660	-.09706
Q9	-.03352	.21656	.23253	-.20507	-.09448
Q10	.10700	-.11621	-.19208	-.45432	-.12712
Q11	.04232	.10027	-.12650	-.23505	-.08352
Q12	.26852	-.05045	.03811	-.02431	.03384
Q13	.45357	-.01196	-.14822	-.22583	.07575
Q14	-.40504	.09023	-.30707	-.06162	-.14618
Q15	.38943	-.38009	.20581	-.11424	.23929
Q16	-.11719	-.10147	.02229	.22717	-.21422
Q18	.18795	-.28853	.08578	-.06959	-.04214
Q19	-.00610	-.52780	-.31722	.09825	.06387
Q20	-.12742	.05787	-.01912	.11893	.09285
Q21	.15309	.08921	.04727	-.16387	.21873
Q22	.06641	.19182	-.39251	.05922	-.21198
Q23	.25808	.34281	-.03242	-.09248	.02059
Q24	.10669	-.05074	.48255	-.18849	-.07324
Q25	.02446	.24123	-.14485	.31087	.25186
Q26	-.06687	.07574	-.39485	.19381	.11563
Q27	-.14496	-.00858	-.18867	.00739	-.17562
Q28	-.17805	-.36877	.05785	.10427	.21852
Q29	.25241	-.16744	.19839	-.03043	.32983
Q30	.18642	-.33980	-.06682	-.17134	.00770
Q31	.02318	-.21433	-.08386	.41788	.11530
Q32	.40208	-.12294	.25596	.42260	-.01957

F A C T O R A N A L Y S I S

	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
Q33	.29254	.10645	-.16731	.11486	-.08831
Q34	.25767	.04627	.19608	-.18679	-.02737
Q35	.43416	.20881	.12064	.36571	-.25760
Q36	.20994	-.10629	.28511	.11903	-.09127
Q37	-.57810	-.03017	.39777	.15147	-.00717
Q38	-.16021	-.36959	.02428	-.06760	.32703
Q39	.16507	.18670	-.46755	-.03288	.53929
Q40	-.21325	.06500	-.00821	-.10920	-.05437
Q41	-.19522	.19065	-.11663	.04407	.27202
Q42	-.34596	.11410	.12131	-.38446	.10748
Q43	-.26765	.15384	.13953	-.20720	.13250
Q44	-.00306	.03660	.12326	.14757	.32531
Q45	-.09074	-.19750	.05754	.38162	-.02251
Q46	-.21438	.17564	.26407	.02805	.18500
Q47	.21681	.40626	.38342	.13881	.12962
Q48	.00190	.06543	.18079	-.33475	.34012
Q49	.07382	.14968	.18272	.01070	.08099

	Factor 11	Factor 12	Factor 13	Factor 14	Factor 15
Q1	-.20790	-.21859	.03267	-.04296	-.20245
Q2	.22304	.11076	-.23269	.07997	-.05937
Q3	-.03580	.09657	.11559	.12524	.17692
Q4	.33601	-.21016	.05506	.15035	.09205
Q5	.23301	-.04948	.18876	.13166	.14258
Q6	-.09855	.32737	-.09360	.14677	.10736
Q7	.22425	.14900	.46638	.13343	-.03772
Q8	.08110	-.07651	.02898	-.02350	-.06880
Q9	.07216	-.15296	-.02845	.06834	-.01319
Q10	.01845	-.01902	-.04742	-.05994	.19128
Q11	-.08317	.29713	.05465	.39181	-.05410
Q12	-.31240	-.03049	.34448	-.06572	.28533
Q13	-.12084	-.23871	-.32726	.25637	-.02855
Q14	.03133	.11084	.14289	-.01362	.18435
Q15	-.02099	.17498	-.04201	-.31777	-.03707
Q16	-.17493	.18006	.31453	.33402	-.07258
Q18	.15199	.16364	.30483	-.03879	-.04908
Q19	.09847	-.13745	-.09659	.20506	.10611
Q20	-.25557	.09292	.14851	-.20715	.16315
Q21	-.03714	-.21916	.34709	-.11789	-.03415
Q22	-.01373	.13411	-.13479	-.27313	-.20469
Q23	.17088	-.14960	.02362	-.06897	-.00810
Q24	-.04230	.06865	.20685	-.02966	.03474
Q25	-.07926	-.17064	.03622	.28429	.08381
Q26	-.08871	.00894	.10952	-.08944	.09938
Q27	.22310	-.11150	-.02705	.21297	-.00379
Q28	-.01865	-.19680	.34161	.11560	-.06653

TABLE 4.4.51 FINAL (DATAFILE) FACTOR ANALYSIS

----- FACTOR ANALYSIS -----					
	Factor 11	Factor 12	Factor 13	Factor 14	Factor 15
Q29	.22959	-.02670	-.03935	.08959	-.26777
Q30	-.05598	.26449	.01609	.08692	-.25730
Q31	.30137	-.21640	.08938	-.02336	.13287
Q32	.10962	.26017	-.03189	.14135	.07075
Q33	-.25610	.13122	-.22667	-.01408	.24543
Q34	.05087	.04762	.16453	-.12715	.05409
Q35	-.01236	-.17101	-.01241	.09715	-.11665
Q36	.22336	.05848	.00639	.15297	.11272
Q37	-.11119	-.12596	.00853	-.04447	-.16654
Q38	-.30138	-.24163	-.13167	.14004	.04166
Q39	.18396	-.05961	.01297	-.15480	-.15831
Q40	.18057	.17554	.03379	.08525	-.20184
Q41	-.00623	.37655	-.05559	.04668	.10546
Q42	.34702	.04955	-.06347	-.06486	.29666
Q43	.33962	.16836	-.07868	.20609	.04863
Q44	.13461	.17461	-.05635	-.11755	-.30924
Q45	.41773	.02009	-.00265	-.35879	.23156
Q46	-.21781	-.06056	.02850	.01219	.11871
Q47	.05797	-.01884	-.32091	.05717	.28460
Q48	-.12720	-.30263	.02819	.06805	.07048
Q49	-.22615	.42204	-.03551	-.00599	.05904

TABLE 4.4.5: FINAL (ROTATED) FACTOR MATRIX

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----- FACTOR ANALYSIS -----

Analysis number 1 Listwise deletion of cases with missing values
Extraction 1 for analysis 1, Principal Components Analysis (PC)
PC extracted 6 factors.
VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser
Normalization.
VARIMAX converged in 16 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Q1	-.13230	.01003	-.49435	-.03898	-.20026
Q2	.51610	.47208	-.33538	.27910	-.05257
Q3	.35856	-.20642	-.04981	-.25508	-.21463
Q4	.70408	.34698	-.04844	.13696	.00989
Q5	.18317	.11772	.57716	.02319	.24571
Q6	-.37984	-.10983	-.43886	-.15345	-.10530
Q7	-.14333	.02478	-.07893	.01196	.09768
Q8	-.03739	.59379	.24709	.32290	.36441
Q9	-.73116	.25556	-.00096	.10507	.32215
Q10	-.69483	.07141	-.02399	-.09414	.06782
Q11	.06710	-.69138	-.04728	-.10985	-.11344
Q12	-.06195	-.22194	-.04073	-.73793	-.00499
Q13	.57592	-.12822	.22228	-.22541	-.04830
Q14	.01418	.04733	.07365	-.17633	.28475
Q15	-.24760	.06296	.51211	-.21124	.23836
Q16	.03991	-.04383	.43332	.08441	.17260
Q18	.54286	-.24930	.09543	-.38079	-.28532
Q19	.13979	-.03068	.00835	.25718	-.56067
Q20	.26957	.63471	-.10577	.37019	.08939
Q21	.53070	-.08064	-.00801	.25132	-.12170
Q22	.44869	-.03205	.45300	.28830	.14503
Q23	-.31468	-.07441	.39821	-.20657	-.52511
Q24	.12089	-.26265	-.13540	.02881	.32575
Q25	.00175	.26658	.26450	.03494	.55526
Q26	-.10814	.22369	.03784	.34056	.59705
Q27	-.07169	.29281	.25646	.06769	.61415

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----- FACTOR ANALYSIS -----

Factor 1 Factor 2 Factor 3 Factor 4 Factor 5

Q28	-.10803	.59120	-.19074	.22088	-.19169
Q29	-.33950	.30152	.55139	-.17850	.05555
Q30	.00082	.70074	.00111	-.14534	.24073
Q31	-.53884	-.31471	-.00362	.07337	-.25951
Q32	-.00835	.39422	-.08436	-.34485	.20786
Q33	.19750	.56255	.09478	-.41139	.26514
Q34	.00909	.76486	.24835	.00743	-.13924
Q35	.01633	.15336	-.03520	-.67383	-.19709
Q36	-.41898	-.08421	.43856	.34894	-.01205
Q37	-.17656	-.05814	-.20700	.10287	.51521
Q38	-.10807	-.05173	.11800	.22862	.61038
Q39	-.15805	-.04891	.02279	-.46691	-.08769
Q40	.19344	.01886	.45597	.57032	.12452
Q41	.05728	.24309	.29874	.64008	-.08902
Q42	.06194	.09391	-.50674	-.19715	.26471
Q43	-.07576	-.15289	-.69946	-.25805	.05286
Q44	.37537	-.36161	.00857	-.40744	.34521
Q45	.31954	-.27989	.17621	.19663	.31074
Q46	.14268	-.24220	.53124	.33288	.03592
Q47	.16618	-.03025	.52323	-.06457	-.16395
Q48	.57663	.08260	.28757	.18034	-.05768
Q49	-.07018	.10662	.26412	.35869	-.41270

Factor 6

Q1	-.08728
Q2	-.00626
Q3	.60677
Q4	-.02337
Q5	-.49549
Q6	-.22922
Q7	-.29959
Q8	-.00682
Q9	-.10293
Q10	-.10661
Q11	-.08425
Q12	.14353
Q13	-.37434
Q14	.76983
Q15	-.09954
Q16	.40018
Q18	.16403
Q19	.00503
Q20	-.14276
Q21	-.45693
Q22	-.06021
Q23	.29820

----- FACTOR ANALYSIS -----

Factor 6

Q24	-.48876
Q25	-.02676
Q26	-.35574
Q27	.19668
Q28	.11547
Q29	.24280
Q30	-.15357
Q31	-.03907
Q32	-.43860
Q33	-.05325
Q34	-.03623
Q35	-.04086
Q36	-.28046
Q37	.46896
Q38	-.09014
Q39	.19146
Q40	.17397
Q41	.07890
Q42	.22323
Q43	.03577
Q44	.16124
Q45	-.05792
Q46	.44000
Q47	.19460
Q48	.09810
Q49	-.03125