THE ROLE OF THE ORGANIZATION STRUCTURE IN THE IMPLEMENTATION OF PUBLIC BUILDING PROJECTS IN KENYA.

by

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A thesis submitted in part fulfilment for the degree of Master of Arts, Building Management, in the Department of Land Development at the University of Nairobi.

NAIROBI

1986.

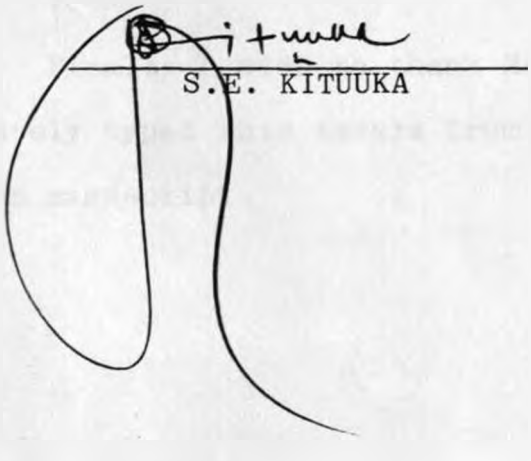
D E C L A R A T I O N

I, PIUS KAWA SEFU, hereby declare that this thesis is my original work and has not been presented for a degree in any other University.

SIGNED

DECLARATION OF THE SUPERVISOR

This thesis has been submitted for examination with my approval as University Supervisor.



S.E. KITUUKA

ACKNOWLEDGEMENTS

I have received assistance from very many people both at the University of Nairobi and outside.

Members of staff in the Department of Land Development provided encouragement at all stages of this study. I would like to particularly thank Mr. J.S. Mbaya, Chairman of Land Development Department and Dr. G.K. Kingoriah, Dean of the Faculty of Architecture, Design and Development, for their help in the writing of this study.

I would like to pay special tribute to the officials of the Ministry of Works, Housing and Physical Planning, National Housing Corporation, and the Municipal Council of Mombasa, without whose help it would have been difficult to get the necessary information for this study.

I would like to thank my supervisor Mr. S.E. Kituuka, whose direction and valuable suggestions did much to improve this study.

Finally I wish to thank Mr. P.G. Kimani who accurately typed this thesis from the original hand written manuscript.

ABSTRACT

This thesis is a study of the role of the organization structure in the implementation of public building construction projects in Kenya. Three case studies of public organizations have been selected for examination. The three organizations are the Ministry of Works, Housing and Physical Planning, the National Housing Corporation and the Municipal Council of Mombasa. The study examines the structural design of these organizations and the problems which arise when implementing building construction projects.

The study has established that the organization structures adopted by the three public organizations are not appropriate or conducive to effective project management. In most cases, they have tended to be rigid and bureaucratic. Those dealing with the projects directly are not given the full authority to do so and are sometimes overuled by those directly above them. The interference comes in the form of instructions which are mostly directives or refusals of some appropriate decisions taken by those dealing with the projects.

The first part of this study comprises the introductory chapter which forms the outline of the study and introduces the evolution of project organization structure. Public organizations implementing building projects in Kenya have been blamed for not

delivering constructed facilities, specifically building projects, on time, at reasonable cost and in good form. It is the author's conviction that the root cause of these problems lies in the way these organizations are structured and the way institutional frameworks in the construction industry in Kenya have come to be adopted and applied without considering the disadvantages involved. The second chapter, therefore looks into the concepts associated with organization structures in order to understand the problems facing the public organizations charged with implementing building projects. Chapter three deals with systems approach and construction organization structures. Systems theory has had significant impact on how organizations are viewed. It provides a basis for understanding the nature of organizations, their problems and their opportunities.

The second part of this thesis consists of three case studies. The case study method has been chosen in an attempt to identify some of the factors influencing the project implementation process. The roles of the departments concerned in the implementation process are examined. Case studies of the projects implemented in each of the organizations have been examined with a view of identifying the

organizations effectiveness in managing the projects. In the projects examined, an attempt has been made to investigate interdepartmental relationships in the project implementation process. The project participants roles were examined to determine how they integrate to achieve harmony.

The data and information for the case studies were collected between February and March 1986 through recorded information from project files, interviews and discussions. The results obtained from the case studies were found to be similar. Procedures adopted by the organizations under study were found to be too lengthy and bureaucratic and there was lack of intergration and conflict of roles during the implementation process.

Chapter five is the conclusion and recommendations.

P.K. SEFU, 1986

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CHAPTER ONE

INTRODUCTION

STATEMENT OF THE PROBLEM

The achievement of economy in the construction of building projects in Kenya is of considerable importance to the industry, to the clients and to the community. The realization of time schedules, cost, and performance standards is of great importance to the industry and economy of this country as a whole.

However, many building projects undertaken and implemented by public organizations in Kenya have exceeded their original estimated costs and completion periods and some have fallen below what would be termed as acceptable performance standards. Some of the projects have stagnated for long periods of time while others are subject to the long and cumbersome arbitration processes.

In most of the organizations, every year money is allocated for the purposes of providing building facilities but it goes unspent and has to be re-allocated every year due to various bottlenecks. Even after completion many projects do not seem to be finalised until after a very long period of time. The reasons for non-finalization are diverse. They range from non-availability of funds and lack of vital

records to those of the contractor not being able to be traced. Lack of staff is often one of the reasons cited for non-completion, on time, of projects by the implementing organizations. Delays are also quite often blamed on untimely communication between the client and the implementing organizations and also between the officers of the organizations effecting the projects.

Progress reports on the performance of these projects accuse the clients and the contractors undertaking the projects of not playing their part as agreed or required in the whole implementation process. The clients on their part point out that the problems are brought about by the inefficiency in the implementing organizations. Contractors on the other hand blame the implementing organizations for the causes of project delays. There are many instances where the complaints made by the contractors are justified hence the extension of contract periods and payment of claims, all to the dissadvantage of the clients.

The author's hypothesis is that the root cause, of the problems affecting public building construction projects in Kenya, is the way the implementing organizations are structured. The structural design of these organizations is not conducive or appropriate for good project management.

Inadequate or inappropriate organization design has

led to the adoption of the wrong type of project organizations which in turn leads to mismanagement of projects thus resulting to a multitude of reasons for project setbacks and delays.

Kast and Rosenzweig have defined structure as

> "the established pattern of relationships among the components or parts of the organization."

They state that

> "in the complex organization, structure is set forth initially by the design of the major components or sub-systems and then by the establishment of patterns of relationships among these sub-systems. It is this internal differentiation and patterning of relationships with some degree of permanency that is referred to as structure."[1]

They also point out that

> "organization implies structuring and integrating activities, that is, people working or co-operating together in interdependent relationships."[2]

Walker points out that there are many factors other than organization structure that have a significant bearing upon the performance of an organization. He however states that

> "organization structure is a particularly important aspect as, if properly designed, it allows the other aspects to function properly."[3]

An observer evaluating the performance of implementing organizations like the Ministry of Works Housing and Physical Planning, the National Housing Corporation and the Municipal Council of Mombasa among others, and who does not understand the intricasies involved in the construction process, might innocently conclude that it is due to the incompetence on the part of the staff in those organizations. It is very obvious that the problem is not the kind that can be singled out and blamed on a particular group.

THE PROBLEM

With the improvement of design equipment, just as in other industries in recent years, coupled with an increase in the size and complexity of projects, organizational problems of a magnitude never experienced before have been created in the construction industry.

The reasons why attention is being focused on management problems including organizational matters, are that the construction industry is under pressure for improved productivity, reduced wastage of resources and increased predictability of its performance. In Britain this led to the publishing of the Emmerson and Banwell reports which focus on the need to reform the approach to the

organization of construction projects. Implementing organizations tend to lack the capability to utilize scientific and technological knowledge by integrating various group contributions in an orderly fashion. They also lack the capability to manage successfully and efficiently, in the sense that individual efforts are coordinated, integrated and compounded in the best possible way for accomplishment of known objectives. Organizational efficiency goes beyond immediate economic goals to include such matters as adequate workforce motivation, job satisfaction, social and national awareness among others.

Jaafari identifies the following organizational shortcomings:-

1. Inefficiency at head-office: this is due to the fact that most organizations tend to remain virtually unchanged regardless of the fluctuation in workload; the later varies considerably and is influenced by external factors.

2. Confusion and conflict: this is inevitable because of lack of unity of command, blurred objectives and low morale.

3. Organizational inertia: this is also inevitable, both at head-office and site

levels, due to the phenomenon best explained by Parkinson's law, which states that work tends to expand to fill the time available.

4. Resistance to change: the larger an organization, the greater will be the in-built resistance met by management against any changes, even those most directly aimed at improving employees status. The resistence is likely to be higher in more permanent enterprises.

He is of the opinion that these problems are not unique to the construction industry and that examples of these can be seen in almost all organizations, both in the public and private sectors.[4]

On the lack of integration in the construction process, Stone states that

> "institutional arrangements and organizational structures within the construction industry tend to impede economy in the use of resources, partly by separating the various parts of the construction process and by creating conflicts between the interests of the various parts of the industry."[5]

MacEween points out that

> "the institutional structure of the building industry no longer

corresponds, even approximately, to the real needs of practice and education, or even to the ways in which both are actually handled. The boundaries between the professions are becoming more and more blurred. It is increasingly difficult to say, precisely, what an 'architect' is. New technical skills are opening up new opportunities for architects, but at the same time the need for specialization is compelling them to concentrate on part of what was formally the whole. The means by which buildings are being commissioned are changing and new forms of contract are in use. Other professions, with other skills, have become essential partners in many design or construction enterprises. New knowledge is coming into the profession from outside. The need for an educational system that provides people with many different skills, and helps them to work together with an understanding of the common task, stares everybody in the face, and is accepted by the RIBA."

He goes on to complain that

"clients are increasingly irritated and repelled by the unnecessary complexity, confusion and cost of the building process; by the difficulties of the traditional forms of contract; the inability of the architect to provide the whole service; the buckpassing between one profession and another; the need to commission and pay different professions separately, and the breaking up of a continuous process into bits and pieces by different people, whose ability to work together is weakened by the traditional professional and educational framework. The barriers between the professions and within the industry are costly to the country and one of the causes of bad buildings."[6]

He accuses professional institutions of being

Self perpetuating bodies strongly resistant to change. These bodies have defined particular skills over which they claim exclusive control. They have defined boundaries of their territory, to be defended against all comers. They live in a state of perpertual border warfare. He observes;

> "like the young girl from Khartoum, they want to know who does which and with what and to whom. The moves by any other profession, or segment of the industry, are viewed with suspicion and jealousy."[7]

The author is of the opinion that the construction process is like treating or operating a patient. Once the patient has been opened up, there are procedures or steps to be followed by the operating team and in a well defined and controlled environment. Any digression from these steps by any of the operating team members or any interference from outside or change of environment will contribute to the death of the patient. In treating a patient the full prescription must be followed and at the specified times, to avoid complications. In the case of operating on a patient, if any complication developed during the operation, the team or doctor has tomake a quick decision and the right one for that matter, to solve the problem if the life of the patient is to be saved. In the construction process, unlike where the doctor, has the permission from the patient's kin to do what

he deems appropriate, the construction team members' hands are tied. Permission to effect a corrective decision must be sought from people who quite often do not understand the issues involved. The response is usually delayed and by the time it comes the project will have "died". One might argue here that the next-of-kin too does not have much understanding of the issues involved. Agreed, but professional issues are better left to professionals. Once a commitment has been made and project commences the project team members should be given the discretion to make decisions where uncertainty arises and not to subject them to having to consult the non-professionals on matters which they (professionals) are better placed to decide upon. The same argument holds for the question of accountability. Those charged with the responsibility, authority and means of performing certain issues should be held accountable. They should also have the necessary skills required in project implementation.

Cooper et al rightly state that

> "to attain its objectives, each organization must determine the functions that have to be performed, allocate these functions to organization members and establish behaviour patterns on the part of its members which lead to the performance of those functions."[8]

This establishes the structure of an organization i.e. systems of communication, systems of authority, (or other roles), and systems of workflow. In order to understand better, the organization structures adopted in Kenya today, it is necessary to look into the evolution of project organization.

EVOLUTION OF PROJECT ORGANIZATION

The organization of construction projects in Kenya has its origins from the colonial administration. J.S. Mbaya gives a brief account of the origin of construction procedures in Kenya. He points out that after the 1939-45 war, there was an influx of European settlers, ex-war drafted professionals and Asian middle class. Some of the Europeans belonged to some professional bodies back in their country. To earn their living they set up business in architectural, quantity surveying, engineering as well as other professional practices. At the same time there grew a demand for building of government as well as private buildings. As most of the professionals were British so the whole system of tendering and building contract procedures as were in Britain came to Kenya.[9]

Walker gives a detailed account of the evolution of project organization in Britain and

points out that the way in which contributors to construction projects organize themselves in the U.K. at the present time has its origins in the Middle Ages. He states that

> "the surviving records of building in the Middle Ages are for prestigious structures and mainly show that a master mason was responsible for acquiring and organizing labour and material and for the technicalities of construction on the basis of an outline from the client. Alongside master craftsmen there often existed clients' representatives, many of whom did not have practical experience of building but who were among the few people who were literate and numerate. They were expert administrators and went under a variety of titles, such as surveyors, clerk of works and sacrist. The client would pay directly for the labour and material consumed."[10]

The eminence of master masons led to the most eminent being appointed King's Mason with responsibility for oversight of the king's palaces and castles. They also acted as advisers on a number of projects in a role akin to that of architect in later years.

The relatively stable conditions in which the 'building industry' existed in the medieval period did not create conditions for change in the organization pattern of building work until demand for building began to rise in the sixteenth century, when the distinctive role of the architect began to emerge and more work began to be awarded on a contract

or 'bargain' basis. At this time engineers were more concerned with mechanical devices for military purposes than with buildings.

The period from the sixteenth century to the industrial revolution saw many changes, which had profound effects on the organization of building projects. England had become a principal trading country of the world and travel had awakened interest in the buildings of ancient Greece and Rome, leading to a demand for such designs. This led to the clearer identification of the role of the architect, and the associated complexity resulted in an increasing tendency to let building work on a contract basis, although 'architects' also often acted as developers.

The Industrial Revolution placed great demand on the construction industry. Walker discloses that

> "the new complexity of the conditions within which construction work was executed, with greater emphasis on economy, value and prestige, the complexity of new building materials and technologies and the developing skills of the building industry specialists themselves, created need for greater specialization among them. These pressures led to the establishment of societies for the discussion of common problems. Architectural clubs were formed in 1791, but clubs for civil engineers had been set up as early as 1771. In 1834 clubs were established for

> surveyors and for builders. Subsequently, to protect themselves from economic pressures on the one hand and from the unscrupulous on the other, the clubs developed in the nineteenth century, into professional institutions as the means of defining their position and creating their public image through the acquisition of royal patronage. This further emphasized the separation of the skills associated with construction and so reinforced allegiance to specialist skills rather than the industry as a whole, and created the basis from which today's conventional organizational structure for construction projects has grown."[11]

Walker however points out that present day organization arrangements for building projects and attitudes to innovations within the industry still reflect to a degree, the conservatism generated by patterns laid down before the Second World War.[12]

In spite of the substantial changes in demand placed upon the industry the pattern of organization of projects remained largely unaltered. Increased government sponsorship of building projects (in Britain) served to reinforce allegiance to the traditional pattern by the need for public accountability, which was seen to be satisfied by competitive tendering on finished designs. However the need for greater co-operation began to be recognized following the Phillips Report which commented upon the ease with which variations

could be introduced during construction, the problems created by drawings issued late, the extensive use of nominated sub-contractors and the desirability of establishing a common basic education for all those involved in the design of buildings and their production.[13]

The Emmerson Report was concerned with supply and demand in the Building Industry, standards of training, research and technical information. The report is particularly significant for its observations on relationships within the construction professions and industry, and with clients, and in connection with the placing and management of contracts. It identified a common criticism of the construction process as the lack of liaison between architects and the other professions and contractors, and between them and clients.[14] The Emmerson report led to the establishment of the Banwell Committee in 1962 to consider issues in more detail.[15] This committee came up with the Banwell Report published in 1964. A particular concern of the report was the unnecessary restricted and inefficient practices of the professions, leading to over-compartmentalization and the failure of the industry and its professions to think and act together.[16]

The Emmerson and Banwell reports brought into sharp focus the need to reform the approach to the organization of construction projects.

Higgins and Jessop in a pilot study sponsored by the National Joint Consultative Committee of Architects, Quantity Surveyors and Builders identified that the problems of communication in the Building Industry were created to a large extent by attitudes and perceptions about the values of contributors to the building process. They suggested that overall co-ordination of design and construction should be exercised by a single person (or group).[17]

All these reports emphasizing the performance and organization of the industry and its professions marked the beginning of a self-examination. There is need for a study concerned with the management of the total building process. This study should adopt a systems approach in order to achieve this goal. The search for a more adaptive system is on in Britain as the various reports indicate. There is a pressing need to institute the same here in Kenya in order to eliminate obsolete frameworks.

STUDY OBJECTIVES

In system design, an approach known as system or operational analysis has been proved to be particularly useful. This is a rational approach to system study whereby an analysis is made of the system and its environment which results in (a) a specification of the several goals of the system (b) an identification of the various components of the system (c) a detailing of the several functions performed by these components; (d) a description of information flow within the system together with a specification of the control loops and other types of interaction among components; and (e) details of the dynamics of the environment within which the system will operate specifically in regard to the influence of the environment on the mission of the system.[18] It may be seen that this effort is primarily descriptive. Indeed, as Cooper et al put it:

> "system analysis is nothing more than a careful and complete description, since, like in any research area, an understanding of systems must be based on a sound description of phenomena."[19]

To identify the existing structures adopted by the implementing organizations, this study is to carry out a comprehensive investigation to establish the interdependence of groups and their actions to the overall construction process. Emphasis will be on

the examination of the project management organization adopted as a result of the way these organizations are structured in the light of the existing institutional frameworks within which the construction process takes place.

The study will attempt:-

(i) to examine and identify the existing project organization structures in public organizations charged with the implementation of building construction projects.

(ii) to find out whether the project organization structures used by the public organizations are capable of coping with the environment within which projects are carried out.

(iii) to study the composition and organization workings of the project team and its relationship with the client. This issue needs a critical analysis with a view of identifying problem areas and recommending alternative solutions to policy makers.

The main objective of the study is to identify an organizational structure with the

appropriate project organization which is condusive for good management.

CHOICE OF STUDY AREAS

In the past, researchers in the building industry have concentrated on the buildings themselves, especially on new building materials and technological developments. The organization and management of the project participants in the construction process has received little attention. There is little point in the construction industry developing the special skills of its members and new appropriate buildings materials, if no one is going to amalgamate them in the best manner to meet a particular clients' objectives.

J.S. Mbaya points out that

> "for a long time now, it has been recognized that the constraints which inhibit effective development and performance of the building industry in developing countries are complicated organizational systems inappropriate tendering and contractual procedures among others."[20]

Kenya falls in the category of developing countries and faces the same constraints in her construction industry. Through the Ministry of Works Housing and Physical Planning, the government sets out to provide constructed facilities, the

bulk of which are in form of buildings. This ministry has set up an organizational structure and adopted institutional frameworks (procedures) to be followed in achieving the governments objectives. Due to the fact that the bulk of construction work in Kenya is handled by this ministry, the author is convinced that this organization forms an ideal study area. It has therefore been selected as one of the case studies to be looked into in this study.

The National Housing Corporation is the second case study chosen in this study. Through this corporation the government sets out to provide housing facilities to its citizens. The pace at which these facilities are provided and their ultimate cost and performance is of considerable importance to the economy. This forms the first reason for choosing the corporation as a study area. The second reason is that it is a parastatal organization with its own procedures and organizational set up.

The Municipal Council of Mombasa has been chosen as the third case study. This will represent the rest of the other local authorities which have departments which deal with building construction work. The Municipal Council of Mombasa is a corporate body with perpetual succession and

a common seal (with power to alter such seal from time to time and is capable in law of suing and being sued and is capable of acquiring, holding and alienating land.[21] During the time of this study, the largest local authority with the largest number of building projects, the City Council of Nairobi, had been disolved and replaced by a City Commission appointed by the government. Mombasa being the second largest local authority proved ideal to the researcher to represent the other local authorities as all of them fall under the same Act of Parliament.

SCOPE OF THE STUDY

The study will focus upon the organization structure of the three implementing bodies i.e. the Ministry of Works Housing and Physical Planning, The National Housing Corporation and the Municipal Council of Mombasa. It will also look into the resultant project organization structures arising due to the way these implementing bodies are structured. It will look into the way in which the people involved in the construction process, from project inception to completion, are organized. The construction organization and tender procedures will be evaluated together with the contractual arrangements currently in use. The forms of

contract will also be evaluated.

Cooper contends that

> "to consider the individual without considering the structure in which he is embeded is to ignore the effects of structure upon individual behaviour "and" to consider the individual without considering the structure is also to ignore the fact that changes at one point in the system may bring about related changes in many variables throughout the system."[22]

In studying any organization we are concerned with its parts and their interrelations. The assimilation of the organizational environment by the individual determines in part his relations to others. It is this assimilation of the environment by the individual which accounts for much of the regularity as well as initiates many of the changes in an organization. For this reason the roles of the project participants are looked into to see how they integrate to achieve organizational objectives.

Chapter one will include the statement of the problem and the evolution of project organization, study objectives, choice of study areas, scope of study and finally research methodology.

Chapter two will be the theoretical framework and literature review. It will dwell on the various schools of thought on systems and organization

structures and their relevance to the construction industry.

Chapter three will deal with the construction organization, tender procedures and contractual arrangements. The existing institutional frameworks will be covered in this chapter.

Chapter four will be case studies on the organization structure and institutional frameworks of the three organizations. These will include:-

(i) The Ministry of Works, Housing and Physical Planning.

(ii) The National Housing Corporation.

(iii) The Municipal Council of Mombasa.

It will include the analysis of project implementation in the three organizations to determine effectiveness/efficiency in the implementation process in the organizations.

Chapter five will be the recommendations and conclusion.

RESEARCH METHODOLOGY

The main purpose of this study is to identify and propose appropriate organization structures conducive for good project management.

To make a comparative analysis of the various building project implementation organization structure, the study will be directed to the problems which occur as a result of the current institutional and organizational arrangements.

(i) First it will be necessary to interview the project participants, from inception to completion to be able to get what aspects of the current arrangements and set up impede implementation. The interviews and discussions will be with architects, surveyors, engineers and other project participants. The people interviewed are those who actually took part in the implementation of the projects selected.

(ii) Data on planned and actual progress of projects will be collected with a view of determining the aspects which contribute most to project setbacks. Two projects from each organization

will be studied and analysed to determine the causes of misundertandings, delays, stoppages, abortive work, confussion and conflict. For each project to qualify for analysis, it has to have been completed and that all records regarding the projects being available to the researcher. Projects were selected only when their participants were still available/present during the time of study so that in depth discussions can be carried out between them and the researcher.

(iii) The objectives of each organization will be established and their outputs will be analysed to make a comparison on organizational effectiveness, quality and goal attainment.

The completion of projects in their planned time, cost and performance will also form the basis of comparison. Any similarities in project setbacks in the three organizations will be noted.

Burns and Stalker, in their study of management structures in the electronics industry adopted the following methodology:-

In each organization, structured interviews were conducted with all members of managerial and supervisory staff and other white collar employees forming part of the managing system of the enterprise. Data collected was on the following:-

1. Measures of respondents perceptions of aspects of the organization structures and management styles.
2. Measures of the respondents perceptions of the way in which their firms have managed organizational change.
3. Measures of respondents perceptions of effectiveness of communications in their firms.
4. The respondents level of satisfaction with their jobs and organizations.
5. Independent, objective measures, mainly financial, of organizations effectiveness.[23]

Solomon and Rizzo developed the diagnostic methods of problems affecting projects. One can apply diagnostics to a past project with a view of finding out how to avoid the same or similar

difficulties, in the new design. Diagnostics are questions that translate symptoms of trouble or difficulty into causes. Once the causes of the deficiency are known corrective action can be formulated to bring performance upto the desirable state. Where an existing capability is to be expanded, a diagnostic approach may suggest that corrective action on the existing facility (a past project) deserves high priority. In many cases the symptoms of existing or past projects are deep seated so that unless special precautions are taken, one can expect new projects to suffer from similar defects.[24] Diagnostics applied to past projects point out design safeguards hence the necessity of carrying out project studies.

Case studies of projects implemented in each of the organizations have been examined with a view of identifying the organizations effectiveness in managing the projects. The aim is to find out a suitable management set up suitable for effective implementation.

Data Collection:-

Data on the projects and their implementation process was obtained from the project participants through interviews and discussions with the researcher and from the project files made available to him.

The purpose of examining project files was to obtain:-

- A list of the project participants, their roles and authority and their forms of communication.
- To obtain information on how the functional departments integrate in implementing the project.
- To highlight the events which influenced the projects completion time, cost and performance.

At this stage one may ask, what the researcher intends to do with the data. Measuring and evaluating results is important in determining performance. Output per work-hour, share of the market, and net profits are relatively straightfoward indicators of performance. However most organizations have multiple goals, some of which are not easily measured. Examples, might be customer satisfaction, increased managerial skill or long-run viability. It is important to recognize multiple goals and evaluate organizational performance on a variety of relevant dimensions. It is particularly important to identify substantive functions that spell success or failure in order to give priority attention to them. It is impossible for the complex organization to set

forth a single measure of performance for its multiple goals. Performance measurements involve effectiveness (the degree to which goals are accomplished), efficiency (the use of resources in attaining goals), and participant satisfaction (the motivational climate) hence the importance of interviewing the project participants. Analysing projects carried out by the organizations is only one way of throwing some light on how these organizations structure affects projects implementation. The rest has to come from the perceptions of these members (participants) through interviews and discussions with the researcher.

Structure is set forth initially by the design of major components or subsystems and then by the establishment of patterns of relationship among these subsystems. For this reason the researcher has considered it adequate to analyse, in detail, two projects in each organization. These projects were selected due to the fact that they were completed and that the project participants were still in those organizations. This made it possible to interview the participants and get their points of view on various aspects. As this consumed a lot of time, due to the detailed nature of the investigations and the limited time allowed

in this study, it was considered wise only to analyse six projects. The time allocated for this study would not be enough to examine a larger number of projects. However, the researcher is strongly convinced that to determine the relationships among parts of an organization and how they integrate to achieve organizational goals, you do not need to analyse a multitude of projects.

The reason for looking at three organizations is for comparative purposes. Kast and Rozenweig suggest the systems model as a framework for comparative analysis.[25] To compare means to examine in order to observe or discover similarities or differences.

ALTERNATIVE APPROACHES

Comparative analysis may be carried out by focusing on one (unidimensional) or several variables (multidimensional). For example, leadership styles might be compared across functions, levels, institutions, or cultures. Such studies provide insight concerning what factors affect a specific variable or dimension. Typically, however, comparative analysis includes more than one dimension in order to facilitate our understanding of how organizations are similar and different in

terms of interrelationships among key variables. The detailed case analysis is a multidimensional approach that concentrates on one organization (or subunit) and analyses as many facets as time and energy will permit. It provides an opportunity to understand a complex social system in great detail. However the results of such an analysis cannot be generalized. Findings concerning effective organization design or management practice may or may not be applicable to another organization.

In order to identify patterns of relationships that lead to effective performance, it is important to include many organizations. This is the essence of the comparative method - "systematic comparison of a fairly large number of organizations in order to establish relationships between their characteristics." Obviously the more organizations that are investigated, the more confidence we have in the findings that emerge consistently. Comparative analysis over a variety of institutions and cultures should reveal patterns of relationships. A body of knowledge presented in this way will allow managers to diagnose situations, anticipate possible consequences of their actions, and choose the most appropriate alternative (the one with the highest probability of success).

Comparative analysis recognizes that there are many variables and that interactions among them can present a complex situation for the manager. Research continues to show that there is no one best way to achieve organizational goals, the same ends can be gained via a variety of means (equifinality).[26]

MULTIVARIATE ANALYSIS

Another approach in comparative analysis is to investigate the important characteristics, dimensions, or attributes that are apparent in all organizations. The key question in this type of analysis is "what characteristics are important for comparative purposes?". A number of researchers have concluded that the nature of the technology (routine vs non-routine) is a key characteristic and have suggested that organizations with similar technologies should have similar structural designs. Others have focused on environment (certain or uncertain) or goals (profit or service) as the key variables. In fact, a wide variety of characteristics have been used in comparative studies of organizations: size, structure, attributes of participants, decision making processes, leadership styles etc.

There is an increasing awareness that no single characteristic is appropriate for meaningful comparative analysis. Currently, researchers are utilizing multivariate analysis to consider, a number of major characteristics and their interrelationships.

For comparative purposes the researcher is of the opinion that the three organizations looked into in this study are appropriate to make inferences about the public sector.

FOOTNOTES

1. Fremont E. Kast and James E. Rosenzweig. Organization and Management: A System and Contingency Approach, (New York, McGraw-Hill 1982) p.198.

2. Kast and Rosenzweig, op cit p.6.

3. Anthony Walker, Project Management in Construction. (London, Granada, 1984) p.13.

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CHAPTER TWO

REVIEW OF LITERATURE ON ORGANIZATION STRUCTURE

Despite the technological advancement in building technologies, new construction tools, equipment, and plant, and a greater variety and better quality of construction materials, the construction industry is generally regarded as one making slow progress in productivity. It is highly probable that the stumbling block to overall performance of the industry is structural: i.e. the fragmented approach to contracting and the limited application of modern management may have constrained the optimal utilization of resources and technology available to the industry.[1]

Public organizations implementing building projects in Kenya have been blamed for not delivering constructed facilities, specifically building projects, on time, at reasonable cost and in good form. The author is convinced that the root cause of these problems lie in the way these organizations are structured and the way institutional frameworks in the construction industry in Kenya have come to be adopted and applied without considering the disadvantages involved.

It is therefore vital to look into the concepts associated with organization structures if we are to understand the problems facing the public organizations charged with implementing building projects in Kenya.

Handy points out that

> "any one who has spent time with any variety of organizations, or worked in more than two or three, will have been struck by the differing atmospheres, the differing ways of doing things, the differing levels of energy, of individual freedom, of kinds of personality. For organizations are as different and varied as the nations and societies of the world. They have differing cultures - sets of values and norms and beliefs - reflected in different structures and systems. And the cultures are affected by the events of the past and by the climate of the present, by technology of the type of work, by their aims and the kind of people that work in them.[2]

FORMAL ORGANIZATION

Formal organization has been termed as the planned structure and respresents the deliberate attempt to establish patterned relationships among components that will meet the objectives effectively. The formal structure is typically the result of explicit decision making and is prescriptive in nature - a "blueprint" of the way activities

should be related. Typically it is represented by a printed chart and is set forth in organization manuals, position descriptions, and other formalized documents. Although the formal structure does not comprise the total organizational system, it is of major importance. It sets a general framework and delineates certain prescribed functions, responsibilities and the relationships among them.[3]

INFORMAL ORGANIZATION

The informal organization refers to those aspects of the system that are not planned explicitly but arise out of the activities and interactions of the participants.

ORGANIZATION STRUCTURES

Organization is a simple label or term which can be very deceptive. In common usage it has three interrelated meanings.

According to Gilman it is:-

1. "a set of understandings of how human and other resources are to be marshalled toward the achievement of an objective.
2. the structure of understandings ranging from policies and procedures to personnel assignments: and

3. the acting agency that is formed when organization as process and structure relate the efforts of a number of individuals in joint accomplishment.[4]

When we speak of organizations, we must do so in operational terms. Rather than conceiving of the organization as a static structural entity, it is useful to consider it as a dynamic system having:-

1. An explicit or implicit objective toward which the participants are working.
2. A formal and an informal pattern of authority and responsibility among the participants.
3. A given quality and quantity of resources both human and non-human.
4. A constant interaction between subsystems, as decisions are made, as strategies are designed for the implementation of decisions, and as decisions are themselves implemented.

Taken in this context an organization is created when two or more people agree to co-operate in seeking a common goal. The integration of these organizational elements is carried out through plans, policies, procedures, and rules, which formally

prescribe how the elements are to relate. On the human side, the informal organization, prescribes how the people want to relate.

A reorganization can be affected by varying one or more of the components. For example, an organization is changed by adding or taking away certain skilled people. An organization is also changed by a new policy which prescribes how people will work together to pursue a particular objective.

Mintzberg points out that every organized human activity gives rise to two fundamental and opposing requirements: the division of labour into various tasks to be performed and the coordination of these tasks to accomplish the activity. He defines the structure of an organization simply as

> "the sum total of the ways in which it divides its labour into distinct tasks and then achieves coordination among them."[5]

He is of the opinion that five coordinating mechanisms seem to explain the fundamental ways in which organizations coordinate their work: mutual adjustment, direct supervision, standardization of work processes, standardization of work outputs, and standardization of worker skills.[6]

These mechanisms are explained as follows:-

1. Mutual adjustment achieves the coordination of work by the simple process of informal communication. The knowledge developes as the work unfolds. So in the final analysis, despite the use of other coordinating mechanisms, the success of the undertaking depends primarily on the ability of the specialists to adapt to each other along the uncharted route.

2. Direct supervision achieves coordination by having one individual take responsibility for the work of others, issuing instructions to them and monitoring their actions.

3. Work can also be coordinated without mutual adjustment or direct supervision. It can be standardized: The coodination of parts is incorporated in the program, (for the work) when it is established, and the need for continuing communication is correspondingly reduced.

4. Work processes are standardised when the contents of the work are specified or programmed.

5. Outputs are standardised when the results of the work, for example the dimension of the product or the performance, are specified.

6. Skills (and knowledge) are standardised when the kind of the training required to perform the work is specified.

Mintzberg considers these to be the most basic elements of structure, the glue that holds organizations together.

Handy looks at orgnization structures in terms of the power, role and task cultures.[7]

The Power Culture:

A power culture is frequently found in small entrepreneurial organizations, traditionally in the robber-baron companies of nineteenth-century America, occasionally in today's Trade Unions, and in some property, trading and finance companies. Its structure is best pictured as a web.

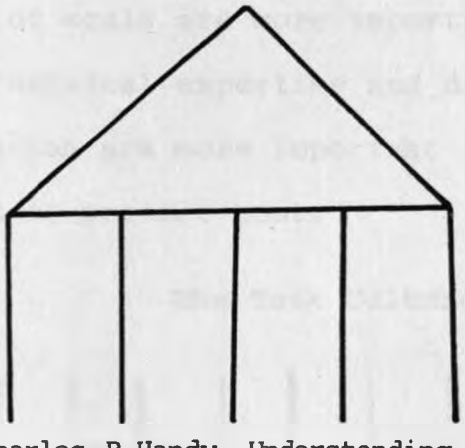
Fig. 2:11. The Power Culture Structure.

Source: Charles B. Handy, Understanding Organizations, p.178.

This culture depends on a central power source, with rays of power and influence, spreading out from that central figure. They are connected by functional or specialist strings but the power rings are the centres of activity and influence.

Size is a problem for power cultures. The web can break if it seeks to link too many activities. The only way the web organization can grow and remain a web is by spawning other organizations, other spiders. A web without a spider has no strength. This is to say that an organization without an undisputed leader does not have any strength.

Fig. 2:2. The Role Culture.



Source: Charles B.Handy, Understanding Organizations, p.179.

The role organization rests its strength in its pillars, its functions or specialities. The pillars are strong in their own right and are renowned for their efficiency. The work of the pillars, and the interaction between the pillars,

is controlled by:

(i) Procedures for roles e.g. job descriptions, authority definitions;

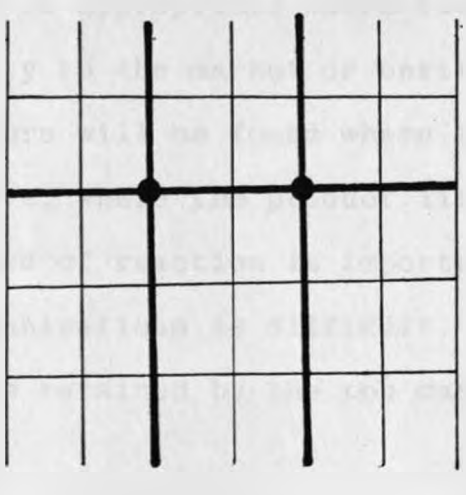
(ii) Procedures for communications, e.g. required sets of copies of memoranda;

(iii) Rules for the settlement of disputes.

The pillars are controlled at the top by a band of senior management; the pediment. It is assumed that this should be the only personal coordination needed, for if the separate pillars do their job, as laid down by the rules and procedures, the ultimate result will be as planned.

The role organization will be found where economies of scale are more important than flexibility or where technical expertise and depth of specialization are more important than product innovation or product cost.

Fig. 2:3. The Task Culture



Source: Charles B. Handy, Understanding Organizations, p.181.

The task culture is job or project oriented. Its accompanying structure can best be represented as a net; with some of the strands of the net thicker and stronger than the others. Much of the power and influence lies at the interstices of the net at the knots. The so called "matrix organization" is one structural form of the task structure.

The task culture utilizes the unifying power of the group to improve efficiency and to identify the individual with the objective of the organization. This culture is extremely adaptable. Groups, project teams, or task forces are formed for a specific purpose and can be reformed, abandoned or continued. The net organization works quickly since each group ideally contains within it all the decision-making powers required. Individuals find in this culture, a high degree of control over their work judgement by results, easy working relationships within the group with mutual respect based upon capacity rather than age or status. The task culture therefore is appropriate where flexibility and sensitivity to the market or environment are important. This culture will be found where the market is competitive, where the product life is short and where speed of reaction is important. Control in these organizations is difficult. Essentially control is retained by the top management by means

of allocation of projects, people and resources. Vital projects are given to good people with no restrictions on time, space or materials.

It is the culture which most of the behavioural theories of organizations point towards with its emphasis on groups, expert power, rewards for results, merging individual and group objectives. It is the culture most in tune with current ideologies of change and adaptation, individual freedom and low status differentials.

Kast and Rosenzweig state that

> "structure may be considered as the established pattern of relationships among the components or parts of the organization."[8]

In the complex organization, structure is set forth initially by the design of the major components or subsystems and then by the establishments of patterns of relationships among these sub-systems. It is this internal differentiation and patterning of relationships with some degree of permanency that is referred to as structure.

Rosenzweig also points out that the formal structure is frequently defined in terms of;

(i) The pattern of formal relationships and duties - the organization chart

plus job descriptions or position guides.

(ii) The way in which the various activities or tasks are assigned to different departments and/or people in the organization (differentiation).

(iii) The way in which these separate activities or tasks are coordinated (integration).

(iv) The power, status, and hierarchical relationships within the organization (authority system).

(v) The planned and formalised policies, procedures and controls that guide the activities and relationships of people in the organization[9] (Administrative system).

TRADITIONAL CONCEPTS OF ORGANIZATION STRUCTURE

Traditional management theorists have, in the past, been concerned with the design of efficient organizations. Rosenzweig states that they emphasized such concepts as objectivity, impersonality and structural form. The organization structure was designed for the most efficient allocation and coordination of activities. The structure was emphasized as the most important and

enduring characteristic of the organization. Many of the traditional concepts were based on experiences with stable organizations such as the military, church, and established public bureaucracies. Industrial organizations were concerned with developing a structure geared to stable production. They emphasised a rigid structure with well-defined relationships and clearly established lines of authority and communication.[10]

Specialization

This is a basic concept of traditional management theory which is to divide work into specialized tasks and to organize them into distinct departments.

The Scalar Principle

The scalar principle states that authority and responsibility should flow in a direct line vertically from the highest level of the organization to the lowest level. It establishes the hierarchical structure of the organization. It refers to the vertical division of authority and responsibility and the assignment of various duties along the scalar chain. Primary emphasis is on the superior-subordinate relationships. The scalar principle is complementary to the concept of unity

of command, in which each subordinate has only one superior.

Span of Control

The span of control, or span of supervision, relates to the number of subordinates that a superior can supervise effectively. Traditional theory advocates a narrow span to enable the executive to provide adequate integration of all the activities of subordinates.

Line and Staff

The line organization is vested with the primary source of authority and performs the major functions of the organization. The staff supports and advises the line. The staff is an aid to the executive. Through the use of specialized staffs, reporting directly to the executive, it is possible to use their knowledge without sacrificing the executives coordinating function.

Traditional management concepts have also been laid down in the Bible where Moses was told:

> "moreover choose able men from all the people, such as fear God, men who are trustworthy and who hate a bribe; and place such men over the people as rulers of thousands, of hundreds, of fifties, and of tens.

> And let them judge the people at all times; every great matter they shall bring to you, but any small matter they shall decide themselves; so it will be easier for you, and they will bear the burden with you. If you do this, and God so commands you, then you will be able to endure and all this people also will go to their place in peace."[11]

Other organization structure concepts include unit of command, chain of command, exception principle etc. However for the purposes of this study it is not considered necessary to dwell much on them.

Traditional concepts viewed the organizations structure as a rigid, closed system. They did not recognize the impact of environmental forces and did not consider the interactions between structure and the other subsystems in the organization.

ORGANIZATION DESIGN PARAMETERS

Herbert Simon in his book 'The Sciences of the Artificial' discusses the sciences of man made phenomena, such as engineering, medicine and management. He identifies the major task of these sciences as design and states that

> "everyone designs who devices courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artifacts is no different

> fundamentally from the one that prescribes remedies for a sick patient or the one that devices a new sales plan for a company or a social welfare policy for a state. Design, so constructed, is the core of all professional training; it is the principal mark that distinguishes the professions from the sciences. Schools of engineering as well as schools of architecture, business, education, law and medicine, are all centrally concerned with the process of design."[12]

One would then ask what constitutes the design process? Mintzberg explains the meaning of design by stating that

> "design assumes discretion, an ability to alter a system. In the case of organizational structure, design means turning those knobs that influence the division of labour and the coordinating mechanisms, thereby affecting how the organization functions - how materials, authority, information, and decision processes flow through it."[13]

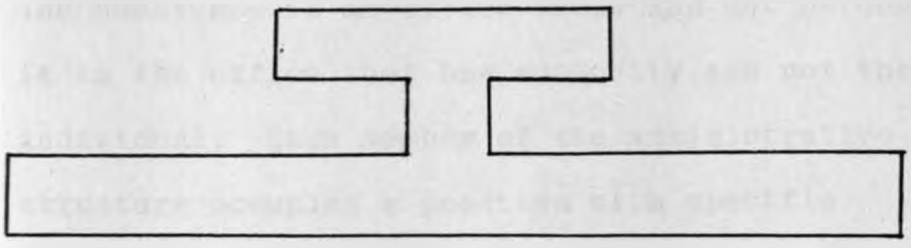
Structure includes the allocation of formal responsibilities i.e. the typical organization chart. It also covers the linking mechanisms between the roles and the coordinating structures of the organization. The basic forms make up what can be called the skeleton of the organization. They need to be joined by muscles, nerves and flesh if they are going to work but the decision on the underlying bone structure should be the first priority.

Generally organizations begin their lives with organic structures. Some begin in the craft stage and then move into the entrepreneurial stage as they begin to grow. As organizations in the entrepreneurial stage age and grow, they begin to formalise their structure and eventually make the transition to a new stage, that of growth bureaucratic structure. Further growth drive stage two bureaucracies to superimpose market-based grouping on their functional structure, thereby bringing them into the new stage; the divisionalized structure. Recently there has been another final stage; that of the mixtrix structure.

The Simple Structure

The simple structure has little or no technostructure. It has a loose division of labour, minimal differentiation among its units and a small managerial hierarchy. Its behaviour is formalised and is organic. Coordination is affected by direct supervision. Power over all important decisions tends to be centralised in the hands of the Chief Executive Officer. The strategic apex emerges as the key part of the structure and often consists of little more than a one-man strategic apex and an organic operating core.

Fig. 2:4. The Simple Structure



Source: Henry Mintzberg, The Structuring of Organizations, p.306.

The simple structure is the riskiest of structures, hinging on the health and whims of the individual. One heart attack, on the Chief Executive, can literally wipe out the organizations coordinating mechanism.

Bureaucratic Structure

Organizations that rely primarily on the formalization of behaviour to achieve coordination are generally referred to as bureaucracies. The word "bureaucracy" is derived from the French word "bureau" meaning desk or office. Max Weber, the German Sociologist, used it to describe a particular type of organizational structure. The term used by Weber was a purely technical one.

The view of rational legal authority was basic to the concept of Weber's bureaucracy. This means that there should be a right to exercise authority based on position and that obedience is owed to the legally established impersonal position.

The obedience is an office issue and not personal. It is the office that has authority and not the individual. Each member of the administrative structure occupies a position with specific delineation of powers. Everybody has a place with certain powers to be executed. The organization is governed by clear laid down rules and regulations.

However elsewhere the word has taken on a decidedly pejorative meaning. Mintzberg quotes Perrow as having said

> "'Bureaucracy' is a dirty word..... It suggests rigid rules and regulations ..... impersonality, resistance to change. Yet every organization of any significant size is bureaucratized to some degree or, to put it differently, exhibits more or less stable patterns of behaviour based upon a structure of roles and specialized tasks."[14]

The Functional Structure

The organization can pool human and material resources across different work flows on a functional basis. The functional structure encourages specialization by establishing career paths for specialists within their own area of expertise, by enabling them to be supervised by one of their own, and by bringing them together to encourage social interaction.

However it is difficult to achieve integration among the functional groups for the achievement of the organizations goal. It lacks a built-in mechanism for coordinating the work flow. The natural tendency is to let co-ordination problems rise to higher - level units in the hierarchy until they arrive at a level where the different functions meet. The trouble with this is that the level may be too far removed from the problem.

Instituting control is very difficult in functional groupings as this leads to conflict among the groups. Chapple and Sayles point out that

> "..... where the internal structure of the organization is broken down into a series of functional divisions there are no "natural" standards of performance and management is forced to exercise, considerable ingenuity in inventing controls which it can use for administrative purposes. Unfortunately, contrived controls, such as these, so far from facilitating inter-divisional cooperation (which is one of their chief purposes) often become themselves a source of conflict."[15]

Centralization and Decentralization

Centralization is the highest means of coordinating decision making in the organization. Where top management see mistakes committed below, quite often, they are led to believe that they

can do better. In complex organizations this leads to a state known as "information overload." Driver and Streufert observe that

> "the more information the brain tries to receive, the less the total amount that actually gets through."[16]

In other words, past some point the top managers can be neither smarter nor better coordinators. They would be better off if they left the decisional power with other brains, which together have the processing capacities, and the time, to assimilate the necessary information. Decentralization acts as a stimulus for motivation. Creative and intelligent people require considerable room to maneuver. Such people will only be retained in an organization if given considerable power to make decisions. Such motivation is crucial to professional jobs. Power should be placed where knowledge is.

Organizational theorists have developed numerous techniques and patterns for structuring organizations. These techniques have been explained in standard texts. Line and staff concepts and the vertical hierarchical chain of command beliefs provided basic points of departure from which to organise activities.

Schwartz explains the concept of organising by stating that

> "to organise is to arrange or form into a coherent whole. In management, organizing involves dealing with various individuals and groups of individuals each of whom performs a function needed to achieve a result."

He concludes by stating that

> "organizing directly affects the efficiency with which human and other resources are used and therefore is very important in managing."[17]

In classical theory, the organization was typically structured from some generic model and the process of adapting the particular structure to the requirements of the organization received only secondary consideration. In the late 1950s and early 1960s some organizations were wrestling with product and project management forms which did not fit into the traditional patterns of organization. These developments cast serious doubt on the universality of certain management principles.

Experimentation with alternative forms of organization structure began to solve some of the problems that did not fit into the traditional theories of organization. According to Mockler:

> "The traditional organization structures, with their rigid divisions of responsibility and authority and their mechanistic chains of command, were too inflexible to meet the needs of the dynamic business environment of the 1960s."[18]

In the late 1960s, a general philosophy of "no best way" to organize caused a shift from traditional organization patterns to development of individualized and flexible approaches to meet the particular situation. Delbecq summerised the current thinking about organization methodology by stating:

> "one cannot use a single stereotyped organizational model and meaningfully understand the rich variety of task and administrative units within modern complex organizations. One must necessarily speak of variety of organizational designs and a variety of administrative systems for coping with different mixes of these model forms."[19]

THE SYSTEMS APPROACH

Traditional organization theory used a highly structured, closed-system approach. Modern theory has moved toward the open-system approach. According to Scott:

> "The distinctive qualities of modern organization theory are its conceptual - analytical base, its reliance on empirical research data, and above all, its synthesizing,

> integrating nature. These qualities are framed in a philosophy which accepts the premise that the only meaningful way to study organization is as a system."[20]

Kast and Rosenzweig have defined a system as:

> "An organized, unitary whole composed of two or more interdependent parts, components, or subsystems and delineated by identifiable suprasystem."[21]

The systems view of an organization emphasizes the interrelatedness of organizational forces and stresses an integrated totality rather than a parochial component view.

Perhaps the systems view is best explained by the reference to the body in the Bible as stated in 1 Corinthians 12:4-31. Specifically in 1 Cor. 12:14-26 it is stated that:

> "the body is not made up of one part but of many. If the foot should say "Because I am not a hand, I do not belong to the body," it would not for that reason cease to be part of the body. And if the ear should say, "Because I am not an eye, I do not belong to the body," it would not for that reason cease to be part of the body. If the whole body were an eye, where would the sense of hearing be? If the whole body were an ear, where would the sense of smell be? But infact God has arranged the parts in the body,

> every one of them just as he wanted them to be. If they were all one part, where would the body be? As it is there are many parts, but one body. The eye cannot say to the hand, "I don't need you!" And the head cannot say to the feet, "I don't need you?" On the contrary, those parts of the body that seem to be weaker are indispensable, and the parts that we think are less honorable we treat with special honour. And the parts that are unpresentable are treated with special modesty, while our presentable parts need no special treatment. But God Has combined the members of the body and has given greater honour to the parts that lacked it, so that there should be no division in the body, but that its parts should have equal concern for each other. If one part suffers, every part suffers with it, if one part is honoured, every part rejoices with it."[22]

The essence of the systems approach says that you should not separate functions individually because they form the whole system. No separate function should be favoured over the others. The activity of any parts of the organization has some effect on the activities of other parts of the organization. In order to optimise decisions of the organization, we have to evaluate the functioning of the individual parts or functions and how they affect the whole organization. The systems approach is a continuous method of evaluating the operation of the organization.

Miller points out that Alexander Bogdanov,

the Russian Philosopher, developed a theory of tektology or universal organization science in 1912 that foreshadowed general systems theory and used many of the same concepts as modern systems theorists.[23]

In England the organizational researchers at the Tavistock Institute of Human Relations have viewed the organization as a sociotechnical system with a structuring and integration of human activities around various technologies toward the accomplishment of certain goals.[24]

In France, Michael Crozier and his associates have used a comprehensive systems approach to investigate complex governmental relationships.[25]

The systems approach has also been adopted by social psychologists as a basis for studying organizations. Using open-systems theory as a general conceptual scheme Katz and Kahn present a comprehensive theory of organization. They suggest that the psychological approach has generally ignored or has not dealt effectively with the facts of structure and social organization, and they use systems concepts to develop an integrated model.[26]

These examples indicate a new approach to

modern organization theory and management practice. They indicate that increasing attention is being given to the study of organizations as complex systems. But on one thing Perrow states that:

> "the varied schools of organizational analysis now seemed to be agreed: organizations are systems - indeed, they are open systems."[27]

Philip Selznick utilizes structural functional analysis and the systems approach in his studies of organizations. The institutional leader is concerned with the adaptation of the organization to its external systems. The organization is a dynamic system, constantly changing and adapting to internal and external pressures, and is in a continual process of evolution. The organization is a formal system influenced by the internal social structure and subject to the pressure of an institutional environment. He observes that:

> "cooperative systems are constituted of individuals interacting as wholes in relation to a formal system of coordination. The concrete structure is therefore a resultant of the reciprocal influences of the formal and informal aspects of organization. Furthermore, this structure is itself a totality, an adaptive 'organism' reacting to influences upon it from an external environment."[28]

Selznick used this systems frame of reference for empirical research on governmental

agencies and other complex organizations.

The Open Systems Group are of the opinion that most scientific disciplines have a large body of knowledge and facts to draw on which has been accumulated over years of testing and experimenting. Theories can be tested against this body of knowledge and gaps identified.[29]

When it comes to the behaviour of systems we have surprisingly little in the way of studies or documented experience. The formal structure of a system is often known but its behaviour is another matter. It is unfortunate that we often have to wait for a system to fail before its possible behaviours are revealed and there are many vested interests engaged in seeing that full records of what happened are not readily available!

In looking at organizations as systems, Drake and Smith suggest that an organization can be viewed in terms of its task, technology, structure and people. These elements are highly interdependent. They state that:

> "historically, attempts to improve organizations have tended to focus predominantly on only one of the above elements with little recognition of its interdependence with the others and consequently often with harmful effects."[30]

Cleland and King observe that the two salient characteristics of modern organization problems are interdependency and complexity. They contend that:

> "modern societal problems are so interdependent that the solution to one cannot be sought without considering the other."[31]

THE RELEVANCE OF SYSTEMS THEORY

There is a lack of a fundamental framework of organizational theory relating to construction projects against which experience of the various organizational initiatives can be measured and compared. Systems theory may provide the opportunity to develop such a framework.

Walker observes that:

> "the attraction of systems theory is a medium for identifying a conceptual framework for the management of the construction process lies in the basic premise that a system is an organized or complex whole: an assemblage or combination of things or parts forming a complex or unitary whole, which is greater than the simple sum of the parts. The systems approach stresses the contribution of the inter-relationships of the parts of the system and the system's adaptation to its environment in achieving its objectives."[32]

Systems concepts to the organization design of the construction process has been advocated by various systems experts. Morris developed an approach to studying integration of the participants at the design - construction interface of construction projects. He compared six projects with different stages of contractor appointment to the project team. He focussed attention solely on the design-construction interface. His work supported the systems approach in that he found that organization theory, especially when employed in the context of a systems framework, could be used to describe and explain the nature of the management process of construction projects.[33]

The systems concept has also been applied in Sweden by Napier. He attempted to understand the problems of the Swedish building industry as a whole as a basis for the design of systems for the future. By considering the building industry as a system with a number of sub-systems, and by studying these systems in their environment, it was possible for him to obtain a realistic picture of the industry and the causes of its major problems.[34]

Each of the two studies have taken a different perspective, but have employed the same basic concepts. Walker advocates a broader approach and states that:

"the fundamental premise of systems theory stresses interrelationships and is as concerned with the links between the parts of the system as with the parts themselves. The problem of how to make the links work effectively is essentially the problem of project management."

He advises that

"In order to apply these ideas to the construction process to the greatest benefit, it is necessary to take as broad a perspective of the process as possible from conception of the project to completion and even beyond."[35]

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CHAPTER THREE

SYSTEMS APPROACH AND CONSTRUCTION ORGANIZATION STRUCTURE

Systems theory has had significant impact on how we view organizations. The systems approach provides a basis for understanding the nature of organizations, their problems and their opportunities.

Cleland and King observe that the two salient characteristics of modern organization problems are interdependency and complexity and that modern societal problems are so interdependent that the solution to one cannot be sought without considering the other. They define a system literally as:

> "an organized or complex whole, an assemblage or combination of things or parts forming a complex or unitary whole."[1]

Schein is of the opinion that:

> "acknowledging that every system has multiple functions and that it exists within an environment that provides unpredictable inputs, a systems effectiveness can be defined as its capacity to survive adapt and maintain itself, and grow, regardless of the particular functions it fulfils."[2]

Perhaps the clearest statement of effectiveness criteria in these terms has been given by Bennis who introduces these ideas in reference to the traditional approaches of measuring output and satisfaction at a given point in time. He states that:

> "if we view organizations as adaptive, problems solving organic structures, then inferences about effectiveness have to be made not from static measures of output, though these may be helpful, but on the basis of the process through which the organization approaches problems. In other words, no single measurement of organizational efficiency or satisfaction - no single time slice of organizational performance - can provide valid indicators of organizational health".[3]

We are therefore faced with complex system problems requiring complex system solutions, whose choice depends on consideration of the relationships and the wide array of possible consequences and impacts on diverse interest groups. Many of these will have significant technological components, but these alone will not suffice. Despite our reliance on technology, we have not developed the ability to organize the technology and to integrate it into systems which effectively resolve problems. In essence, we have not developed the ability to manage technology effectively. If we are ever to

escape from the vicious circle of having tomorrow's problems evolve from the technological solutions to the problems of today, we shall have to go beyond the mere management of existing technology to develop an ability to plan for technological change.

The central view of management is the same in all these contexts, whatever may be the terminology in use. Management is the process of leading organizational effort in pursuit of organizational goals. In coordinating the achievement of organizational goals, the manager performs a number of functions. These are variously described in the literature as planning, organizing, motivating, staffing, controlling etc. The value of the systems concept to the management of an enterprise/organization can be seen in terms of two elements of the manager's job. First he desires to achieve overall effectiveness of his organization - not to have the parochial interests of one organizational element distort the overall performance. Second he must do this in an organizational environment which invariably involves conflicting organizational objectives.

The systems concept or viewpoint is the simple recognition that any organization is made up of segments, each of which has its own goals.

The manager can achieve the overall goals of the organization only by viewing the entire system and seeking to understand and measure the interrelationships and to integrate them in a fashion which enables the organization to efficiently pursue its goals.

The systems concept in management decision making virtually necessitates the use of objective analysis of decision problems. The human mind can comprehend only so much, and the systems viewpoint requires consideration of the many complex inter-relationships between problem elements and the objectives of numerous functional units. To accomplish objectives, even in prespecified ways requires organized effort. This, in turn, requires that human beings be given specific directions and be motivated to follow them. These individuals must be monitored and controlled to ensure that they have performed their assigned functions properly. The organizing function, therefore, has to do with the procurement of human and non-human elements, the grouping and alignment of the factors and the establishment of authority and responsibility patterns within the overall organizational framework and within the policy and strategic limits, as prescribed by the results of the planning process. The organizing process recognizes that a complex system of informal relationships exist in any group activity.

The formal organization emphasises functions, positions and specific grants of authority and responsibility. Schwartz postulates that:

> "to organize is to arrange or form into a coherent whole. In management, organizing involves dealing with various individuals and groups of individuals each of whom performs a function needed to achieve a result. Organizing directly affects the efficiency with which human and other resources are used and therefore is very important in managing."[4]

The system's approach is a way of thinking about complex processes so that interrelationships of the parts and their influence upon the effectiveness of the total building process/ construction process can be better understood, analysed and improved.

The success of any construction process depends on the way the project team members work together. It depends upon them perceiving the same objectives for the project and recognising that what each of them achieves depends upon what the others do. The role of the project manager has come about as a result of the inability of the contributors to achieve integration among themselves.

To understand how the building process operates as a system it is necessary to understand

the distinction between closed and open systems. A closed system is one that does not respond to events and occurrences outside the system. It cannot adapt to changes and is, as a result, predictable. Machines are closed systems in that the parts are selected to perform specific functions in a given set of conditions to produce a predetermined output. If conditions change the machine will not adapt to them. An open system adapts to events and occurrences outside the system. The events and occurrences take place in what is known as the systems environment. An open system has a permeable boundary and there is import and export between an open system and its environment. It influences and is influenced by its environment. An open system is dynamic and adapts to its environment by changing its structure and processes. It is always changing and evolving and presents differences over time and in changing circumstances.

The construction process has always been an open system. Clients exist in the environment of the construction process system and the system must adapt to them. It imports ideas, energy, materials, information etc. from its environment and transforms them into its output, which is the finished construction.

Walker illustrates this process as an input-output model and identifies five functions upon which the project management process should focus.

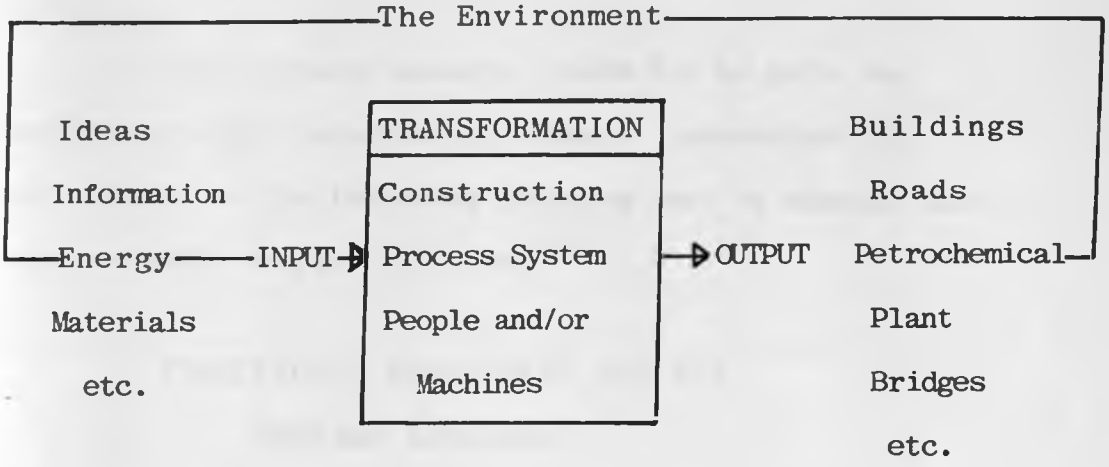


Fig. 3:1 The Construction Process as an input-output Model.

Source: Anthony Walker, Project Management in Construction, p.35.

Recognising the construction process as an open system means that the functions upon which the project management process should focus can be summarised as:

a. Identifying, communicating and adapting the systems objectives;
b. Ensuring that the parts of the system are working effectively;
c. Ensuring that appropriate connections are established between the parts;
d. Activating the system so that the connections that have been established

work effectively;

e. Relating the total system to its environment and adapting the system as required in response to changes in its environment.[5]

The project manager needs to be able to anticipate the interconnectedness generated by decisions in the building process and to manage the system with respect to them.

TRADITIONAL MANAGEMENT AND THE SYSTEMS APPROACH

According to Walker traditional management 'theory' had a fixed view of management. It evolved around 'principles', which were held to be universal truths about how sound management should be undertaken. The principles were considered to be the only way to manage business activities or processes, irrespective of the external conditions in which they were carried out. Many of the earlier concepts in the social sciences and organization theory were therefore closed-system views because they considered the system under study as self-contained. They concentrated only upon the internal operation of the organization and adopted highly structured approaches.[6]

The classical approach to the design of organization structures originated from the schools of Fayol, Urwick, Taylor and their successors in the early twentieth century. Their 'principles of management' were concerned with such things as pyramidal structure, unity of command, line and staff, the scalar chain, and span of control. The primary element was the bureaucratic form, with its pyramidal organization structure and the idea that authority is delegated downwards. Division of labour was advocated so that the sub-goals of the various units would add upto the overall organizational goals, and coordination would be handled through the management hierarchy. This traditional approach to organization and management was essentially rigid and stemmed from military and church models. It did not make explicit the effects of the human component and external influences on the organization. The major criticism levelled against the traditional schools of management thought is that they were offered as the one best way to organize. Modern organization structure thinking denies such an assumption, but believes that each school has something to offer within a systems framework.

Morris is of the opinion that specialization tends to split up the building process and yet

there are pressures arising in society now which are creating a need for more integration within the building process. He states that

> "the systems approach to the design and analysis of complex situations is becoming increasingly accepted as a powerful aid both in understanding the problems of our society and in appraising the organization forms best suited to coping with those problems."[7]

He points out that the building process is one such type of organization form and that

> "an organizations' structure is a function of its purpose, subject to the constraints of the environment within which, and the technology with which, it operates."[8]

General systems theory has had an attraction for management thinking as it presented an opportunity to converge the strands of thought into an acceptable and theoretically sound framework with less rigidity and more recognition of interdependency in organizations than the traditional 'principles' imply. It reflects the scale of the activities to be undertaken (.e.g the design and construction of a building) and the effects upon the activities of environmental influences. It discounts rigid approaches that propose one method for all circumstances.

Lawrence and Lorsch's study led to the contingency theory of organization design, which states that there is no one best way to organize but rather that organization is a function of the nature of the task to be carried out and its environment. They found out that different environments, which generate different levels of uncertainty, require varying degrees of separation (differentiation) of organization units (e.g.- architect, engineer, contractor) and hence they require different degrees of integration. The extent of differentiation within an organization depends upon the uncertainty and diversity of the environment and the effect this has on the way the task has to be organized and managed. Lawrence and Lorsch found out that the amount of differentiation in the effective organization was consistent with the environmental demand for the interdependence of the parts of the organization. In developing their contingency theory they state that this starting model is complicated as soon as we move to a complex, multi-unit organization, in which each unit strives to cope with different parts of the environment. Lawrence and Lorsch see the existence of an integrating unit and conflict - resolution practices as contributing to the quality of integration and in turn to overall performance.[9]

In recent years, this unit has come to be represented on construction projects by project managers.

Other significant research studies led up to the contingency theory. Burns and Stalker have analysed the organization implications of rapid environmental change in the electronics industry. Their ideas developed out of empirical observations of two contrasting forms of organization structure in use in the firms they studied. They gave these two types of structure the names mechanistic and organic. Although no one firm consistently or exclusively used either form, there was apparently a clear separation between those making most use of the mechanistic type and those making most use of the organic. Their conclusion was that mechanistic systems are appropriate to the management of organizations with relatively stable environments while organic systems are more appropriate to the management of organizations with environments subject to relatively rapid change.[10] The mechanistic system as Burns and Stalker conceived it has the following characteristics:-

There is much emphasis on functional specialization; people tend to work on their specialist tasks without much regard for the overall goals of the organization; the duties, powers and methods associated with each job are precisely defined; communication takes place mainly along the chain of command, between superior and subordinate,

what people do reflect instructions and decisions coming from higher up in the hierarchy. The hierarchy of control rests on the assumption that only the head of the firm has, or should have, the total picture.

On the other hand, the salient features of the organic system are that; jobs are loosely defined and are constantly redefined. Tasks are more likely to be performed in the light of knowledge of the firms overall objectives. People communicate with each other across the organization as much as within the formal chain of command. Where people from different levels communicate with each other, the process is more like consultation than command and obedience. The chief executive is not assumed to know everything.

Burns and Stalker did not suggest that either system was superior to the other. They were of the opinion that when taken in context with the task and environment being considered one pattern will be more appropriate for the specific tasks and environment in question.

A three year study conducted by Ashridge Management Research Unit set out to examine whether performance measured in human and financial terms is influenced by particular combinations of

management style and organization structure. They question popular theories about 'best management style' and 'best organization structure.' Their research has indicated that the problem of defining the dynamic framework of organization can be broken down into two distinct aspects, one of which can be termed the problem of control and the other, the problem of INTEGRATION. They observe that the term control describes the extent to which the activities of managers and supervisors are laid down by senior management and defined by detailed rules and regulations or are left mainly to the judgement and choice of the individual.

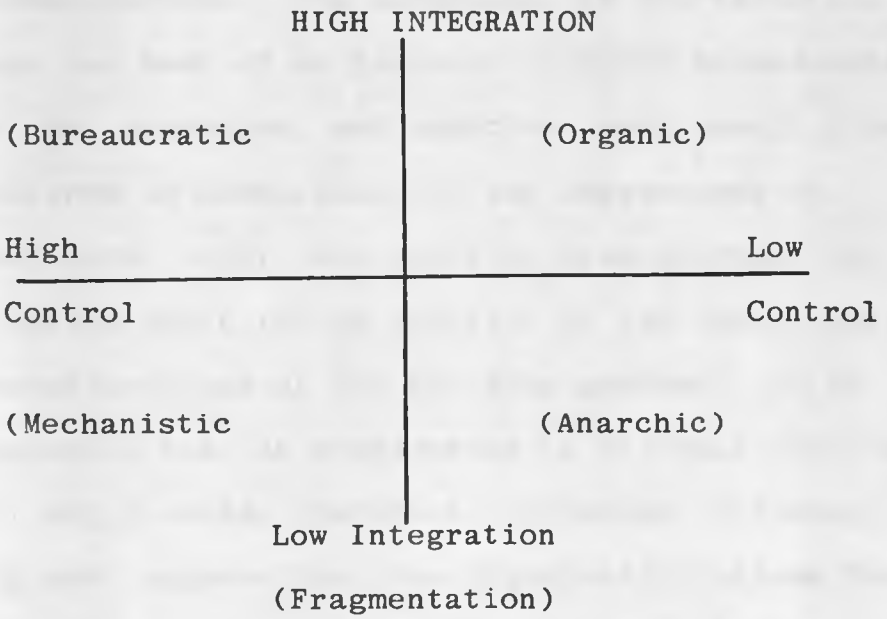
Integration is the extent to which the activities of managers and supervisors in different functional areas are closely co-ordinated in relation to the overall objectives of the company or organization. They point out that the principle of democracy and the values which this implies - i.e. freedom, choice and individuality, are strongly upheld in modern industrial societies. To this extent centralised control structures are often described as inherently 'bad', while those which provide the individual with the oportunity to participate in decision making and to exercise judgement are said to be 'good'. In their opinion, centralised control systems which give the

individual little chance to decide his own activities are appropriate and desirable in some circumstances, while systems leaving more to the judgement of the individual are appropriate in others. Any job which requires an employee to exercise judgement, initiative, discretion or creativity contains a significant level of unprogrammed work. The greater this level, the less appropriate it seems to subject the work to close control. Control systems also become more appropriate as the mechanisation process continues.[11]

Lansley et al have come up with a model which points to the existence of four basic types of organizational systems. It is possible to construct the model by taking both control and integration into account. The 'mechanistic' type represents the situation in which control is high but integration is low. The 'organic' type involves high integration and low control. The remaining two categories, high control and high integration and low control, low integration have been labelled respectively, 'BUREAUCRATIC' and 'ANARCHIC'.

Fig. 3:2 STRUCTURE MODEL

(ORGANIZATIONAL SYSTEMS)



Source: P.R. Lansley et al, Managing for success in the Building Industry.[11]

The study done by Lansley et al, has added further weight to the argument that there is no one best way of organizing a business. Effective organization is contingent upon the purpose which the organization is seeking to fulfil and upon the nature of the tasks which have to be managed.[12]

A study of the building industry done by the Tavistock Institute indicates that in the administrative field, no comparative metamorphosis has occured in the roles of those who jointly and severally, are responsible for controlling the building process. The study shows that the disparity in development between the social and technical functions on the one hand and the

administrative functions on the other is the root cause of difficulties which show up clearly in communications. The experience of the Tavistock team has been of an industry in which misunderstandings, delays stoppages, and abortive work result from failures in communications and impressions of confusion, error, and conflict have provided the starting point for an analysis of the operational characteristics of the building process. It is suggested that in considering a rational structure for any planning operation (including building) one must suppose that the organization allows for the flow of information that is relevant in a technical sense from any functional group to any other functional group. One must recognize functional interdependence. The Tavistock researchers state that

> "different form of organization have to be considered in relation to the varying powers to intervene in the building process possessed by members of the building team and by others. If the form of organization is changed, then the power of intervention of each member of the building team is likely to become different from what it is now."[13]

They point out that we have only to consider the diversity of interests involved among architects, quantity surveyors, engineers, builders, sub-contractors, suppliers and labour, on the one

hand and clients with varying requirements, local authorities, building users, planners, the public and the government on the other hand, to realize that there is not likely to be a single generally accepted criterion for improvement. Such a criterion would have to take account of the costs and incentives of all the parties, as well as of matters of time, security, amenity, functional success, environmental contribution, rateable value prestige and so on.[14]

THE BUILDING PROCESS AND THE ROLES OF PROJECT PARTICIPANTS

The building process is the whole series of activities required between the initiating point of a clients' needs and the production of a building to fulfil that need. The start is the clients building need and the end is satisfaction of the clients needs. The whole process involves four phases. These are the project conception phase, design phase, design realization (contract, documentation phase) and construction on site.

Due to the limited capability of knowing, most individuals cannot be knowledgeable in the large number of diverse activities of the building process. Even if a person does know a great deal

about many things he does not have time and the capacity to make decisions in several areas in a short time. Therefore, there is need to divide the tasks into specialities and to assign them to different persons or group of persons (organizations). The design inception, and design realization phases are thus created by contributions made by design team members of different disciplines, architects, structural engineers, mechanical and electrical engineers, quantity surveyors etc. The on-site construction of the building is undertaken by main contractor, general contractors, or design and construction companies. These companies use a mixture of directly employed labour and sub-contractors. The sub-contractors are in most cases specialists or suppliers. The client provides the necessary finances.

The participants in the building process, clients design teams, and construction team are responsible for their internal management control of their specialities. Due to the fact that the process involves many skills, many groups and different interests, there is need for overall co-ordinating management to ensure that each of the participants tie in their activities with those of others so as to keep the programme and budget.

The generally held view of relationship between the professional activator of the building process within the industry and the lay initiator of the process outside the industry is that of the architect 'taking a brief from the client.' This concept, which is essentially that of one individual communicating his requirements to another individual, is implicit within the traditional thinking of the building team. The concept, for most building projects of any size today, is obsolescent, if not obsolete, as a true representation of the relationship between the building industry and the society it serves. In most cases the client is not an individual but a complex system of differing interests and the clients' relationship is seldom with a single member of the building industry. Even if initiated through individuals, the relationship rapidly becomes a conference between groups of both sides.

The building process today is a complex organization comprising of participants whose roles are segmented and specialised in groups involved either on a design or production aspect. These roles are segmented throughout the projects life cycle. There is need to set up an appropriate structure of relationship to ensure integration. The structure must allow for the separate

contributions to the common scheme from different specialists, including those from the client system. On the other hand it must avoid the different contributions developing too far without cross-reference to others whom their decisions implicate, and of any of the potential interveners being left behind the growing scheme, to intervene later with demands for reconsideration. It should be realized that even with such a carefully designed structure, there will be difficulties, but without it, confusion, delays and abortive work are inevitable.

The Tavistock researchers observe that there are a series of roles which control the application of the many varied resources (including knowledge and skills) that are required to develop and maintain the systems of operations. These roles, which are defined in terms of particular aspects of the operations and the type of resource they contribute, together constitute a system of resource controllers. None of these roles is a contemporary development. All take their basic definition from conditions in the industry at the time they were developed. In each case, the role was developed as an answer to social, economic, and technical problems present at the time. The roles as so defined have become entrenched and protected within institutes, federations, and

associations designed to protect the interest of those carrying them.[15]

The conditions that gave rise to these roles have changed over time, but their definitions have changed little, if at all. The characteristic reaction of their protective institutions has been one of more rigid defence of the roles as traditionally defined. Institutional preoccupations have become increasingly inward looking and defensive in the face of external changes. The first reaction of any of the institutions and associations to a new development in the organization of the building team tends to be concerned with the implications for its members of the change, rather than with the effect on the effectiveness of the total building process. The overall result is a tendency to freeze all resource controller roles within definitions that are increasingly inappropriate to the changing social economic and technical conditions under which the building process must proceed in the contemporary world.

In the construction process progress meetings are inevitable. In these meetings the needs of the job will be lost in attempting to settle responsibility for broken agreements irresponsibly undertaken by all parties. At such formal meetings -

in theory set up to meet the management needs of the project - all are imprisoned by their collusive acceptance of unreal, independent accountability for parts of an interdependent responsibility. Although the reasons for these situations are commonly seen in personal terms - incompetence, laziness or financial greed of others for example, and although bitterness and even hurt, can be given by accusations in such terms - these behaviours are seldom crucial. An observer can see that such behaviour is forced on those concerned by the demands of their roles in the system, rather than by personal motivation. Dissatisfaction is the most usual residue of such experiences. Few can leave such meetings without a distasteful feeling of self--inflicted offence to their self-respect as professionals, tradesmen or craftsmen.

The Tavistock Institute's work is often referred to as the socio technical school of organization theory. Central to their approach is a concern with identifying, first the forces which create the pattern of structural differentiation in an organization and second, the means of effecting organizational integration. P.W.G. Morris righly states that

> "the building process is heavily differentiated and is likely to be even more so as technology becomes

> more sophsisticated, yet at the same time there is an increasing need for it to become more integrated."[16]

Differentiation is a compound term used by organization theorists to cover both the differences in orientation between an organizations members and also the differences in the organizations' formal structure. Essentially it is a measure of the relative difference between the subsystems in an organization.

Integration on the other hand is a measure of unity of effort. Walker states that it has been defined as

> "the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the environment."[17]

He goes on to observe that the inter-dependency of the contributors to the construction process has long been recognized but often as sequential interdependency. One part cannot act until after the previous part has done its work.

Analysis in systems terms focusses attention upon the need to bind together the differentiated yet interdependent contributors to the process. This requires a high level of integrative activity which has not traditionally

been recognised and provided. The provision of integration must be directed towards the achievement of the total systems objective. The structure of the system will depend on the technical demands of the project together with the environment in which it is undertaken.[18]

THE NEED FOR PROJECT MANAGEMENT

The main reason for the development of the project management concept, is that the traditional forms of organization structure and management techniques do not handle project type work effectively. While management theory has made great progress in the development of scientific tools and methodology for solving complex resource allocation problems, the organizational interfaces that affect the outcome of the application of these resources are not fully understood or accepted.

There is a need for different forms of organization, specialized information systems, managers skilled in the techniques of project planning, financial management, control and the particular human problem arising in project work, because of the special characteristics of projects and the problems caused by them.

A project has been defined as

> "a non-routine, non-repetitive, one-off undertaking, normally with discrete time, financial and technical performance goals."[19]

Decision making in project work tends not to be repetitive and bad decisions at any stage in a project affect a project throughout its life and it is not generally possible to recover from early deficiencies in project management. Project work is complex with respect to interdependencies between the departments and companies involved.

This involves a complex organization including people from many different professions, backgrounds, trades departments and companies. Additionally these relationships and interdependencies are dynamic and never static. No one functional department or company is the most important over the whole life of the project and thus no individual functional manager can assume the leading management role for the complete project. A project of any complexity involves different disciplines and collaboration among institutions. Specialist knowledge and specialized functions have to be combined in ways that are appropriate for the project, so that it is not enough to have competent engineers, economists, architects, administrators as seen from the point of view of each discipline separately.

Solomon and Rizzo state that

> "in the face of a crucial need for integration of the various aspects of a project, there is a strong tendency for planning and implementation to be fragmented in a number of ways - by discipline, organization, level of organization and by stage. Such fragmentation can easily prevent the integration that is necessary for a successful project."[20]

There is an urgent need for processes which integrate the efforts of separate contributions to a project. In an organization which is strongly differentiated yet largely interdependent, such as that found for construction projects, the key success is the quality and extent of the integrative effort provided by the managers of the organization. The root of project management should therefore be integration of the organization. This applies, whatever the organization structure is adopted. In any organization there will be someone or some group, responsible for managing the process. Conventionally, the architect both designed and managed. More recently, a project manager has frequently been appointed to manage the process. The manager's fundamental activity is integration. The integrative mechanisms designed into the organization structure will depend on the particular project and its environment.

The project manager is able to operate through the various functional managers in directing the resources which are involved in effectively carrying out a project. He can focus his attention to project goals rather than parochial functional goals, and he serves as an instrument for implementing decisions in terms of the same structure in which they are made, i.e. the system. In practice the project management structure is superimposed on the functional organization of the company or organization and provides a focal point for the decision making and execution phases of a particular project.

THE MATRIX ORGANIZATION

The use of 'horizontal organizations - project teams - which cut across the "vertical" functionally oriented traditional units is known in the literature of management as a matrix organization.[21] In matrix organizations one finds a management philosophy which dictates that the organization shall reflect major work relationships rather than traditional work alignments. This new organizational structure contains four major elements: functional support, project management, routine administration and research and development (strategic planning).

Functional support consists of facilitative technology provided for the organization by various groups. Project management is carried out by a set of managers acting as unifying agents for particular projects in respect to the current resources of time, funds, materials, people and technology. The project managers act as focal points for their project activities through an organization superimposed on the traditional functional organization structure. The project managers are in effect, the general managers of the organization for their particular projects. They actively participate in planning, organizing and controlling those major organizational and extra-organizational activities involved.

Routine administration involves the accommodating services provided for mission-related activities. The ability to attain goals and to solve problems in large complex organizations is often fragmented and diffused throughout the structure of the establishment. Such a diffusion makes it difficult to marshall organizational forces to deal with a problem or opportunity.

Often the term'project organization' is used to denote an interdisciplinary and interorganizational team pulled together for a specific task. Personnel are drawn from the hierarchically arranged units to perform a specific task; the organization is temporary

in nature, built around the task to be done rather than on the basis of functional homogeneity. When such a taskforce is assembled, a matrix organization is formed. This matrix organization includes the functional units and the teams of personnel assembled to accomplish the specific task. The matrix organization encompasses the complementary functional and project units.

The project manager accomplishes the project objectives by working with functional groups of the company and with outside organizations. The total project organization has no discrete boundaries; it is a complex structure that facilitates the coordination and integration of many project activities. The project manager shall be concerned with how the parent and outside organizations will be aligned to accomplish the multilateral objectives of the project. To achieve integration there must be flexibility. The need for flexibility and the way in which it naturally leads to a project concept are illustrated by an excerpt from a letter written by an aerospace company vice president to a government official

> "In order to sense and react quickly and to insure rapid decision-making lines of communication should be the shortest possible between all levels of the organization. People with the most knowledge must

> be available at the source of the problem, and they must have decision-making authority and responsibility. Meaningful data must be available on a timely basis and the organization must be structured to produce this environment.
>
> '.... initiative is essential at all levels of the organization' We try to press the level of decision making to the lowest possible rung of the managerial ladder. This type of decision-making provides motivation and permits recognition for the individual and the group at all levels. It stimulates action and breeds dedication. With this kind of encouragement, the organization can become a live thing - sensitive to problems and able to move in on them with much more speed and understanding than would be normally expected in a large operation. In this way we can regroup or reorganise easily as situations dictate and can quickly focus on a "crisis."[22]

ALTERNATIVE ORGANIZATION FORMS

At one extreme is the pure project organization, where the project manager is given full authority to run his project, at the other is the pure functional organization departmented on a traditional basis, reflecting the traditional hierarchy. In the middle lies an infinite variety of project - functional combinations - the matrix organization. Each of these forms has certain advantages and disadvantages. No one form is best for all projects, or even best for one throughout its entire lifetime. The essence of project

organization is versatility.

The pure functional organization provides flexibility in the use of manpower. Personnel can be used on many different projects; specialists can be grouped so that knowledge and experience gained on one project are transferred to another. The organization has a broad manpower base to work with, and a continuity exists in the functional disciplines procedures, and policies from one project to another. One disadvantage of the functional organization acting alone, however, is that it does not provide the emphasis necessary to accomplish project tasks. No one individual is responsible for the total project; there is no client/customer focal point. Since no one person functions as the "champion" of the project, responsibility will be difficult to pinpoint, coordination complex, response to client needs slow, and motivation and innovation decreased. Ideas may tend to be functionally oriented, and approaches to the management process will tend to perpertuate the functional organization without regard for ongoing projects.

The major advantage of the pure project organization is that it provides complete line authority over the project; the project participants work directly for the project manager.

The strongest disadvantage to this type of organization is that the cost in a multiproject company/organization would be prohibitive because a duplication of effort and facilities would be required among the projects.

A mixed project and functional structure, or matrix organization is desirable for producing large projects within desired cost, schedule and performance standards. The mixture can lie anywhere between the two extremes, the exact structure being determined by the particular task requirements. The matrix or mixed organization has many advantages.

The project is emphasised by designating one individual as the focal point for all matters pertaining to it. Utilization of manpower can be flexible because a reservoir of specialists is maintained in functional organizations. Specialised knowledge is available to all programmes on an equal basis. Representations to project needs and customer desires is generally faster because lines of communication are established and decision points are centralised. A better balance between time, cost, and performance can be obtained through the built-in checks and balances and the continuous negotiations carried on between the project and the functional organizations. Interfunctional competition tends to be minimised by the

intervention of the project manager.

INFORMATION SYSTEMS

A further option available to the designer of construction project organizations, according to Bennett, is the possibility of using information systems. The essential purposes of information systems are to filter the mass of data generated by construction projects in order to identify the relevant information and to direct it at appropriate times to the appropriate places within the project organization. In order to do this it is necessary for the work to be planned in order to establish targets and budgets against which actual performance can be monitored. In practice systems range from simple manually handled forms on which progress and cost data is recorded at regular intervals or as specified stages are reached. More sophisticated systems are mechnical data handling aids and the use of computers is now normal practice on very large complex projects and increasingly common on projects of even moderate size and complexity. The use of information systems tends to spread the data handling tasks more evenly throughout the project without necessarily in any way reducing the total volume of data. They also allow much of the work to be undertaken by specialists rather than

by managers. These effects are likely to substantially reduce the data handling demands made on managers and so allow them to concentrate on essential information and on making decisions.[23] The fact that information systems can be very expensive has to be balanced against these benefits in making a decision to use a particular approach. However the silicon chip and its use in small computers and automatic measuring devices allied to recent developments in information handling systems is rapidly reducing the cost of being well informed.

FOOTNOTES

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CHAPTER FOUR

THE CASE STUDIES

INTRODUCTION

This chapter sets out to describe how the government's (public) implementing organizations of building construction projects are organized and structured. The aim is to find out how effective these organizations set out to implement and manage building construction projects. The three organizations under study are the Ministry of Works, Housing and Physical Planning; the Municipal Council of Mombasa, and the National Housing Corporation.

An attempt is made to identify some of the factors, influencing the project implementation process. The roles of the departments concerned in the implementation process are examined. Case studies of projects implemented in each of the organizations have been examined with a view of identifying the organizations effectiveness in managing the projects. In the projects examined, an attempt has been made to investigate interdepartmental relationships in the project implementation process. The project participants' roles were examined to determine how they integrate to achieve harmony.

The author is strongly convinced that the present organizational structures, adopted by the public organizations implementing building construction projects, are not suitable for effective project management. The inappropriate structures are the root cause of project delays, cost escalation and bad work. The aim of this study is to find out a suitable management set up suitable for effective implementation.

CASE STUDY NO. 1

MINISTRY OF WORKS, HOUSING AND PHYSICAL PLANNING.

Organization and Functions

The Ministry of Works was established in 1963 when Kenya established internal self-government. Before that time, public works were carried out by the Public Works Department under the direction of the Commissioner of Works and subsequently the Director of Works.

Ministry's Responsibilities

The ministry is responsible for the management and direction of the Public Works of Kenya. It is responsible for rendering those

services required to obtain the clients' accommodation requirements, translate these into building designs and carry out the construction and subsequent maintenance of the buildings. These responsibilities include:-

(i) Advising on standards of design and construction of government buildings.

(ii) Providing client ministries with estimates of costs of buildings and structural works.

(iii) Preparing designs for projects by using either its own resources or those of consultants whom it will appoint as necessary.

(iv) Implementing the contractual procedures required to select contractors to carry out the works.

(v) Supervising the work of contractors on site and evaluating progress achieved.

(vi) Researching and developing various aspects of the construction process.

Treasury circular No. 5 of 7th May 1984 states that the ministry is responsible for advising on standards of design and construction of

government buildings and giving due weight to the need for economy in the level of finance involved. The Chief Architect being the adviser on all building matters will be solely responsible for determining the standards to which government buildings are constructed.

OTHER RELATED AGENCIES

Any ministry whose request for specified accommodation is accepted by the Buildings Department is thereafter a client ministry in the eyes of the Buildings Department. The Treasury is responsible for approving the expenditure incurred by all government ministries. The Ministry of Works does not proceed with the design of any building which has not had prior Treasury approval. This approval is sought by the client ministry. The Ministry of Lands is responsible for obtaining all land required for government building projects.

DEPARTMENTAL ORGANIZATION

The Building Department came into being in January 1970 when the Buildings, Structural, Electrical and Contracts & Quantity Surveying branches were incorporated in one department under the direction of the head of the former Buildings

Branch, the Chief Architect. The former Ministry of Works composed the Roads Branch and the Buildings Branch. Since 1970 the Buildings Department has evolved to become the present Ministry of Works, Housing and Physical Planning. Figure 4:1 on page 113 shows the Ministry of Works organization chart as at April 1975. Figure 4:2 on page 114 is the Buildings Department Organization Chart with the Chief Architect as the Departmental Head.

The Chief Architect was responsible to the Engineer-in-chief for the following:

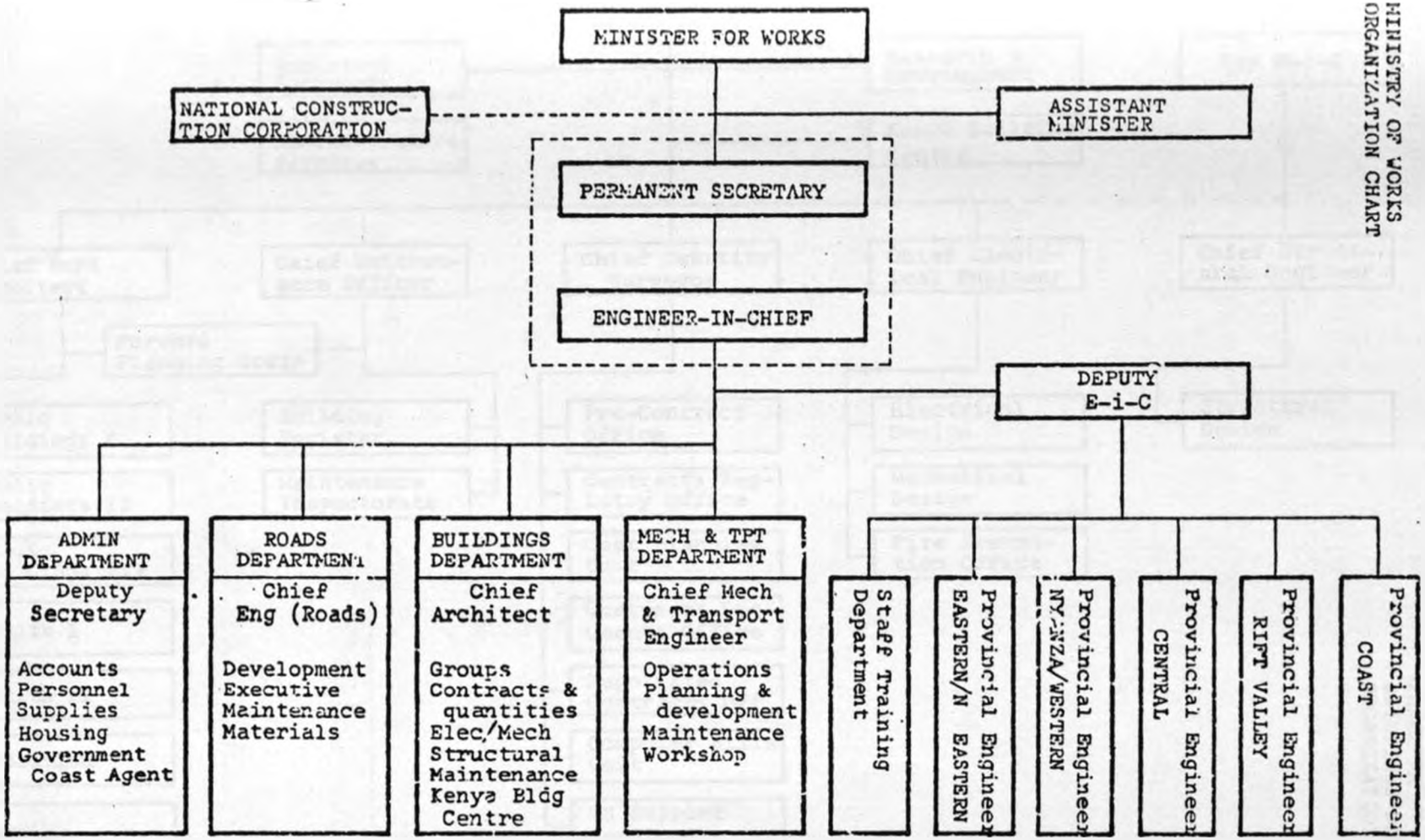
(a) Formulation of policies affecting the department and promulgation and administration of such policies when approved.

(b) Direction of the technical and administrative activities related to the implementation of development and maintenance works.

(c) Career planning and promotion of personnel in the department.

(d) Compilation of the departments' annual development and recurrent estimates of expenditure.

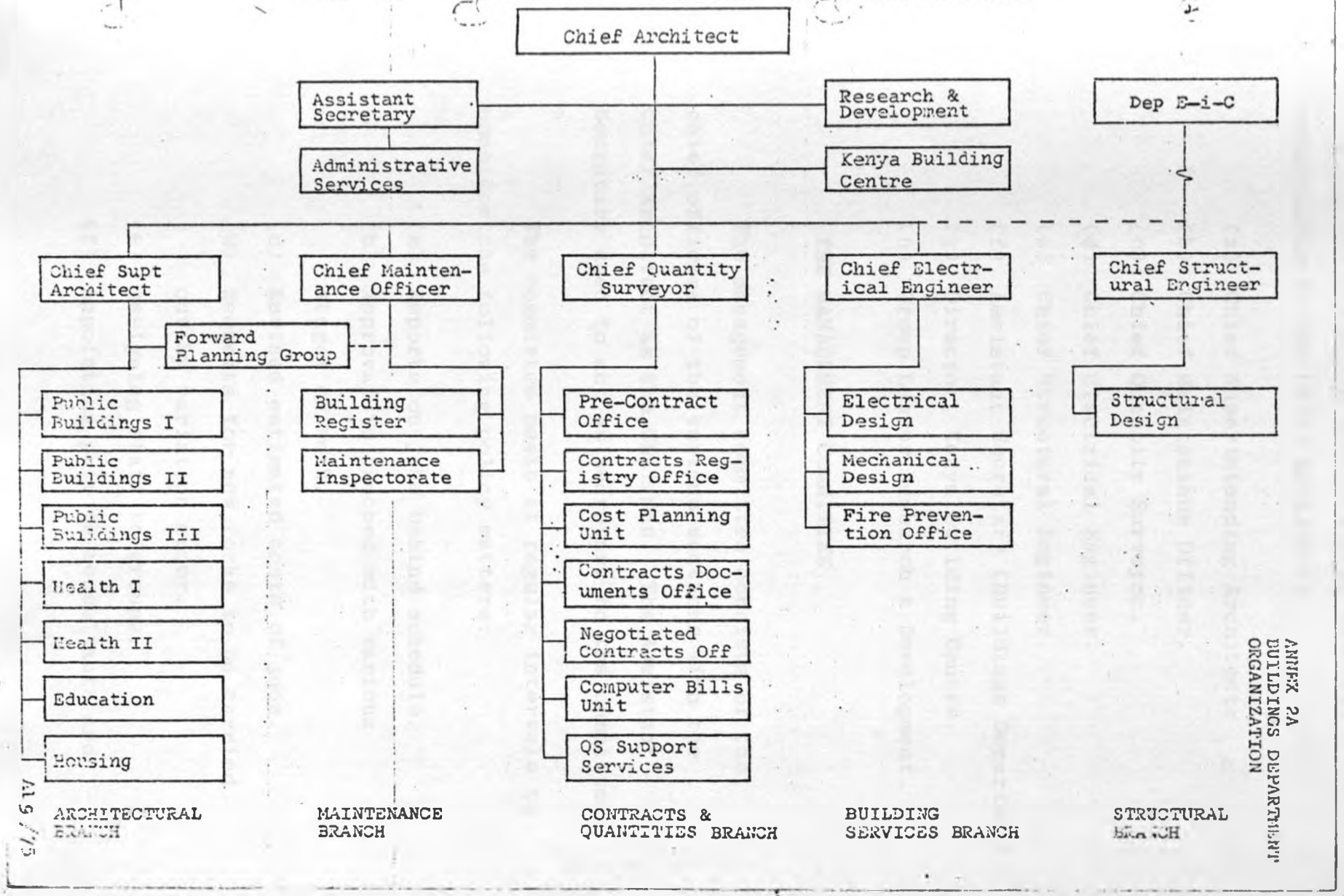
Fig. 4:1 MINISTRY OF WORKS ORGANIZATION CHART



Source: Ministry of Works.

AL 4/75

Fig. 4:2 BUILDINGS DEPARTMENT ORGANIZATION CHART



ANNEX 2A
BUILDINGS DEPARTMENT
ORGANIZATION

Source: Ministry of Works

The following officers were directly responsible to the Chief Architect:

(a) Chief Superintending Architect.
(b) Chief Maintenance Officer.
(c) Chief Quantity Surveyor.
(d) Chief Electrical Engineer.
(e) Chief Structural Engineer.
(f) Assistant Secretary (Buildings Department).
(g) Director, Kenya Building Centre.
(h) Group Leader Research & Development.

THE MANAGEMENT COMMITTEE

The management committee consists of the chief officers of the various sections with the Chief Architect as the Chairman. The Assistant Secretary used to act as secretary to the committee.

The committee meets at regular intervals to consider the following policy matters:

(a) Reports on jobs behind schedule.
(b) Approval to proceed with various stages of work.
(c) Revised estimated costs of jobs.
(d) Requests for new rorks to be carried out by variation order.
(e) Assigning staff to groups.
(f) Appointing private consultants and

clerks of works.

(g) Approval of research and development projects.

(h) Other matters of policy which may arise from time to time.

Any urgent matters of policy were referred immediately to the Chief Architect for decision.

Development projects for which the design is to be carried out in the headquarters are handled by the Architectural Branch which is divided into Design Groups. A group consists of a Group Leader, Project Architects, Architectural Assistants, Clerical staff and any other professional or technical staff which the management committee may from time to time assign. In principle groups function as interdisciplinary teams. Where possible all jobs for a given client ministry are handled by one and only one group. This facilitates liaison with the client ministries. A group is responsible for the day-to-day running of all stages of its jobs, including contract administration. Jobs are normally run by job teams under the direction of the group leader.

All the specialized branch chiefs were responsible to the Chief Architect. The Forward Planning group assists design group leaders and

Provincial Architects in planning and monitoring the implementation of the Annual Works programme, i.e. identifying, scheduling and monitoring the physical and financial progress of all jobs carried out by each design group and provincial architects. The group provides feed-back information about jobs on the programme to the relevant officers both in the Ministry of Works and in client ministries. This involved recommending corrective action required to minimize the difference between the actual progress of jobs and their planned progress. The group maintains close liaison with the planning officers of the client ministries in conjunction with the responsible group leader. The Forward Planning Group is directed by a Senior Building Development Officer (Planning Officer I) who reports to the Chief Superintending Architect (Development) and the Chief Maintenance Officer about their respective works programmes. For personnel administration purposes, the Forward Planning Group (FPG) comes under the Architectural Branch.

As the head of the department the Chief Architect is at a higher hierarchical position both remuneratively and in terms of administration. The other chief officers are placed subordinate to him. Irrespective of knowledge and experience, the Architect is always the group leader within the

operational groups as stated in the Building Organization and Operational Manual (BOOM) which guides the operations of the ministry.

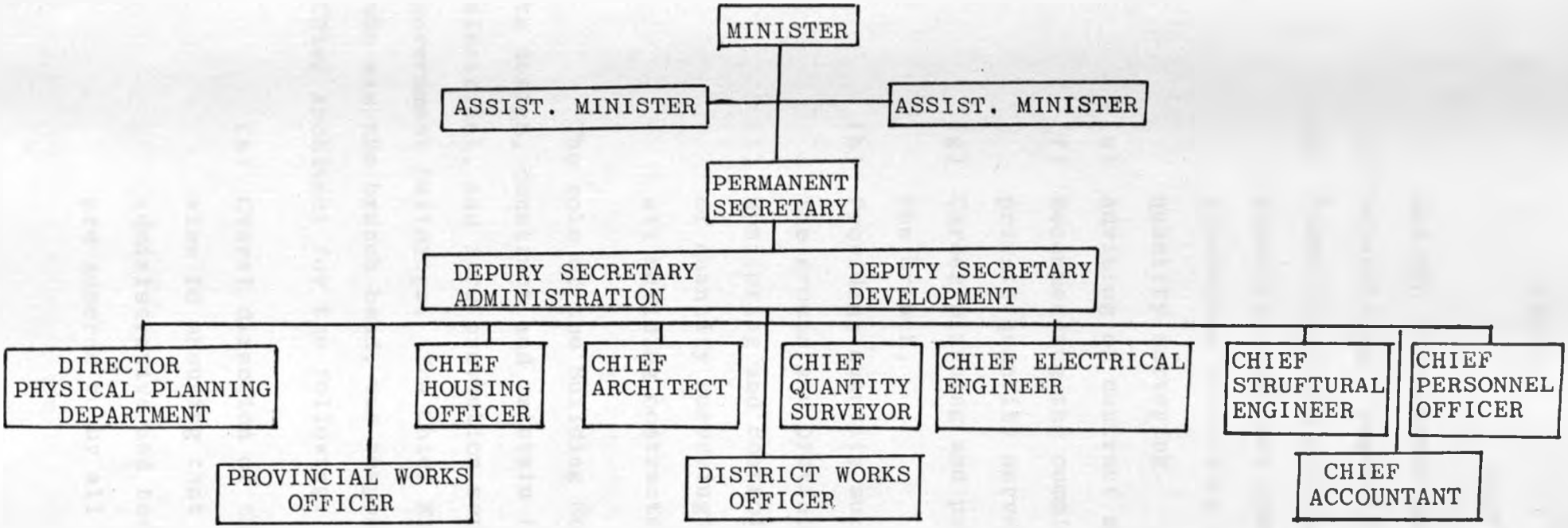
During the time of the study, the organization structure of the Ministry of Works, Housing and Physical Planning was as shown in Figure 4:3 on page 119. All departmental heads (chief officers) were now reporting directly to the Permanent Secretary, who is the ministry's accounting officer. Prior to this, all the other chief officers were branch heads reporting and being responsible of their sections (branches) to the Chief Architect who was the Departmental head.

The role of the Contracts and Quantity Surveying branch was to tender and administer the acceptance of development and recurrent works contracts and to provide quantity surveying services related to such contracts. In particular the Chief Quantity Surveyor was responsible to the Chief Architect for the following:

(a) Overall direction of the branch with a view to ensuring that proper contracts and tendering procedures are used throughout the department and provinces.

(b) Advising on all matters concerning the invitation and acceptance of tenders

Fig. 4:3 MINISTRY OF WORKS ORGANIZATION STRUCTURE



Source: Ministry of Works

and the administration of contracts.

(c) Maintaining a register of contracts.

(d) Formulation and promulgation of administrative and operational procedures concerning contracts and quantity surveying.

(e) Advising on contract and legal matters.

(f) Recommending the commissioning of private quantity surveyor consultants.

(g) Career planning and promotion within the branch.

(h) Providing quantity surveying staff for the groups and provinces.

(i) Monitoring and controlling standards of quantity surveying work related to all building contracts.

The role of the Building Services branch was to design, construct and maintain the mechanical, electrical, and fire prevention services in government buildings. The Chief Electrical Engineer, who was the branch head, was responsible to the Chief Architect for the following:

(a) Overal direction of the branch with a view to ensuring that the proper administrative and technical procedures are adhered to by all personnel.

(b) Monitoring and controlling the standards of electrical and mechanical engineering design carried out on all government building works.

(c) Formulation and promulgation of administrative and operational procedures concerning the design, construction, and maintenance of building engineering services.

(d) Advising on fire safety and fire prevention standards.

(e) Recommending the commissioning of private electrical/mechanical consultants, and monitoring the standard and quality of electrical/ mechanical services design input to buildings by the consultants.

(f) Career planning training and promotion within the branch.

(g) Providing electrical/mechanical services, design, supervision of construction, and maintenance to the design groups and provincial engineers as required.

(h) Approving electrical/mechanical drawings at final state of preparation.

(i) Liaison with East African Power & Lighting Company, (KP&L Co.), Ministry of Energy, Ministry of Labour and Local

authorities regarding statutory aspects of electrical/mechanical services.

The role of the structural branch is to provide structural designs and specifications for government buildings, including drainage and sewarage disposal facilities, and for those marine and bridge works which fall within the responsibility of the Ministry of Works.

The Chief Structural Engineer was, previously responsible to the Deputy Engineer-in-chief, and subsequently to the Chief Architect after the formation of the new Ministry of Works Housing and Physical Planning, for the following:

(a) Overall direction of the branch with a view to ensuring that the proper administrative and technical procedures are adhered to by all personnel.

(b) Monitoring and controlling the standards of structural engineering design carried out for all government building works.

(c) Formulation and promulgation of all administrative and operational procedures concerning all aspects of structural design.

(d) Recommending the commissioning of private structural engineering consultants.

(e) Career planning and promotion within the branch.

(f) Approving structural drawings at final stage of preparation.

There were a number of functional units under the chief architect which did not fall under any branches mentioned above. These were the Assistant secretary, Research and Development group, Forward Planning group and the Kenya Building Centre.

The Assistant secretary was responsible to the chief architect for:

(a) Direction of the department's adminstrative procedures as defined in the Code of Regulations.

(b) Acting as secretary to all meetings held by the Project Committee, Management Committee and the registration of contractors committee.

(c) Co-ordination of departmental personnel matters, including the planning of manpower requirements.

(d) Preparation and amendment of the departments' Annual Recurrent Estimates.

The Group Leader, Research and Development is responsible to the chief architect for co-ordinating the updating and promulgation of

amendments of the Buildings Organization and Operations Manual (BOOM).

The Forward Planning group reports to the chief architect and the primary objectives of the group are:

(a) Assisting Design Group Leaders and Provincial Works Officers, in planning and monitoring the implementation of the Annual Works Programme, i.e. identifying, scheduling and monitoring the physical and financial progress of all jobs carried out by each Design Group and Provincial Works Officer.

(b) Providing feed-back information about jobs on the programme to the relevant officers both in the Ministry of Works and in client ministries. This involves recommending corrective action required to minimize the difference between the actual progress of jobs and their planned progress.

(c) Maintaining close liaison with the planning officers of the client ministries in conjunction with the responsible group leader.

(d) Assiting in the preparation and

amendment of the Annual Development and Recurrent Estimates for the relevant portions of the Ministry of Works Vote.

(e) Assisting in the administration ofthe funding of jobs voted in the Ministry of Works Vote.

The primary objective of the Kenya Building Centre is to provide information to the public on matters pertaining to the construction industry.

With the new arrangement of departmental heads reporting directly to the Permanent Secretary as depicted in figure 4:3 things changed substantially in the organization of the ministry. All the sections under the chief architect, became independent and were responsible to the Permanent Secretary for their functional obligations. As at the time of the study, the Ministry of Works, Housing and Physical Planning had assumed a functional organization.

The functional arrangement has several shortcomings. The very nature of assigning organizational work to functional units carried with it the opportunity for sub-optimization and a failure to assume a total-system approach. Functional units will tend to seek solutions and identify problems

in terms of the scope of duties of particular units rather than looking beyond them.

The functional structure forms the traditional management pyramid, with the only focal point of power binding the organization together being the top management. Critical decisions are referred to the Permanent Secretary. This leads to delays as there is lack of delegation. The permanent Secretary is vested with too much responsibility. He has to decide on professional matters and also deal with the administration of the ministry.

The functional structure is best suited to the handling of a continuous flow of basically repetitive work, with each department working on its own function. This is the situation in the typical factory department or office. Unfortunately this traditional form of organization does not handle projects efficiently, tends not to meet schedules and is operations oriented and not project or goal oriented. There are severe difficulties involved in achieving effective communication, collaboration, co-ordination and control with several different functional departments involved in a project with this form of organization. The differences in activity, philosophy, education, training and

personal values also tend to increase the likelihood of conflict and misunderstanding between functions when engaged, in project work under time and cost pressures.

Organizations with functional arrangements reflect some weaknesses as follows:

1. They tend to emphasize the separate functional elements, at the expense of the whole organization.
2. Under functional departmentation, there is no group that effectively integrates the various functions of an organization and monitors them from the "big picture standpoint.
3. Functional organizations do not tend to develop "general managers."
4. They emphasize functional relationships based on the vertical organizational hierarchy.
5. They tend to fragment other management processes.
6. They tend to be closed systems and develop a strong resistance to change.
7. Functional segregation through the formal organization process encourages conflict

among various functions.

8. The emphasis on the various operating functions focuses attention on the internal aspects and relations of the company (organization) to the detriment of its external relations.

PROJECT ORGANIZATION

Research carried out on the management styles adopted by these organizations in implementing their projects was found to be adequate.

(To avoid breach of confidence, the names and identities of those interviewed will not be disclosed in this study).

The Ministry of Works acts as a service ministry to all government ministries by planning, designing and supervising the construction of all government building projects. This is done through the Departmental Representative (DR) who is responsible for the technical aspects of the construction process. The DR may be appointed internally or could be a consultant appointed from outside to oversee the construction of the project on behalf of the ministry. The DR acts in the interests of the client. The project team is

responsible to him on all matters pertaining to the project. All communication regarding the execution of the project is done through him. He has the responsibility of integrating and co-ordinating all the project participants. More specifically the DR shall:-

(a) Monitor the contractor's progress during the currency of the contract and maintain a check on all matters of progress and quality.

(b) Issue prompt instructions to the contractor to remedy default.

(c) Investigate persistent defaults so as to reasonably establish whether in spite of all other provisions in the contract relating to the contract period, the contractor's actions amount to default.

(d) Consult with the chief architect and chief quantity surveyor to establish the Ministry of Works attitude to the situation.

If the contractor fails to take sustained action to remedy a default notified to him verbally, by site meeting minute or site instruction, the DR after consultation with the chief architect, may

issue a formal letter giving notice under clause 27 of the contract agreement. This notice may be signed by the DR and must be despatched by registered post.

PROJECT ONE

As mentioned earlier in chapter one, this project was considered suitable and relevant for analysis due to the fact that the project participants were still working in the organization and could be available for interviewing by the researcher in order to give their views and opinions concerning the project. The availability of detailed data on the project also made it suitable for study. During preliminary discussions between the researcher and the project participants, it was pointed out to the researcher that, this project is one among many they have come across with similar problems. According to them, if there were any differences in the projects they have handled, these would be a matter of degree but essentially they were the same, i.e. if there were any delays then the difference would be the periods of delay but the causes of the delays were the same or similar in the majority of projects.

This project was for the provision of housing for an Agricultural Research Station.

Actual project planning started in November 1978. The client for this project was the then Ministry of Livestock Development. The Permanent Secretary of the client ministry accepted a tender of Ksh. 2,170,000/- on 10th November 1980, by signing the acceptance letter. The Provincial Works Officer/ Coast Province, Mombasa, was appointed the DR (Departmental Representative). The duration of the project was 50 weeks and completion was to be 18th December 1981. The contractor was instructed to communicate with the Provincial Works Officer/DR, on all matters concerning the contract. The project team members comprised the Provincial Architect, Provincial Quantity Surveyor, Provincial Building Surveyor, Provincial Electrical Engineer, Provincial Maintenance Surveyor and the Provincial Structural Engineer. All these professionals headed their sections in the province respectively, i.e. The Architectural section, Contracts and Quantities section, Forward Planning section, Electrical and Mechanical section, Maintenance section and the Structural section. All these sections were housed within the same building.

It is important to note that on 24.2.1981 the Project Quantity Surveyor (Mombasa) found it necessary to write to the Provincial Electrical Engineer and asked him whether he or the Chief

Electrical Engineer, in the ministry's headquarters Nairobi, would deal with the electrical part of the project. As at March 1981 the project was only 8% complete. Tenders for the electrical works were eventually opened on 6.3.81. The site was handed over to the contractor by the DR on 31st December 1980. Therefore completion date would be 18th December 1981. It will be seen here that the electrical part of the contract was delayed for 3½ months before tenders were called. The contractor listed this as one of the reasons why he could not proceed with certain stages of the contract i.e. building works. After tender opening of the electrical works on 6.3.81, the recommendations, of the DR, were sent to the Chief Architect in Nairobi for acceptance. This led to further delay as the Chief Architect would then (as is the procedure) pass the tender documents to the Chief Electrical Engineer for scrutiny. The Chief Electrical Engineer agreed with the recommendations of the Provincial Electrical Engineer and requested the Chief Architect to accept the recommendations of the Provincial Electrical Engineer.

The splitting of roles between the headquarters and the project team leads us to conclude that the departmental chiefs in the ministry's headquarters do not trust their professional officers dealing with

the project, otherwise the case of sending recommendations to headquarters for approval would not arise. When asked by the researcher on what the DR and the Electrical Engineer thought of this issue, they indicated that this was a time wasting requirement as in most cases the headquarters accepted the recommendations without any amendments in a rubber stamp fashion. They argued that the criteria for appointing a contractor were the same as laid down in the regulations. Here we see that the headquarters was performing the same roles as the PWO/DR and his team on the same project resulting to duplication and time wasting and thus contributing to cost escalation. The electrical sub-contractor was finally appointed on 22nd September 1981 approximately six months later after tenders were opened by the DR for the same.

In week 54 out of the 50 weeks contract period only 29% of the work had been completed. The clients representative at this stage, (on 23rd January 1982) complained of the excessive delay in the project. The DR then informed the clients representative that the situation on site cannot be assessed due to lack of transport. The project architect finally managed to visit the site on 8th February 1982. The DR then informed the chief architect that the project had been at standstill

since November 1981 upto 17th February 1982. Due to non-payment, by the client ministry, the contractor had abandoned the site at 29% completion on site. The Permanent Secretary (MOW) wrote to the Permanent Secretary (Livestock Development) stating that a payment certificate was prepared and submitted to them for payment on November 1981 but had not been honoured as at 10th February 1932 and as a result the contractor deserted site. On 17.3.82 the chief architect instructed the PWO/DR to serve the contractor with a default notice if he (contractor) got payments in time. On 8th April 1982 the contractor applied for extension of time for the project which was supposed to have been completed in 31st December 1981. The reasons given by the contractor for requesting for an extension of time were that the delayed appointment of the electrical contractor delayed his progress on the building works and that non-payment by the client ministry made him suspend work and desert the site. The first payment certificate due to the contractor was delayed for 16 weeks, the second 20 weeks and the 3rd payment took 18 weeks to be honoured. These reasons were found to be valid by the DR and the contract was extended to 9th September 1982. After 107 weeks only 40% of the work had been completed. On 16.6.1982 the chief architect wrote to the PWO/DR telling him to make sure that the works are

completed by 9.9.82. In turn, on 5.7.82 approximately a month later, the PWO/DR wrote to the officer-in-charge Kilindini Depot (clerk of works) stating that the client representative was complaining that the job was at a standstill but he (DR) could not prove it without Site Weekly Reports. One would be right to say that the DR at this stage had lost control of the project and did not know what was happening. The contractor requested for extension of the contract on 14.10.82 and the PWO/DR recommended for extension upto 9.3.83. The chief architect advised the PWO that the 3rd request for extension of time does not give a good reason and adviced that the contract be determined if necessary. Eventually the contractor was issued the 1st warning to improve work on 21.7.83 by the DR. In October 1983 the contractor was issued with a default notice but he still pleaded for extension of time. On 30.11.83 it was established that the payments were delayed for 31 weeks, and on 3.1.84 the DR recommended for the 3rd extension of time upto 31st March 1984. On 28.5.84 the PS (MOW) requested the PS client ministry to state when they honoured the 8th payment voucher before action could be taken against the contractor who had already defaulted. On 22.11.84 the DR (PWO) requested the CA to inform on the payment issue. On 7.1.85 the chief architect requested the PWO (DR) to expedite action and state what has been done

to implement the project so far. He stated that the client maintained that there was no payment voucher which had not been honoured. The DR asked the CA to confirm when the voucher was actually paid. As a result of this request the Permanent Secretary (MOW) wrote to the client ministry asking them to state when they actually paid the voucher. This was on 11.2.85. He stated that they could not determine the contract, if they still owed money to the contractor. On 20.2.85 the contractor was issued with a default notice according to clause 27 of the contract agreement. (This was the second time the same notice was issued. The other one was on 9th October 1983). On 22.2.85 the client stated that voucher no. 8 was honoured on 20.6.84, but due to the closure of the Financial Year,the cheques were not released until July 1984.

There was a third extension of contract period upto 31st March 1984. On 24.7.1985, the Chief Architect instructed the Provincial Works Officer to hasten the determination of the contract and eventually the contract was determined on 24th September 1985. On 24th October 1985 the PS (MOW) requested the PWO to finalise arrangements to call tenders, to complete the project. On 12.11.85 the PWO/DR requested the Provincial Quantity Surveyor (Project QS) to discuss the issue with him. The note

(in file), requesting the Project QS to discuss the matter with PWO (Project Architect), was marked to the Project QS on 7.2.86. The researcher was at this time conducting the study.

PROJECT PERFORMANCE

To determine the success of the management of this project, we have to look at its performance on time, cost and quality. The project commenced on 31st December 1980; a duration of 50 weeks. As at February 1986 the project was only 40% complete and was to be re-tendered for completion. With the rise of the costs of construction one would say with certainty that the final cost will exceed the original cost. The quality of the product is purely a subjective matter. In this case we cannot comment on the quality since it was still incomplete as at the time of the study.

The conclusion to be drawn here, on the major cause of failure of the project was that the organizational set up of the implementors was not conducive to make it possible to manage the project effectively. From the start there was uncertainty concerning the roles of the project participants. A case in point here is where the Project QS had to ask the Provincial Electrical

Engineer whether he was dealing with the electrical part of the project. The DR should have known who is dealing with what in this project. This should have been cleared in a project review meeting or a site meeting. Even after electrical tenders were opened by the DR, the same had to be sent (by post) to the Chief Architect for approval. The problem here is the communication process involved. After the CA received them, he passed them over to the Chief Electrical Engineer for scrutiny. This takes time as everything has to be handed over with a covering letter. The Chief Electrical Engineer then in turn handed them back to CA with a recommendation to accept. To cut the red tape the Provincial Electrical Engineer should, and is professionally able to, advise the DR and accept the suitable contractor.

When the client ministry failed to pay the contractor, the DR could not be able to do anything about it. On the other hand the Chief Architect was ordering the DR to serve the contractor with a default notice without knowing what problems the project was experiencing. It was stated that all matters relating to the project should be addressed to the DR. Here we see interference and mistrust from the headquarters, specifically from the Chief

Architect, in form of directives to the DR. The DR through his letter to the Clerk of Works, showed that he was out of touch with the site. In effect he did not know what was happening. He expected to know the position on site by communication in writing from the clerk of works. He only did this after the client complained that the project was at a standstill. This is a very unreliable method of managing a project. If he received misleading reports from the site, as is the case in many instances, he would make the wrong decisions.

There was confusion on whether the contractor was paid or not. The issue on payments started on February 1982. Communication on the issue went on between the DR, the Chief Architect, the Permanent Secretary (MOW) and then onto the PS client ministry. It was after two months that the Chief Architect got an answer from the client ministry regarding the issue. Meanwhile nothing could be done against the contractor. This long communication process caused a big lag of vital information to the DR. At times neither the PS, CA nor the DR (PWO) knew whether the contractor was paid by the client ministry or not. This delay could be solved by giving the DR authority to write to the client ministry directly and save time. If, as the person handling the project, he does not know whether the client has

paid the contractor or not, there is little chance that the CA or the PS (MOW) would know. This is why eventually the PS (MOW) had to write to PS Livestock Development requesting for this vital information. This led to the issuing of a default notice to the contractor twice, because the first one was invalid. Due to the delay in acertaining the payment issue the first default notice was issued on 19th Oct. 1983 while the second one, for the same reasons, was issued on 20th February 1985.

There were also communication problems within the project participants. These people are housed in the same building and the same corridor. A case in point was where on 12.11.85 the PWO (Project Architect) requested the Project Quantity Surveyor to discuss the issue of retendering with him. The note requesting the Project QS to discuss with the Project Architect was marked, on file, to the QS on 7.2.1986, a delay of more than three months. This was cited by those interviewed as one of the major causes of project delays because critical decisions could not be made in time due to the fact that correspondence could take abnormally long periods before reaching the recipients.

It was found that the DR did not have a

freehand in the management of the project. Critical decisions concerning the project could not be made by the DR. He still had to ask for approval from headquarters. This is shown by the fact that the decision to terminate the contract had to come from the Chief Architect as an instruction. The project participants were acting in their own functional lines and there was no unit to integrate all of them for the common purpose of implementing the project hence the calling of electrical tenders way after the building contract period had expired and was to be extended. The electrical engineer complained that in very many cases, like this one, he is informed that a particular project was on-going and that his services were required, only after the projects were sometimes half way complete.

There was nothing the DR could do to force the client ministry honour the certificates to pay the contractor.

PROJECT NO. 2

This project was an extension to a Health Centre costing Ksh. 1,994,142/50. The site was handed over to the contractor on 15.2.80 and the completion date was to be 15th October 1980, a contract duration of 40 weeks. The DR was the

Provincial Works Officer/Coast (Mombasa) while the Project Architect was from the ministry's headquarters in Nairobi. The Project Quantity Surveyor was also based in the Chief Quantity Surveyor's office in Nairobi. The project electrical engineer was based at the Provincial Works Officer's (DR's) office in Mombasa.

The location of the project participants in this project is different from the first one. In this case most of the project participants are based in Nairobi. However the project was controlled and managed by the DR based at the Province in Mombasa. The DR scheduled the first meeting to take place on 25.4.80. This never took place. The project participants from Nairobi claimed that they received the invitations one week after the site meeting was supposed to take place. The second site meeting scheduled by the DR to take place on 4.7.80 was postponed due to lack of quorum. On 1.8.80 the DR scheduled a site meeting for 19.8.80. Upto this time every project participant would go to site with the contractor, assess his part and go. The project architect would travel from Nairobi come and inspect the site and then go back. They would then issue site instructions, which would in turn be posted to the DR (Mombasa) for signing.

At first the projects progress was satisfactory, but as at 31st October 1980, when the contract period had expired only 60% of the work had been completed. The delay was attributed to the late appointment of the electrical sub-contractor on time and the extra works added. Every time the project architect came to site when the DR was not present, he would issue instructions to the contractor. The contractor would then have to wait for them to be endosed by the DR. Due to these delays the contract period was extended to 6th April 1981. The supervision of plumbing and drainage works was done by an engineer based at the ministry's headquarters. The project could not be finalised on time due to the failure to issue the necessary site instructions on time.

When we look at the composition of the project participants we see that they were scattered and did not form one group. The DR was at the Provincial headquarters Mombasa, where the project is located, while the project architect was at the headquarters in Nairobi. The project quantity surveyor and the drainage engineer also came from Nairobi while the electrical engineer was based in Mombasa. In this case the DR had a problem in co-ordinating the project participants. Quite often there was lack of quorum in site meetings

arranged by the DR. Vital decisions could, therefore, not be taken on time and some were made in time and some were made in isolation of others as the project participants went to site on their own time and made their decisions independently. Payment certificates were prepared by the project QS in HQ, then sent to the DR in Mombasa for endorsement hence making the payment process too long. At the time of the study, the final payment had not been prepared due to difficulties of ascertaining the cost of variation orders issued by the project architect in Nairobi and the DR in Mombasa. The DR was also an architect by profession and was issuing site instructions when he visited the site on inspection tours. The conflicting roles between the DR in Mombasa and the project architect in Nairobi caused friction and misunderstanding. The two ended up surpassing the amount allowed in the contract. Additions added to the contract made the work cost Ksh.2.3 million. Due to additions to building works, it became necessary to add electrical works. The electrical engineer in Mombasa could not issue the necessary instructions because he had been instructed by the chief electrical engineer not to issue instructions for any additional work without first getting approval from him. This approval took a long time to come due to the red tape in the communication process.

The two projects have experienced or suffered from the major disadvantages of organizations with functional structures. There was no group responsible for the integration of project participants. The Permanent Secretaries of both the client ministry and the implementing ministry were too far up in the ministries hierarchy, that they were removed from the problems affecting the projects. Their communication regarding the projects, in fact, made matters worse. From the problems experienced in the two projects, it is right and fitting to say that the organization structure is the root cause of the project failures.

CASE STUDY NO. 2

ORGANIZATION OF THE MUNICIPAL COUNCIL OF MOMBASA

Legal Status

Before analysing project data, it is necessary to highlight the legal status of the council and the duties and powers of its officers.

The Local Government Act Cap 265 commenced on 30.4.1963.[1] This is an Act of Parliament for the establishment of authorities for local government to define their functions and to provide for matters connected therewith and incidental thereto. Section 12(1) states that

> "for every municipality there shall be a municipal council established under Cap 265, and every municipal council shall consist of such number of councillors as may be elected, nominated or appointed under section 26."

Section 12(3) states that

> "every municipal council shall under the name of 'The Municipal Council of.....' be, each and severally, a body corporate with perpertual succession and a common seal (with power to alter such seal from time to time) and shall by such a name be capable in law of suing and being sued and of acquiring, holding and alienating land."

Section 73 deals with meetings and proceedings. The chairman in any meeting is the Mayor. If the chairman does not hold meetings as requested by the councillors, the Town Clerk can hold and chair such meetings.

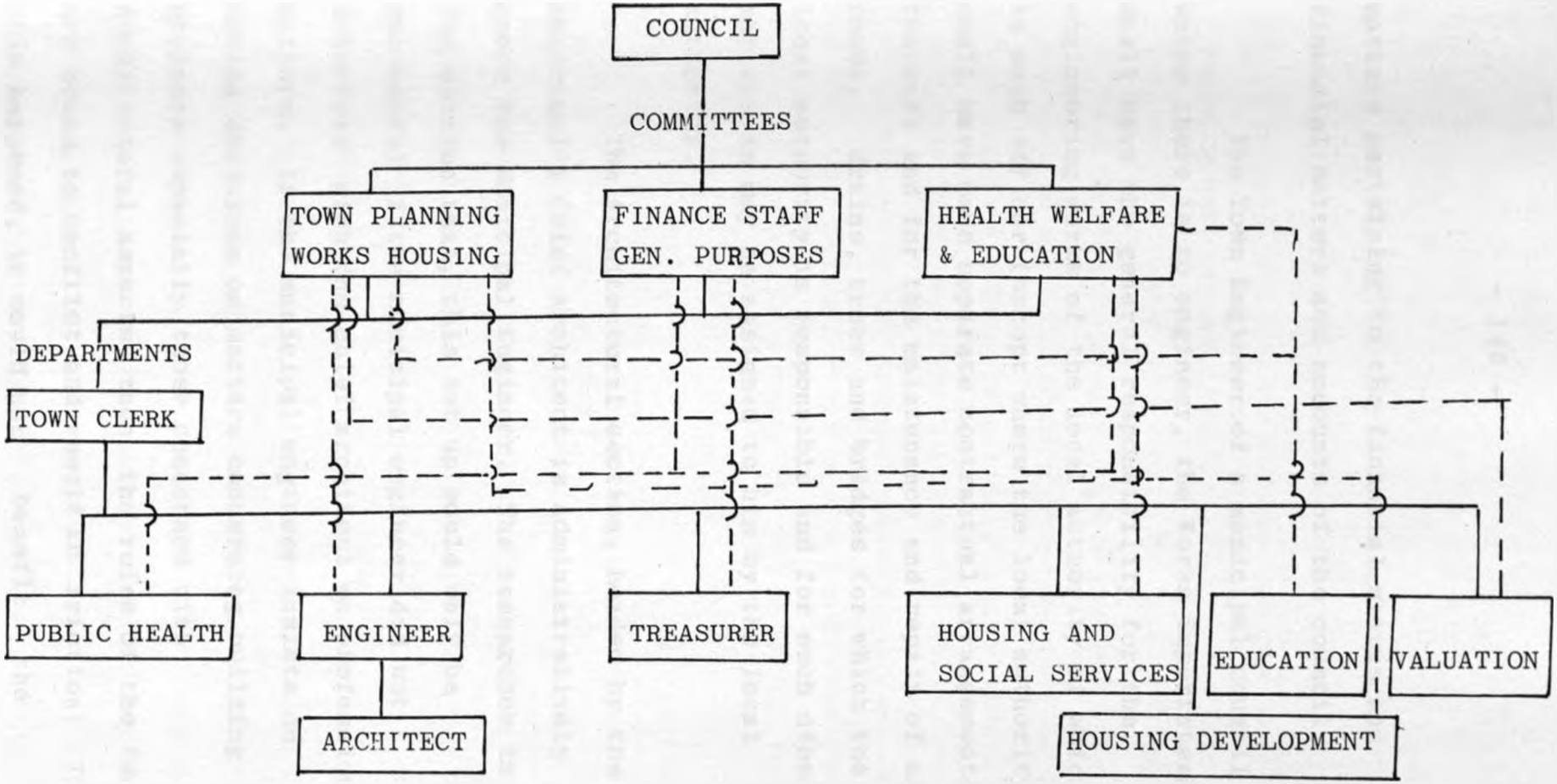
Part V1 deals with committees. Section 91(1) authorises the local authority to appoint a committee for any such general or special purpose as in its opinion would be better regulated and managed by means of a committee and may delegate to a committee so appointed, with or without restrictions or conditions as the local authority thinks fit, any function exerciseable by the local authority either with respect to the whole or any part of the area under the jurisdiction of the local authority, except the power of levying a rate or borrowing money or of making by-laws.

STATUS AND DUTIES OF CERTAIN OFFICERS

Fig. No. 4:4 on page 148 shows the organization chart of the municipal council of Mombasa. The Town Clerk is the chief executive and administrative officer and has the general responsibility of co-ordinating the whole of the work of the local authority. The Town Treasurer is the chief financial advisor to the council and all

Fig. 4:4 MUNICIPAL COUNCIL OF MOMBASA ORGANIZATION CHART

COUNCIL COMMITTEES AND DEPARTMENTAL STRUCTURE



KEY:

——— Direct line of accountability

- - - - Indirect line of accountability.

Source: Municipal Council of Mombasa

matters pertaining to the financial status and financial matters and accounts of the council.

The Town Engineer of a municipal council or where there is no engineer, the Works Superintendent shall have the general responsibility for the engineering works of the local authority of which he is such officer (except where the local authority shall have made separate contractual arrangements thereof) and for the maintenance and repair of all roads, drains, trees and bridges for which the local authority is responsible and for such other matters as may be assigned to him by the local authority.

The Architectural section, headed by the municipal's Chief Architect is administratively under the Municipal Engineer. The researcher is of the opinion that, this set up would only be successful if the municipal engineer did not interfere with the chief architect on professional matters. If the municipal engineer insists on making decisions on matters concerning building projects especially those concerned with Architectural aspects, then the roles of the two are bound to conflict and result in friction. If this happened, it would not benefit the project.

The Town Clerk shall be responsible for convening all meetings of the local authority and its committees and sub-committees and for the preparation of agenda, minutes and reports of committees and sub-committees. He shall advise the local authority and its committees and sub-committees on all matters upon which his advice is necessary, including the standing orders thereof and local government legislation. He shall, either personally or by his nominee attend all meetings of the local authority and of its committees and sub-committees. He advises the Mayor on all matters pertaining to council officers. Subject to any general directions which the local authority may give he shall have the charge and custody of, and be responsible for all charters, deeds, records and other documents belonging to the local authority which shall be kept as the local authority may direct. He shall have the duty of ensuring that the business of the local authority is carried out with order, regularity and expedition in accordance with the by-laws, regulations, resolutions and standing orders of the local authority. He shall have the responsibility for the general correspondence of the local authority. Where any document will be a necessary step in legal proceedings on behalf of the local authority, he shall sign such document

unless any written law otherwise requires or authorises, or the local authority shall have given the necessary authority to some other person for the purpose of such proceedings. He conducts negotiations on behalf of the authority. He has the responsibility for convening decisions of the local authority to officers of the local authority relating to their work and conduct.

Standing Orders

All contracts must comply with standing orders 31 and 38,[2] i.e. every contract whether made by the council or a committee to which the power of making contracts has been delegated shall comply with section 143 of the Act. Tender will only be accepted by the consent of the minister. Every contract shall have a cancellation clause empowering the council to cancel the contract and to recover from the contractor the amount of any loss resulting from such cancellation.

The requirement that every tender must be signed by the minister can lead to project delays and cost escalation. This can be the case where the council has to ask the contractor to extend the validity period of their tender before the minister signs it. In most cases the validity is extended

on condition that there is an adjustment to include the increase in costs due to increased prices of materials.

To determine the managerial effectiveness as influenced by the structural organization of the council, one project, handled by the municipal engineer, is analysed and the second project had been undertaken by the director leading the Housing Development Department of the Municipal Council of Mombasa.

PROJECT ONE:

THE CONSTRUCTION OF 42 BUNGALOWS AT CHANGAMWE MOMBASA

This project was initiated by the Municipal Engineer. The Financier was the Kenya National Assurance Co. Ltd. It was expressly agreed that the financier will not interfere with the councils tendering procedures. The municipal engineer stated that the town clerk should write to the financier to notify them that the municipal engineer is the final signatory to payment certificates although the work is to be supervised and certified by the chief architect. The municipal architect was to certify the payment certificates before any loan instalment was released by the Kenya National

Assurance. If it was deemed necessary, the financier's professional advisers would have the right to inspect the statements and the charges thereof will be to the account of the council. The financier's project officer will be paying monthly visits to inspect the construction work.

The Minister for Local Government gave the consent for the loan of Ksh.10 million from Kenya National Assurance Co. Ltd, on 3rd September 1981. Tenders were opened on 16th October, 1981. The lowest tender of Ksh.7,494,999 with a completion time of 50 weeks was accepted by the municipal engineer, on behalf of the council, on 11.12.1981. The contractor was instructed to move into the site on 1st April 1982 and the completion date would be 16th July 1983.

The following officers were attached to the project, thus making the project team, and their instructions were deemed to be the municipal engineer's instructions. The team comprised the Project Architect, Drainage and Roads Engineers, the Structural Engineer and the Clerk of Works. As at 26.1.1983 very little work had been done on site and the municipal engineer warned the contractor and requested the councils tenders sub-committee to discuss the matter. The council met on 4.3.83

to discuss the contractor's slow progress on site. Accordingly, on instructions from the council, the Town Clerk gave the contractor 14 days notice under clause 25(1) (b) of the schedule of conditions contained in the contract, afterwhich the contract was determined. The contractor claimed that the delay was due to a credit squeeze and non-payment from "other" projects thus causing him cash flow problems. Following the contractors contention the tenders sub-committee and finance committee respectively decided that the contractor should be given back the site after he had signed and submitted an agreement between him and his financiers.

The contractors reasons for failing on site are not valid under the contract agreement. The decision, by the tenders sub-committee and the finance committee, to hand back the site to the contractor, after the contract had been legally determined, was invalid and could only be seen as interference. This action caused a lot of confusion as nothing was done on the project till May 1983. When the council met on March 1983 and decided to determine the contract, the ideal action which should have been taken was to retender the project. This was not done. The issue was instead left to the Tender and Finance Committees to cause confusion.

Following their confusion, nothing was done till May 1983. The Project Architect should have advised his "boss" (the Municipal Engineer) against this kind of action. However the project architect pointed out to the researcher that the only way to show his views under such circumstances was to have his views minuted. After that the sub-com ittees decided against professional advice and handed back the site to the contractor, who did nothing from there on.

In May 1983 the financier, KNA, informed the Town Clerk that due to certain very unsatisfactory factors regarding the implementation of the Municipal Council housing projects financed by KNA, it had been decided that more rigorous control and supervision of such projects would be instituted. In particular, an independent professional consultant to the project would be appointed. Such consultant would have wide ranging responsibilities to ensure that the project is implemented satisfactorily and that funds are not misdirected. The municipal engineer objected to the appointment of the consultants arguing that the project had not suffered due to lack of professional guidance. The contract was determined on 2nd August 1983. Effectively, this means that the contract was determined twice. This was brought about by the blunder of the Finance and Tenders Committees of handing back the project to the contractor after it

had been determined the first time.

The project was re-tendered and an offer of Ksh.7,433,900 with a completion period of 45 weeks was accepted and site handed over on 17th October 1983. The problems which arose from then on were those of payments. The financiers refused to pay certificates prepared by the municipal engineer, stating that the council's Clerk of Works could not and was not competent, to prepare certificates for payment, hence their insistence on valuations prepared by the consultants. The project was finally completed on 19.11.1984.

PROJECT PERFORMANCE

Looking at the composition of the project team, we see that the team, lacked some key professional staff, most notably the services of a Quantity Surveyor. The absence of this key professional led to some kind of "tug of war" between the council and the financiers. The financiers doubted the capability of the clerk of works to prepare certificates for payment. The result was a delay in payments to the contractor. It is only in the second phase of the project that the financiers saw this loophole and demanded the appointment of consultants to fill this gap.

There was also conflict between the project members. The Municipal Engineer was the Departmental head, but in this case his contribution was merely administrative. There was conflict between him and the Project Architect concerning technical matters like the verification of building materials on site. The Municipal Engineer did not either respect the professional opinion of his Chief Architect, or he could not understand his role in this project. He was supposed to concentrate on administrative matters of the department and leave professional matters to the professionals. He could not oversee the running of the various sections of his departments and at the same time engage himself in the running of individual building projects. He would obviously be overloading himself with matters he is not better placed or competent to decide on. Payments to the contractor were not made on time. The project team had no power to enforce payments as the financier paid on his own terms. It is only proper that whoever signs a contract pays the contractor. There was no contractual agreement between the financiers and the contractor. Among all the site meetings held throughout the project, the Project Officer (who was supposed to provide the services of a co-ordinator) appeared only once and almost at the end of the project. There was lack of project

control and co-ordination in this case. Due to re-tendering there was an increase in the cost of the project. As soon as the houses were handed over to the occupants, complaints started pouring in about leaking roofs, jamming doors and a host of other defects. This cast doubts on the quality of the final product i.e. the houses.

PROJECT TWO:

MUNICIPAL COUNCIL OF MOMBASA SECOND URBAN PROJECT; WORLD BANK COMMUNITY FACILITIES AT MIKINDANI SITE AND SERVICE PROJECT.

The project was a lump sum contract carried on specifications and drawings only. The procedure of tendering was in accordance with the local government Act.[3] The project comprises of two primary schools, one community centre, one health sub-centre and a community market. Tenders were opened on 27.11.1981. Presiding over the opening was the councils Chairman of Finance and General purposes committee (a councillor), the Director of Housing Development Department, the Town Clerk's representative, and the Town Treasurer's representative. After tender opening, all the tenders were kept by the town treasurer. The Housing Development Department scrutinized the tenders and recommended the lowest offer of Ksh.

6,600,007 for acceptance. Due to the lapse in time and validity period, the contractor wanted the tender sum adjusted to accommodate the rise in material costs. The adjustment had to be discussed by the councils chief officers under the guidance of the Director of the Housing Development Department. The council decided to adjust the tender figure to Ksh. 8,100,007. The financiers of this project were the World Bank and the Town Clerk had to seek permission from the banks headquarters in Washington USA, to adjust the tender figure.

The project team which met from time to time to discuss vital issues concerning the project were the chairman of the project (a councillor), the deputy chairman (another councillor), the deputy mayor, Chairman: Finance and general purposes committee, Chairman Town Planning and Works committee, Chairman Housing and Social Services committee, Chairman Establishment committee, Chairman Public Health committee, Chairman Education committee, Provincial Local Government Officer, a Ministry of Finance representative, National Housing Corporations representative and the Ministry of Works representative. The officers of the council included the Town Clerk, Town Treasurer, the Municipal Engineer, the Director Housing Development Department

(Project Architect) and his deputy, the Housing Manager, the Senior Public Health Officer and the committee clerk.

In this project the borrower from the World Bank was the government of Kenya while the Municipal Council of Mombasa acted as the executing agency under a subsidiary loan agreement between the government and the council. Payments were made on a reimbursement basis. The contractor took possession of the site on 30.8.1982. The contract period was 50 weeks. On 14.9.83 the contractor asked for an extension of time which was extended to 10th October 1983. On 25th November 1983 a certificate of practical completion was issued.

PROJECT PERFORMANCE

Though the Housing Development Department was constituted on 31st December 1978 to implement the project under the supervision of the World Bank and the Ministry of Local Government, it was found that the project implementation team included most of the councils' chief officers and committees. Meetings were frequent and could be called at short notice when necessary. This can be attributed to the fact that most of the project participants were based in Mombasa where the project was being

undertaken. As a result most of the projects' problems were ironed out before they affected the project adversely.

However the failure of the council to process the tenders in time and accept the lowest tender led to escalation in costs to the tune of Ksh. 1,500,000/- Tenders were opened on 27th November 1981. It was established that after tender opening, the tender documents were taken and kept in the custody of the Town Treasurer (Audit Section) for more than three weeks. The Town Treasurer had nothing to do with the tender documents. The documents were misdirected. It was pointed out to the researcher, by the director of the Housing Development Department, that the Town Treasurer wanted to scrutinize the tenders and recommend the best tender for acceptance. This was a clear case of conflict of roles between the Town Treasurers' Department and the Director of Housing Development Department. The appropriate section to have scrutinized the tender documents was the Housing Development Department.

Upon submission of the same tender documents by the Town Treasurer, the Housing Development Department embarked on the process of scrutinizing and analysing of the documents in accordance with the set requirements and conditions of the particular tender.

Another factor which led to, (or contributed to) the delay of the project was the lack of a site plan. It was on 17.8.1982, when the Director requested the Land Surveyor Housing Development Department to have the plots for the community facilities surveyed because the contractor was to be given possession of the site. This should have been realised earlier. As a resulf of these delays, the contractor justified on increase in the tender figure from Ksh.6,600,007/- to Ksh.8,100,007/- due to an increase in the price of building materials. The contract had to be extended for 8 weeks due to the lack of approach roads to the site. This should have been pointed out earlier by the land surveyor. While the director (Project Architect) concentrated on other aspects of the project, he overlooked the role of the departments' land surveyor on this project. The director had too much work on his hands. He should have concentrated on directing and delegated the duty of handling architectural matters to an architect below him.

The composition of the councils project team lacked key professional staff like the Quantity Surveyor and there was nobody to provide the co-ordinating function. There was a conflict of roles in the municipal engineer's department.

The fact that the municipal engineer was the departmental head did not empower him to assume the role of the project architect. The main structural defect here lies in the definition of role boundaries. The lack of co-ordination was seen later in the project when the financiers decided to appoint a project officer to act as a project manager. However the project had already suffered.

There was efficiency in the second project due to the composition of the project team and the constant supervision from the World Bank. However the problem of conflict of roles between departments also comes up. There was a delay of three weeks when the Town Treasurer's department decided to keep the tender documents, in order to recommend the suitable contractor. This was not their duty. This escalated the project cost from Ksh. 6,600,007/- to Ksh. 8,100,007/-.

CASE STUDY NO. 3

THE NATIONAL HOUSING CORPORATION (NHC)

The National Housing Corporation was established in 1967 by the Housing Act.[4] The corporation was to play the role of providing funds and technical assistance for a progressive low-cost housing programme for the whole country. The corporation falls under the auspices of the Ministry of Works, Housing and Physical Planning. Through the corporation, funds intended for the low cost housing are channelled to local authorities, housing co-operatives, and other housing development organizations. These funds come from the Ministry of Works, Housing and Physical Planning. The corporation provides loans to local authorities for rental housing and tenant-purchase housing schemes. To achieve the governments housing objectives, the corporation has been charged with the implementation of the government's housing policy. To achieve the objectives of the Act, the corporation undertakes the following activities:-

(i) It provides technical assistance in the form of designing, tendering, and supervising construction for those local authorities which lack

the necessary technical personnel.

(ii) In many cases the corporation develops and manages housing in order to supplement the capacities of the local authorities concerned. This includes initiating, developing and managing of housing estates by the corporation.

(iii) In collaboration with the Housing Department of the parent ministry and Housing Finance Company of Kenya, it undertakes to stimulate greater participation by the private sector by developing mortgage loans provided by the HFCK. It therefore acts as a developer for mortgage housing schemes.

(iv) It encourages and undertakes research and experiments in housing related matters by collecting and disseminating information concerning housing and related matters. To achieve this goal, the corporation works closely with the Housing Research and Development Unit (HRDU) of the University of Nairobi.

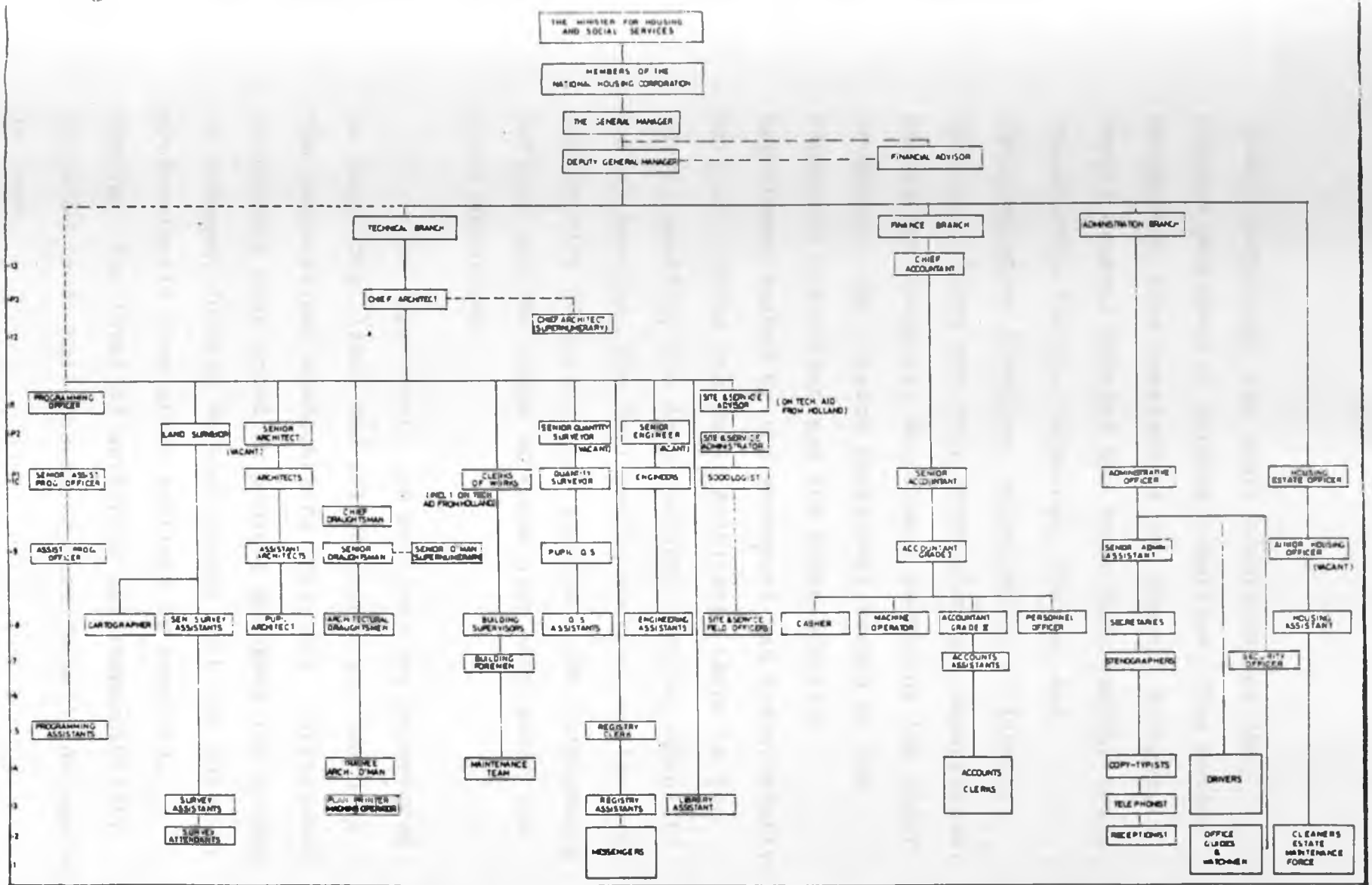
The corporation provides for the training for members of its staff and performs other duties connected with housing as the minister may direct. In an attempt to alleviate housing shortage problem, the corporation has undertaken housing projects in Nairobi, Mombasa, Nakuru, Eldoret, Kisumu, Nyeri, Kakamega, and Wundanyi among others.

THE MANAGEMENT STRUCTURE OF NHC

Figure 4:5 on page 167 shows the organization structure of the National Housing Corporation. The Managing Director is the chief executive officer of the corporation. He reports to the National Housing Corporation Board which has a chairman who is under the Ministry of Works, Housing and Physical Planning. The Act provides that the corporation board shall consist of the Permanent Secretary in the parent ministry, which is currently the Ministry of Works, Housing and Physical Planning, a person appointed by the ministry for the time being responsible for finance, and not less than six nor more than eight persons appointed by the minister of whom at least three shall be public officers. The Minister for Works, Housing and Physical Planning has powers to designate one of them as chairman.

Members of the NHC Board are selected to form three committees. These are the Technical and

Fig. 4:5 THE ORGANIZATION STTUCTURE OF NATIONAL HOUSING CORPORATION



Source: National Housing Corporation

Tender committee, the staff committee and the Finance and General purpose committee. The Senior Management Team consists of the General Manager, a Deputy General Manager and three departmental heads responsible for the Technical, Finance and Administrative branches, supported by a Financial Advisor. There are only three distinct departments, namely the Technical Department headed by the Chief Architect, the Finance Department headed by the Financial Controller and the Administration Department headed by the Personnel and Administrative Officer. Under the Chief Architect, there is the Survey section, the Architectural section, Quantity Survey section, the Engineering section and the Site and Service Administration section. The Programming Officer and the Clerk of Works also come under the Chief Architect.

The departments and sections are structured on functional lines and all personnel are based in the corporations headquarters (Nairobi). Divisional architects have acted as project managers for groups of schemes, forming working groups with the relevant professionals from other sections as required. However the level of authority and responsibility required to do this has never been formally delegated to them.

The present organization of the technical branch of NHC is headed by the Chief Architect who, because of the absence of qualified middle level managerial staff has some 15 staff reporting directly to him (her). The branch is organized into professional disciplines although on projects it operates within multi-disciplinary teams usually headed by the Architects. The structuring of the branch into professional disciplines makes it difficult to achieve integration among them for the common goal of efficient project implementation. The basing of the organization in Nairobi makes it difficult to have constant contact with the sites as most of the projects handled by the corporation are located in various towns throughout Kenya except Nairobi.

PROJECT ONE:

NYERI MORTGAGE HOUSING SCHEME;

45 NO. HOUSING UNITS.

The first meeting on this project was held on 30.7.1983, between officials of NHC and those of the Nyeri Municipal Commission. It was felt that mortgage housing schemes experienced problems due to lack of bridging finance and technical staff. It was suggested that the solution might lie in the establishment of a joint team comprising the

commission, the NHC and the Housing Finance Company of Kenya, to alleviate the problem. The NHC would be the developer with HFCK providing the long term financing. The commission would provide the required land and NHC would also provide bridging funds.

On 3.7.81 the Managing Director (NHC) wrote to consultants to give quotations for soil and site investigations. When these were received, the Engineer (NHC) recommended the lowest. The Managing Director still advised him to contact the Ministry of Transport and Communications to give their quotation. The Engineer then asked the Senior Engineer to advise whether they should commission consultants or have the Ministry of Transport and Communications do the work. On 4.2.82 the Senior Engineer directed the Engineer to find out if MOTC were ready to carry out the work. The Ministry of Transport demanded to be paid in advance which was unacceptable to the corporation. On 17.8.82 the Tenders Committee met and awarded the building contract. As a result, three days later, the Structural Engineer (NHC) requested for soil test results from the Town Engineer Nyeri Municipal Council. In a joint consultative meeting it was agreed that the council would carry out the soil tests. The results were needed urgently as the contract was already awarded and the main

contractor could not proceed without having settled this problem. There was uncertainty here as to who should decide on the issue of soil tests. The Project Architect should have liaised with the Project Engineer to sort this issue out without waiting for the managing director to act.

The contract amount was Ksh. 9,895,722.70. The date of possession was 5.10.82 and the DR was the Divisional Architect North Eastern Division who was the Project Architect. The duration of the contract was 50 weeks and the completion date was to be 16th September 1983. During the handing over of the site, it was agreed that the Nyeri Municipal Council would not interfere with the contractor during the execution of the contract. As at 21.12.82 progress on site was poor and the contractor was warned to improve performance on site. The first payment was made on 8.1.83 and was signed by the Project Quantity Surveyor, Project Architect, Chief Architect, Senior Quantity Surveyor and the Financial Controller. It was finally signed by the Managing Director on 18.1.83. This kind of "red tape", of having many signatories, leads to delays in paying the contractor. The contractor was given a default notice for failing to proceed with the work regularly and diligently. On 10.3.83, the Clerk of Works - Nyeri, wrote to the Project Architect in Nairobi,

informing him that only 10% of the work had been done in 40% of the contract period.

The first formal site meeting was held on 29.12.82 when well over 40% of the contract period had expired! The second meeting was held on 3.2.83. The failure to hold site meetings regularly led to the development of problems to levels which were difficult to arrest. Upto this stage the Project Architect seemed to have lost grip of the overall project. As at 14.4.83 the contractor was still complaining of delayed payments. As at 8.5.83 the contractor was still complaining of non-payment since February and no site meetings were held to solve his problems. The corporation did not pay certificate no. 3 prepared on 10.3.1983 until 15.6.83. Due to non-payment of certificate no. 3 and 4, the contractor suspended work on 16.6.83 and also issued a notice to determine the contract due to non-payment. As a result of this, the Project Architect instructed the Senior Quantity Surveyor to prepare certificate no.4 immediately and this was done on 4.7.1983. However it was not signed by the Financial Controller until 14.7.83. This payment certificate caused a delay of 3 weeks. This was because it had to "shuttle" from department to department in search of signatories who were not necessarily required in the first place. In this case the Project Quantity

Surveyor was caught offguard by the contractor for not having prepared the payment certificate, due to the contractor, on time. He had to be instructed, in writing, by the Project Architect to do so! By this time certificate no. 5 was also due. However, because of the crisis situation at this time, the certificate was prepared on 10.8.83 and paid to the contractor the following day. This means that the payment process can be as fast as 2 days. There was no reason why the other certificates should not have been paid on time. The Project Quantity Surveyor took his time to prepare them, the other signatories took their time to sign them, and eventually the Finance/Accounts department took its time to release the cheques. None of the project participants seemed to have been concerned about this issue. According to them, once they had done their part, that was all and there was no way they could force "other" departments to do their work. This is one of the major setbacks associated with dividing the sections into particular professional disciplines into independent groups and yet they have to work together on the same project.

As at 22.7.83 only 22% of the work was done and the project was 28 weeks behind schedule. The contractor was issued with a termination notice on 30.8.83 and a month later the contract was determined.

When preparing the second list of tenders the Chief Architect instructed the Senior Quantity Surveyor that they give the previous contractor a second chance to compete with the others!.

A tender of Ksh. 8,688,061, was awarded for the completion of the scheme. Duration was to be 45 weeks and was to be completed on 19.11.84. From here on there was no delay in payments and as at 16.11.84, 45 weeks i.e. 100% of the contract period had expired, 87% of the work had been done. The completion date had tobe revised. On 31.7.85, a certificate of practical completion was issued. Figure 4:6: Project Financial Appraisal.

The extra cost incurred in this project can be shown as follows:-

Value of 2nd tender	Ksh.	8,688,061.00
Add payment to 1st contract		2,527,056.10
Revised construction cost		11,115,117.10
Less: Value of 1st tender		9,895,722.70
Increase in cost		1,219,394.40

Source: 'NHC' Project File.

The contractor in this project claimed loss of profit of Ksh. 1,432,985 due to prolongation of contract period by 23 weeks. This was when he was instructed to stop work and await for new designs from the architect and the structural engineer. At the time of the study, discussions were going on to settle the contractor's claim.

PROJECT PERFORMANCE

The duration of the original contract was 50 weeks and the completion date was set to be 16th September 1983. The contract was determined on 22.9.83. The second contract was 45 weeks but was prolonged by 23 weeks. As seen from the calculation above, there was an increase in cost of Ksh. 1,219,394.40. The contractor was also claiming loss of profit which would lead to higher costs in this project. The delay in the second contract was caused by lack of timely instructions to the contractor from the project team members, mostly the project architect and the project engineer, hence the extension of time and the contractor's claim for loss of profit. The main cause of this was, lack of co-ordination between the project team members because site meetings were rare, and the cronic lack of communication with each other within the same offices. The researcher learnt that officers liked this kind of communication just in case anything became 'hot' and were required to account for their contribution.

PROJECT TWO:

KIBERA SITE AND SERVICE SCHEME:

(AYANY ESTATE).

The contract included 45 number of serviced plots, 417 core houses and 50 complete houses. Preliminary plans were prepared by the HRDU. In the first site meeting those present were the Chief Architect NHC, Engineer (NHC), the District Officer Kibera, the Project Quantity Surveyor (consultant), the Clerk of Works (NHC), the Building Supervisor, the Main and Civil Works contractor and the Project Architect (NHC). The project commenced on 13.6.77. The contract period was 70 weeks and the contract amount was Ksh.15,333,052.91. Initially there was a delay due to the problem of squatters on site after the site had been handed over to the contractors. The main contractor stated that he would be claiming for extension of time as a result of this. After 16 weeks the Project Architect was complaining of the existence of squatters and graves on site. These complaints were directed to the Chief Architect. After 30% of the contract period, the civil works contractor claimed for compensation arising from the time lost due to lack of information to proceed with the work. The main reason for not having been instructed to proceed was that the squatters and

graves were still on the construction site. The civil contractors put their claim of Ksh.990,760.30 to the consulting project quantity surveyors. The site layout then had to be changed because part of the original one was waterlogged and in other areas had graves. The consulting quantity surveyors conceeded that the civil works contractor was justified to claim Ksh.517,260.19 only for the delay. When the chief architect challenged this, the civil works contractor threatened to refer the matter to arbitration. The project architect complained, to the chief architect, that the civil works contractor was refusing to follow her instructions and those of the clerk of works. She recommended determination and a determination notice was given. At this stage the chief architect complained to the project architect on the way supervisory staff had handled the project by not keeping site records and the way the quantity surveyor had handled site measurements. He drew the attention of the project architect to her duties. He pointed out that, amongst other things the duties include co-ordination of work carried out by various consultants working on the project as well as the supervisory staff. She was instructed to let the consulting quantity surveyor to know the corporations dissatisfaction on the way they had handled the project. On 14.8.78 the

project civil engineer NHC recommended to the chief architect that the civil works contractor should be determined as he had not resumed work. The chief architect (after 10 days) took exception to this and directed that the project architect should deal with the matter. One can see here that there was no group effort. The key project participants were not seen to be able (or would not be allowed) to make constructive recommendations and opinions for the project. Professional interests, as depicted by the behaviour of the chief architect, were overriding those of the project. This quite often leads to conflict and the eventual ruin of many projects. As at 12.10.78 only 45% of the work had been done, 47% paid and 99%, i.e. 69 weeks, of the contract period had expired. On 14.2.79 the project engineer gave the civil works contractor 7 days notice to resume work or determine the contractor (civil works) and finally it was determined. The main contract period was extended to 94 weeks and a new civil works contractor was appointed. As a result of the delay caused by the civil contractor, the electrical contractor asked for an increase of the tender figure for electrical works. As at 12.7.79 the anticipated final contract value was Ksh.18,962,475.37, and the revised contract period was 132 weeks. Building works had been completed and the remaining were only civil

and electrical works. On 9.11.79 a certificate of practical completion (Building Works) was issued.

It is important to note here that when the project quantity surveyor recommended an increase to the electrical tender figure in the order of 30%, the consulting engineers recommended the same increase. The senior quantity surveyor (NHC) stated that the project architect was in a better position to co-ordinate the case of determined civil contract with the legal advisors. (The Chief Architect himself had, as seen earlier, cautioned and objected to the project engineers dealing with any policy matter of a co-ordinating nature regarding the project). It was however supprising that the chief architect agreed with the project architect that since the matter was not an architectural one but that of contract procedures then the Senior Quantity Surveyor (NHC) should deal with the matter!

PROJECT PERFORMANCE

There was conflict between project members in this project which led to a considerable delay in the completion of the project. The original contract period was 70 weeks which had to be extended to become 132 weeks. The additional expense incurred by reason of the determination of the civil works contract was close to Ksh.3 million.

Due to lack of instructions at the right time the civil works were delayed and when eventually done, they did not conform to the required measurements. This resulted in major portions of the work being redone. This was attributed to incomplete drawings inherited from the HRDU. This meant that the NHC project team never scrutinized the drawings earlier.

In an explanation (brief) to the Managing Director, the project architect stated that HRDU were to blame for delay due to poor preliminary survey causing the redesigning of site and a host of drawings during the construction stage. The delay was then attributed to the general design deficiency produced by HRDU and that the project architect (from HRDU, during design stage) did not advise and co-ordinate the project engineers dealing with civil works. One would be right to say that she (the Project Architect NHC) also on her part failed to co-ordinate and integrate the project participants during the construction stage.

SUMMARY OF FINDINGS FROM THE CASE STUDIES

MINISTRY OF WORKS

* In the case of the Ministry of Works, procedures used in project implementation were lengthy and bureaucratic. Vital decisions which required attention at the source could not be made and approval had to be sought from the Ministry headquarters.

* There was considerable delay in payments by the clients and the project implementors could not do anything about it.

* Although the acceptance letter stated that all matters concerning the project should be communicated to the DR, he was still receiving instructions from headquarters on what to do. At times the DR was instructed by the chief architect to determine a project.

* In some projects, the participants were scattered and did not form one group. Some were based at the headquarters and others at the provincial level. This made communication difficult and lengthy i.e. time consuming hence contributing to mismanagement and failure of projects. With this kind of arrangement the DR could not co-ordinate the project participants.

Decisions were made in isolation making integration impossible. Vital decisions could not be made on time due to the lengthy process involved as a result of basing some project participants at the headquarters and others at the provincial level.

* There was considerable delay regarding the appointment of sub-contractors and the signing of letters of acceptance for the main contract by the client ministries. The late appointment of sub-contractors come about because the subcontracts were handled by different departments, who claimed that in most cases a project commenced and they would not be informed on time by the chief architect.

* Apart from honouring payments and signing letters of acceptance and determination, the client ministries had very little to do concerning the management of the construction process.

* The Forward Planning Group only produced "situation reports" and these were of a historical nature and were rarely used to co-ordinate project participants. This is a big waste to vital information. If any recommendations were made to improve the situation these were not effected as the FPG does not have any authority to do so.

* The reports compiled by FPG were of no use to the

project participants as these were compiled and stored in the FPG.

* There is no co-ordinating unit. Several independent departments come together to implement a project.

* For the projects handled by the Provincial Works Officer, support from headquarters was not adequate in terms of staff and equipment. There was a problem of information for projects designed and tendered at the headquarters and then handed over to the PWO for implementation. There was lack of drawings and specifications and other contract documents which led to severe delay as project participants had to travel to the headquarters to sort these out after letters written to HQ had failed to secure the same.

* The project architect who acts as the team leader is not adequately trained to provide co-ordination services. Architects disrupt the implementation process by interfering with decisions of other professional staff (they act as jack of all trades).

THE MUNICIPAL COUNCIL OF MOMBASA

* As for the Municipal Council of Mombasa, councillors forced their decisions to take precedence against those given by professional project members. This is highlighted by the example where the tenders and finance committee decided to give the site back to the contractor after the contract had been rightly and effectively determined.

* Some project members did work which they were not qualified to do thus raising genuine dissatisfaction from the financiers. This includes building inspectors making valuations and preparing certificates for payment.

* There was conflict among project members concerning technical matters brought about by unclear roles.

* Some council officers (Municipal Engineer) insisted on being signatories to certificates although they had no direct participation in the project.

* Where project participants were centralized and dealing with projects within that location, there were fewer communication problems as meetings could be called within a few hours to discuss critical matters. The project architects' decisions had to

be approved by the municipal engineer who is a civil engineer by profession.

THE NATIONAL HOUSING CORPORATION

* There was a problem concerning project management authority in National Housing Corporation, between the project participants. The chief architect decided that the project architect should deal with all matters even those of engineering nature. Due to this the civil works contractor took advantage to refuse instructions from the project architect. This caused conflict of authority between the project architect and the project engineer.

* Payments to the contractor were neglected till there was a crisis then the project architect or the chief architect would issue a directive to the senior quantity surveyor to instruct the project quantity surveyor to make sure that the contractor would be paid.

* Instructions to the contractors were not given on time by the project members as there was poor co-ordination between them.

* The senior management structure of NHC consists of the General Manager, a Deputy General Manager and three departmental heads responsible for the

Technical, Finance and Administration branches supported by a Financial Advisor. The consequence of this structure is that the whole organization is dependent upon the personal management of the General Manager.

* All technical functions are currently controlled by the chief architect as the head of the technical department. Six middle management staff report to the chief architect:

(i) Senior Architect, (ii) Senior Land Surveyor, (iii) Senior Quantity Surveyor, (iv) Senior Engineer, (v) Site and Service Administrator and (vi) the Senior Programming Officer. The clerk of works and chief Draughtsman though functionally responsible to the senior architect are administratively controlled by the chief architect. This structure is very difficult to operate as it requires the chief architect to control too wide a range of different functions.

* The programming section under successive well qualified programming officers has established a basically sound system for scheduling and monitoring projects. However, officers involved with the implementation of projects voiced concern that there is lack of co-ordination. It was found that the failure of the procedures was largely due to the fact that

the procedures were never fully implemented or kept upto date and that senior management had not used the information provided by the section to initiate action. The section needs to be more closely involved in analysing the cause of delays and decision making, rather than merely recording past performance.

FOOTNOTES

1. The Local Government Act Cap 265 of the Laws of Kenya.

2. Standing Orders of the Local Government Act Chapter 265 of the Laws of Kenya.

3. The Local Government Act Chapter 265 Section 143.

4. The Housing Act Chapter 117 of 1967 of the Laws of Kenya.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS.

It is hypothesized that the organization structures adopted by the three public organizations involved with construction projects are not appropriate or conducive to effective project management. It has been found that in most cases they have tended to be rigid and bureaucratic. Those dealing with the projects directly are not given the full authority to do so and are sometimes overruled by those directly above them who had nothing to do with the projects. The interference comes in the form of instructions which are mostly directives or refusals of some appropriate decisions taken by those dealing with the projects i.e. the project team.

Conflicting roles of project participants have made it difficult to deal with uncertainty as one cause of action would be taken only to be overruled and necessitating the second attempt on the same kind of decision or action by another project participant thus causing considerable delays, and escalation in project costs.

Project implementation control is the exercise of a disciplined approach to the prescribed

implementation plan which lays down the objectives of the project, the cost limits within which it is to be constructed, and the time limits of phased completion. These general principles apply irrespective of the agency actually charged with the task of implementation. However professional resource control forms a larger part of the management function. The structure of the organization and the responsibility and authority of the project participants will determine whether it is possible to exercise project co-ordination and control. The essential determinant of the structure of an organization for the design and construction of a project is the arrangement of decision points and the way in which the contributors need to be integrated in order to produce the material upon which decisions can be made. [1] Walker contends that

> "the most positive approach has been the creation of multidisciplinary practices that employ within one firm (organization) all the professional skills associated with projects. If, with such practices, specialists work in project-dedicated teams, then one would expect that conditions would be created in which a high level of integration could occur. However, if such practices continue to organize in "departments" of specialist skills, a great integrating opportunity will have been lost"[2]

Differentiation is high on a project when professional consultants are from separate firms. An attempt must be made to integrate them otherwise a situation will develop where they will only communicate by post.

The essence of the systems approach say that you should not separate functions individually because they form the whole system. The activity of any part of the organization has some effect on the activities of the other parts of the organization. It has been stressed that systems theory stresses interrelationships and is as concerned with the links between the parts of the system as with the parts themselves. [3] The problem of how to make the links work effectively is essentially the problem of project management. A project manager is in a position to design the integration of the contributors in the project organization for the purpose of co-ordinated decision making. It may be possible to identify a list of routine decisions that are common to all construction projects, but it is not possible to determine when they will need to be taken.

Due to the limited capability of knowing, most individuals cannot be knowledgeable in the large number of diverse activities of the building process. Even if a person does know a great deal about many

things he does not have time and the capacity to make decisions in several areas in a short time. As the construction process involves many skills, many groups and different interests there is need for overall co-ordinating management to ensure that each of the participants tie in their activities with those of others so as to keep the programme and budget.

There is need to set up an appropriate structure of relationships to ensure integration. The structure must allow for the separate contributions to the common scheme from different specialists, including those from the client system. It must avoid the different contributions developing too for without cross-reference to others whom their decisions implicate, and of any of the potential interveners being left behind the growing scheme, to intervene later with demands for reconsideration. It should be realised that even with such a carefully designed structure, there will be difficulties, but without it, confusion, delays and abortive work are inevitable.

As pointed out by the Tavistock researchers,

> "the roles of project participants were developed as an answer to social, economic, and technical problems present at the time."[4]

No one functional department is the most important over the whole life of the project and thus no individual manager can assume the leading management role for the complete project. A project of any complexity involves different disciplines and collaboration among institutions. Specialist knowledge and specialized functions have to be combined in ways that are appropriate for the project, so that it is not enough to have competent engineers, economists, architects, administrators as seen from the point of view of each discipline separately.

Conventionally, the architect both designed and managed. A project manager has frequently been appointed to manage the process. The managers fundamental activity is integration. The integrative mechanisms designed into the organization structure will depend on the particular project and its environment.

From the findings of this study, it is concluded that the major cause of problems is the lack of an integrative mechanism among the functional departments dealing with projects. The most appropriate structure is that of project management structure superimposed on the functional organization and which provides a focal point for the decision making and the execution of a particular project. The matrix organization is hereby recommended due to

its recognition of the integrative function of the project manager in a functional organization. The role of the project manager in this case is to investigate, research, analyse, recommend and co-ordinate matters relative to the project. He serves as an expeditor of the project activities by dealing directly with individuals in the co-ordination of the project affairs.

Recommendations

The Ministry of Works needs a change in its top management. It needs an officer who is capable of co-ordinating and integrating the teams at the headquarters. The ministry should have a Director of Works or a Deputy Secretary Technical who would be reporting to the Permanent Secretary. Departmental heads should report to the Director of Works who should be a technical person, in any of the fields of the construction process. He should be very knowledgeable in construction project management. Being a technical ministry, key administrators should be technical people who understand, better, issues concerned with technical personnel. At the provincial level, we should have a provincial director of works who should be given autonomy in running the projects allocated to him and there should be no interference from the headquarters. Professional personnel

implementing projects at the provincial level should all be centralized at the province to avoid communication problems. Money set aside, and committed for projects, should always be available and preferably should be kept by the implementing ministry and not the client ministry. This is to avoid unnecessary delays in honouring payments to the contractors.

The senior management structure of the National Housing Corporation consists of the General Manager, a Deputy General Manager and three departmental heads responsible for the Technical, Finance and Administration branches supported by a Financial Advisor. Due to the urgent nature of technical matters, which occured frequently, it is recommended that the Technical Manager should deputise for the General Manager. The senior management team should also include a Programme Manager. His responsibility would be to report to the management team on the performance of projects undertaken by the corporation. The officer will provide a link between the senior management team and the operating division and should, administratively, report to the technical manager.

The Chief Architect is the head of the Technical Branch. It is recommended that a more general title of Technical Manager should be employed and this post should be open to either profession.

The responsibilities of the head of the technical department cover the direction and co-ordination of all the technical functions. In most cases the head of the technical department has tended to be involved in the direct management of projects to a greater degree than should be required and has been less involved in overall co-ordination. There is a need to improve co-ordination and control while delegating individual project management to a greater degree. It is recommended that full authority for implementing projects should be delegated to Technical Divisions reporting to the Technical Manager. The technical manager would therefore be responsible for the overall management of these technical divisions and control of their work methods and standard of work. He should not be expected to direct individual projects personally.

Architects have continued to act as project managers though the level, authority and responsibility required to do this has never been formally delegated to them. There have been some problems associated with this kind of arrangement. The problems of co-ordination and control are likely to multiply as the scale of operation expands. With the current organization structure and procedures, it would be increasingly impossible to manage the

increasing workload in future. It is, therefore, recommended that the technical branch should be restructured to recognise formally the need for team working arrangements between different professional groups, within project management teams. A provision must be made for another officer to deputise for the technical manager as the post carried very wide ranging responsibility for the overall co-ordination of the department.

To provide good integration in the management of the projects, a multi-disciplinary team work is essential. Lack of contact with sites and co-ordination among project members, has been a major cause of problems and delays. This justifies decentralization of divisions. This will however mean that professional staff of proven capability will have to head the divisions. Each division should be located close enough to control a group of projects and should have a full range of technically qualified officers with appropriate skills to implement and manage the projects.

The Managing Director should be responsible for the efficient implementation of projects and day-to-day management of the corporation. For this reason the managing director should be a technical person with a bias on any of the professions involved in the project implementation, preferably project

management. To solve the unnecessary delay in signing the payment certificates, there should be fewer signatories and those not directly involved in the project should not be signatories to its payment certificates.

To facilitate timely and professional decisions the chief architect in the Municipal Council of Mombasa should be given autonomy in making professional decisions. The fact that he is administratively under the municipal Engineer, should not give the engineer the power to muzzle professional decisions, concerning architectural matters, made by the architect.

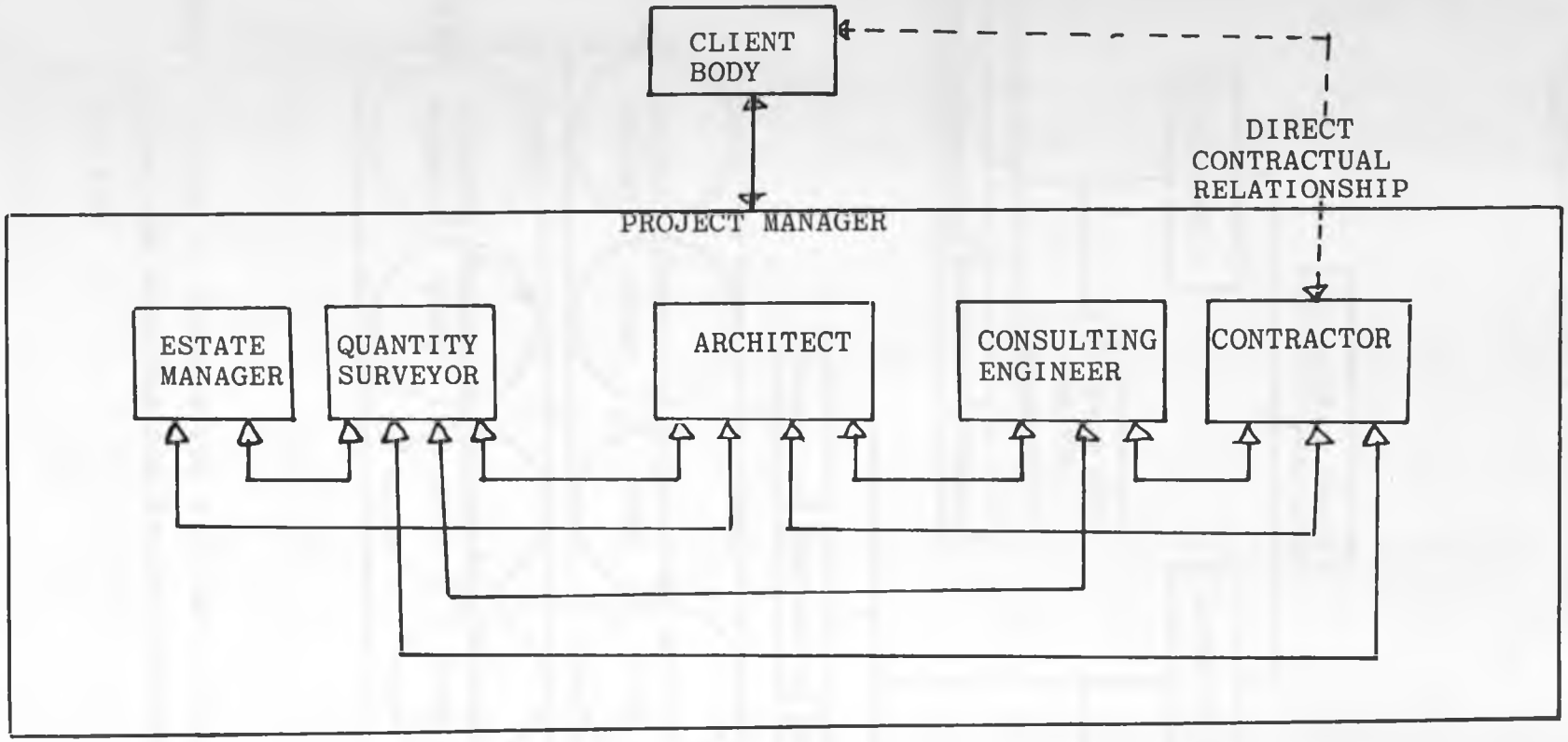
Councillors should not be allowed to make critical decisions affecting construction projects, where professional knowhow is required, against the advice of the qualified technical officers. As it has been established in this study, that there was lack of vital professional staff in the councils project teams, it is recommended that the council establish and employ the co-ordinating and managing services of a project manager. In undertaking any future projects the council should make sure that they employ the services of consultants to fill the gap of lack of professional personnel in their own establishments. However these consultants should

be co-ordinated by the council's own project manager. The structure depicted in figure 5:1 on page 200 is recommended to facilitate a team approach.[5] The role of the project manager would be of a collaborative manner to facilitate the work of all the project contributors. He would make sure that the appropriate decisions are made at the right time. Figure 5:2 on page 201 illustrates the matrix organization structure.[6]

FURTHER AREAS OF STUDY

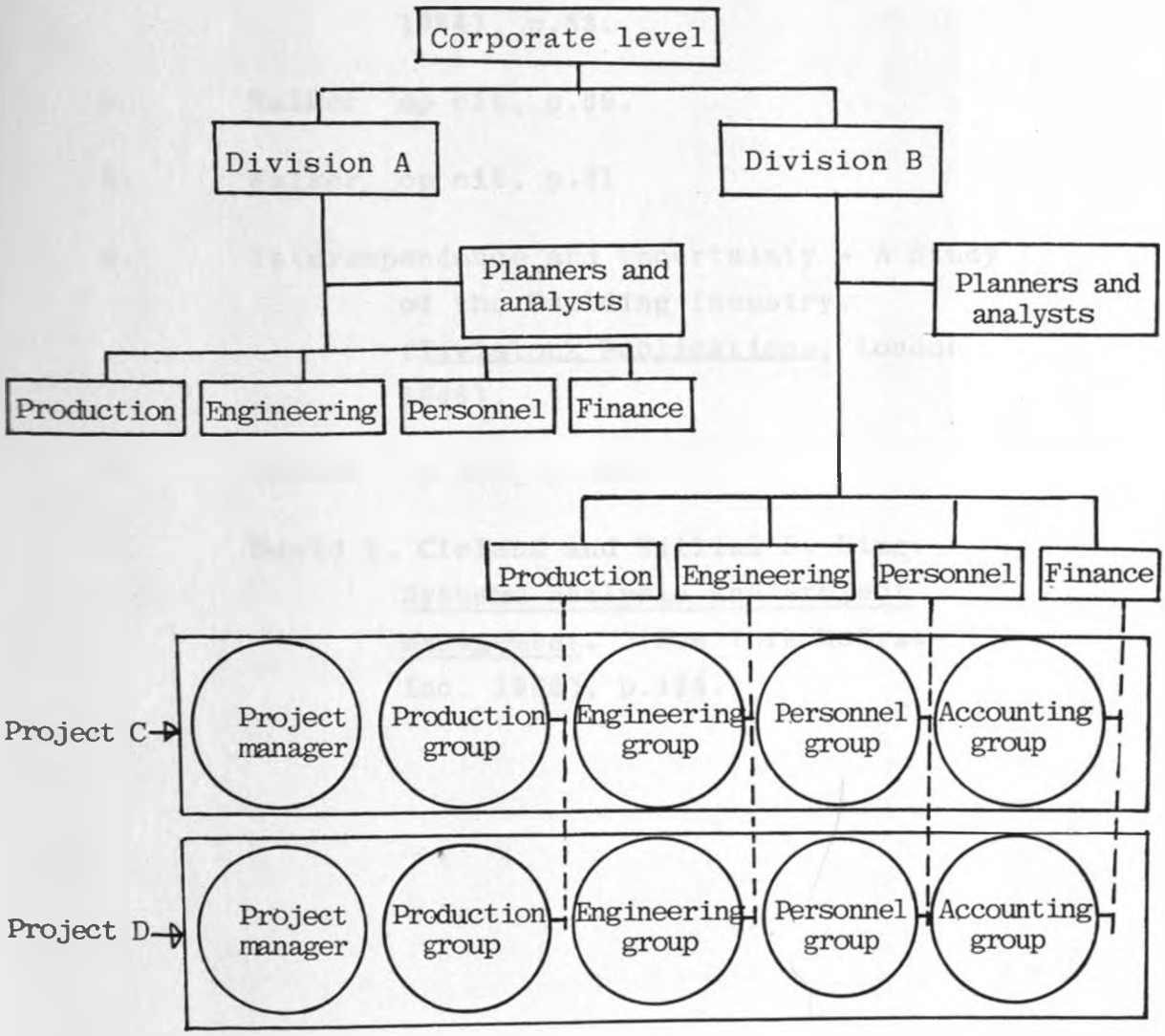
This study has analysed projects in only three public organizations. To identify the patterns of relationships that lead to effective performance it is important to include many organizations. There is a need for comparison of both public and private organizations in order to establish their effectiveness in the way they are structured. The three organizations looked into in this study are based in the two major urban areas in Kenya, namely Nairobi and Mombasa. One can also study those based in non-urban areas, like the county councils. One might also consider a variety of different sizes of organization structure especially with a view to finding out how the small organization structure manifests. The more organizations that are investigated the more confidence one has in the findings that emerge consistently. The issues to be considered by any researcher here is whether one form of organization structure allows the basic operations of the building process to be realized more effectively than any other.

Fig. 5:1 PROJECT MANAGEMENT STRUCTURE



Source: Anthony Walker, Project Management in Construction, p.141.

Fig. 5:2 ILLUSTRATIVE MATRIX ORGANIZATION



Source: David I. Cleland and William R. King, Systems Analysis and Project Management, p.194.

FOOTNOTES

1. Anthony Walker, Project Management in Construction. (Granada, London 1984), p.88.

2. Walker op cit, p.89.

3. Walker op cit, p.31

4. Interdependence and Uncertainty - A Study of the Building Industry. (Tavistock Publications, London 1966).

5. Walker op cit, p.141.

6. David I. Cleland and William R. King. Systems Analysis and Project Management. (New York McGraw-Hill Inc. 1968), p.194.

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THE APPENDIX

THE DIAGNOSTIC METHODS OF PROBLEMS AFFECTING PROJECTS

One can apply diagnostics to a past project with a view of finding out how to avoid the same or similar difficulties in the new design. Diagnostics are questions that translate symptoms of trouble or difficulties into causes. An analysis of causation was carried out. The following questions were asked about the organizations that implement projects.

1. Is there top level support? Support means assistance with staff, facilities, information, protection from (political) interference, etc.

2. Are there qualified individuals who can act as project leaders and key people on the team? The qualifications include technical, managerial leadership, communication and negotiating skills as well as motivation.

3. Is there an organizational unit assigned the functions, authority and commensurate responsibility to execute the project? If not is there an organizational unit with clear responsibility and authority to co-ordinate the inputs of other entities to policies and goals? Is the project team assured of top level support to resolve difficulties?

4. Is there an adequate mechanism for co-ordination with other organizatins in other sectors?

5. Is the implementing agency capable of developing a detailed operating plan, i.e. to specify the major tasks to be undertaken, schedule and sequence these tasks to be undertaken in a realistic time frame, assign responsibility for the tasks, estimate the resource requirements by category (personal, material, money, equipment, supplies, etc.) and by appropriate time period?

6. Does the implementing institution provide adequate salary, allowances, promotions? Are project personnel rewarded for their services?

7. Is sufficient work space, equipment, communication facilities, transport and supplies available? Is there adequate support personnel for such services? Is there assurance that quality, quantity and timeliness of these resources will be available/adequate? If not what remedial action is available? or taken?

8. Is the financial management adequate to provide: realistic estimates of financial need? Realistic allocation of spending authority? Timely disbursement of funds? Reasonable but not excessive controls? Post-audit on use of funds? Flexible budget authority to project

permitting transfers among expenditure categories?

9. Are there responsive procurement procedures to cut red tape and meet the deadlines required by the project? Are there prolonged, formalistic bid procedures or uncontrolled "kick-back" procedures that will interfere with project execution?

10. Can the implementing instituion report on project progress and resource utilization? Are reprots tied to plans? Can it take remedial actions in order to bring project operations into conformance with targets and standards? Will a system for project control and periodic evaluation be workable between the executing agency and the client?

11. Does the implementing agency foster teamwork? Can the prospective project team members work as a unit among themselves and with other organizations? Are there any factors that impede necessary co0ordination e.g. personality, culture, social? Can these barriers be surmounted?

12. What area in the organization do you think requires change? What do you propose?

13. Have you encountered uncertainities during the course of your work? Uncertainities are either basically organizational or due to outside factors such as government policy, economic and social