TOTAL QUALITY MANAGEMENT IN MINERAL RESOURCES DEVELOPMENT IN NIGERIA

BY

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CERTIFICATION

This Project titled *Total quality Management in Mineral Resources Development in* Nigeria by Jackdell Stephen Mallo meets the regulations governing the award of the degree of Master of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

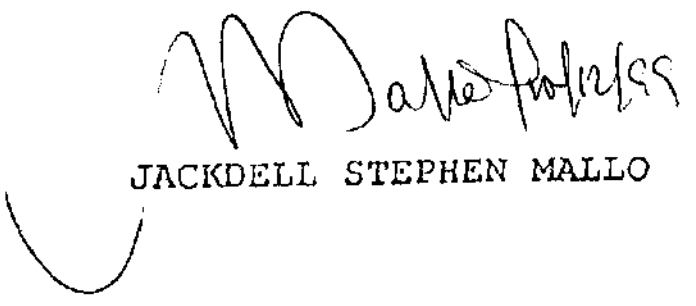
Chairman, Supervisory Committee	12/10/99 Date
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DEDICATION

This Thesis is dedicated to my wife Mrs Deborah Stephen Mallo and my son Stephen Mallo (Jr) for their support and encouragement all through the period of the MBA programme.

DECLARATION

I Jackdell Stephen Mallo do hereby sincerely declare that no part of this project has ever been written in whole or in part, to the best of my knowledge and all works refereed to in the thesis have been duly acknowledged.



JACKDELL STEPHEN MALLO

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ABSTRACT

A modern management technique that can lead to achieving corporate excellence in both services and products in the Solid Minerals Sector of the Nigerian economy, is Total Quality Management. This concept encourages organizational excellence by continuously meeting agreed customer requirements at lowest cost using the potentials of all employees.

The study has identified this new management philosophy as the most important management technique capable of drastically minimizing or eliminating such impediments associated with mineral investment in Nigeria such as poor funding, unfavorable government policy/implementation, inadequate technological transfer, inadequate technological development, inadequate infrastructural development and low capacity utilization of mining/mineral processing industries.

The study has shown how the entire mineral sector comprising the Federal Ministry of Solid Mineral Development, Federal Government Parastatals, and the organized private sector of mineral investment can implement the tools, techniques and project of TQM.

The Formation of Steering Groups, Project teams, and cor-ordinators at all the relevant spheres of mineral policy and mineral investments have been demonstrated according to appropriate structure and Top-Down requirements.
To this effect, some TQM experiences have been drawn from foreign contract mining investment, showing that, Quality Mineral Policy, Quality Employment, Quality Services, Quality Exploration/mineral development, Quality Mining/Mineral processing of products are competitive advantages of TQM.

These advantages should offer strong economic leaverage and wider investment scope for domestic and international mineral resources investors with regards to the Nigerian Minerals. These in turn, will stimulate downstream investment and capital formation that are vital for capital market development and subsequent industrialization of the country.

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CHAPTER ONE

INTRODUCTION

Total quality management is a concept which encourages organizational excellence in the achievement of corporate goals and objectives. The phenomenon which has become a standard in developed economies of the West, started in Japan after the Second World War. It is incredible that Japan which occupies only 0.3% of the worlds land surface and with virtually no mineral resources recorded over 11 percent World Gross National Product (GNP) in 1980 [7].

This economic achievement has since been spurred on by fierce competition between companies in Europe, North America, East Asia and Japan.

The new concept of management which drastically leads the reduction in production cost has made other developed economies of the world to abandon their old ways of management in order to unravel the secret of the incredible success of Japanese economy.[ ]

Total Quality Management is a new concept in the Nigerian

Mineral Industry which for decades was neglected as a result of over-dependence on the oil sector. With the creation of the

Federal Ministry of Solid Minerals in 1995, government policy has been directed towards the encouragement of private (local and foreign) investment in the mineral sector. In the same vein, support is being given the small, medium size and large companies to enable them participate in its development.
The study therefore is geared towards propagation of total quality management in both the policy organ- The Federal Ministry of Solid Minerals Development and government Mining parastatals and private mining companies.[1]

The inculcation of Total Quality Management in the Nigerian economy at its earliest stage of development cannot be overemphasized. This is so because all aspects of human development revolves around industries such as defence industries, petroleum and petrochemical, steel industry, machine and building and auto industry etc all of which, and many more are dependent on the mineral sector for the supply of their necessary basic raw materials.[ ]
The essence of Total Quality in mineral development stems from the fact that all human activities have a direct or indirect relationship with solid mineral sector. For Nigeria to achieve some measure of meaningful industrialization and economic growth, there must be a planned development of its available mineral resources through Total Quality Management. TQM pushes mineral investment organizations towards their goals and objectives.

To the nation, Total Quality Management will help in achieving some economic reconstructions schemes, goals and objectives which ensures conducive macro-economic environment. This in turn, stimulates investments and capital formation that are vital to the capital market development.

Further more, it encourages economic growth and development. Japan has no significant mineral resources, however the inculcation of the concept of total Quality Management even where these minerals are not available, tremendous industrialization has been possible through a planned and disciplined consumption from external sources.[9]

Modern civilization is the heritage of mining industry which has over the years developed local farming implement ranging from simple land tools, ornaments and implements of war to modern high tech engines like robot and missiles. There can therefore be no gain saying that without the mining industry, man's life is worthless.

As it is with most sectors of the Nigerian economy, the path of growth of the mineral sector is dotted with certain impediments. These impediments which could be eradicated through Total Quality Management are poor funding, unfavorable government policy, and implementation, militating technical factors and inadequate infrastructural development. To

government organs and mining investment concerns, the study will help in improving and raising the capacity for good governance for both policy organ of Government and business organizations. This study provides the entire mineral sector with tools and techniques of total Quality management and how to implement Total Quality Management.

The study is of vital importance especially as a new concept in the mineral industry. It explains more about this new management philosophy, describes how it is implemented, illustrates how effective it can be, demonstrates, an awareness of the pitfalls and explains where it could go wrong and emphasis on the measures that can be employed in the Federal Ministry of Solid Minerals, government parastatals and private small and medium size companies.

1.2 STATEMENT OF PROBLEMS

Until recently, the awareness of the importance of mineral resources in the economic development of Nigeria had only been associated with tin and coal mining. The new awareness of the availability of other economic minerals for the consumption of local industries and for export, has invigorated the establishment of over 250 private mining and quarrying companies in Nigeria. This number is not exhaustive and does not include the two government parastatals with their 30 subsidiary companies.

The corporate goals and objectives of most of these companies are profitability, growth and survival.
However, in the face of increasing competition, for mining licenses investment capital and marketing potentials, more and more of these companies are already finding it difficult to achieve these goals and objectives. With this trend, there is bound to be high competition for both internal and external customers who will only associate with the best, in the industry.

The modern techniques for achieving corporate excellence in service or product is through Total Quality Management. The crux of the matter in this study is to present the concept of TQM to achieve organizational corporate excellence in the Federal Ministry of Solid Minerals Development, government parastatals and the Private Mineral Investment Sector.

1.3 STATEMENT OF HYPOTHESIS

Adherence to the principle of mineral resources development by the Federal Government and Mineral Investment companies is sine-qua-non to equitable harnessment and exploitation of the mineral resources potentials of the nation. Quality Mineral Policy, quality service and quality mineral products are competitive advantages that offer strong economic leverage and wider scope for international investors.

1.4 OBJECTIVE AND SIGNIFICANCE OF THE STUDY

The objective of the study is to assess how Total Quality Management can invigorate the Federal Ministry of Solid Minerals Developments, government parastatals and the private investors towards achieving their goals and objectives.

This can be achieved through quality employment, quality exploration/development, quality mining and quality processing of minerals. The Federal Ministry as a policy organ of the Federal Government, must offer quality services to re-assessment of its present internal customers(the employees) with the view of only retaining the qualified cadre.

The external customers (the investors) presently face a lot of frustrations in the process of acquiring the legal documents for the prospecting and mining. It is the duty of the Ministry to sanitize the sector of illegal miners who frustrates the efforts of legitimate mining investors.

The significance of the study can be seen from the economic point of view, mining being the bedrock of industrial development, is beneficial to organizations, corporate bodies and students of business. The study helps the nation to achieve Economic Reconstruction Schemes, goals and objectives which ensures conducive macro-economic environment. This in turn stimulates investment and capital formation that are vital to capital market development.

It also encourages economic growth and development.

1.5 LIMITATION OF THE STUDY

The principal limitation of this study is the relative novelty of the concept of TQM in the entire mineral industry, in Nigeria and consequently the ease and speed with which these new mineral investment companies will be able to cope with its challenges. There is the absence of examples of TQM practicing sister organizations which could serve as a yardstick for the new companies. Any attempt to explain things from other organizations stand may not achieve the immediate desired impact.

1.6 SCOPE OF STUDY

The study is aimed at ensuring the concept of Total Quality Management in all the facets of mineral investment. These include the federal ministry of solid minerals development/mining processing parastatals and the organized private sectors of mineral investment. The study covers the basic prescriptions and the need to match it with the objective management philosophies in the policy organ and in the corporate -mineral investment sector of the Nigerian economy. The implementation of the findings of the study will in no small way rejunivate the minerals industry.

1.7 Operational Definitions

TQM- Total Quality management. It defines the concept as a practical methodology for continuous improvement of business.

Internal Customers- Employees with the organization i.e in the Federal Ministry of Solid Minerals Development or in the private sector

External Customers To the Federal Ministry of Solid Mineral Development are understood to mean, all prospective foreign and local investors. The farmers whose land are constantly being devastate by mining activities. Nigerians who are affected by the affluence of mining activities.

Goals- These are broad and general guidelines which provide levels of attainment by corporate bodies which are relatively timeless.

Objectives- Objectives are statements that help guide the activities of group members towards the overall goals. Objectives are more specific and time based, measurable and quantifyable.

Steering Group- The steering group is responsible for creating the improvement climate, setting overall targets, monitoring progress and

ensuring overall communication and co-ordination. The group owns and manages TQM process.

Project Group- Reports to the steering group, it addresses the issues or exploit the quality opportunities.

Co-ordinator- This is the person who looks outwards for ideas and inwards for advising the steering group and project teams where and how they should develop TQM, understanding at the same time the prevailing culture and that which is most likely to succeed.

BQM- British Quality Association

BSI- British Standard Institute

DTI- Department of Trade and Industry

IQA- Institute of Quality Assurance

IPA- Involvement and Participation Association

DPA- Department Purpose Analysis

NMC- Nigerian Mining Corporation

NCC- Nigerian Coal Corporation

SME- Small and Medium scale Enterprises

RMRD Raw Material Research and Development Council

QIT- Quality Improvement Team

SMT- Small and medium scale enterprises

1.8 PLAN OF STUDY

Chapter One Consists of introduction, statement of problems, statement of hypothesis, objective and significance of study, limitation of study, scope of study and operational definitions.

Chapter Two Literature Review, introduction of evolution of Total Quality management Understanding, Total Quality management objectives, of TQM, the operation of TQM. Critical dimensions of quality projects, tools and techniques of TQM.

Chapter Three, Trends of Mining Activities in Nigeria. Historical prospective, Trends in Mineral Resources Development, manpower Development in the mineral industry and mineral policy.

Chapter Four, Financing of Mineral Resources Investments Projects.

Genesis of project financing in Nigeria, Financing SMEs in Nigeria, Sources of Finance. Institutional sources of mineral resources financing, domestic sources of finances, venture capital companies, government agencies, parastatals and ministries, foreign sources of finance, privatization and joint venture participation.

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chapter six: Analysis, Methodology Approach to Implementation ol TOM in Mineral Resources Development. The role of Federal Government, the Role of Executive/management, TQM structure and top-down requirements in mineral investments, Nigerian Mining Corporation, Small and Medium Scale Enterprises, Framing a quality policy, Education and Training. Features of Mineral Investment organizations that internalize TQM culture, external assistance for TQM plan, Computerization of Mineral Resources Development concerns, Drawing TQM experience from contract mining companies.

Recommendation and Conclusion

References.

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CHAPTER TWO

2.0 LITERATURE REVIEW OF THE CONCEPT OF TOTAL QUALITY MANAGEMENT

2.1 INTRODUCTION

Total quality management (TQM) as a concept is new in Nigeria. It is defined as: continuously meeting agreed customer requirements at the lowest cost, by releasing the potential of all employees.

The origins of TQM dates back to Taylor's scientific management, the establishment of quality inspection units and departments, management by objectives, quality circles and customer attitude surveys and schemes. The development of Total quality management is credited to the Japanese. Its emergence as a corporate culture by other developed economies was spurred by the attempts to understand and apply the "secret" of the Japanese economic miracle.[']

The west was bewildered by the systematic progress in Japanese goods and technology. This triggered the quest to explore the magic through a pioneering work tittle, "The Art of Japanese management.

Two important elements were discovered which revealed the secret of Japanese success, to be quality and customer. America, Britain and other developed economies begun to adopt the Japanese approach of management which later came to be known as Total quality management. This study may not be complete without discussing four different approaches in the evolution of Total quality management.

1. The Japanese initiative 2. The American experience 3. The British Approach and 4. Quality circle revolution in Africa.

2.2 EVOLUTIONARY PATTERN OF TQM

The Japanese Initiative: After the second world war, Japan realized how backward, its industries were with regards to the large industrial nations such as Britain, America and Germany. The industry decided to set aside old ideas of management and emphasis was instead placed on in-house training at the shop, floor level and every attempt was made to delegate responsibility to the foreman and the shop floor operatives.[ ]

In 1950 the Japanese standards Association was formed and in the following year the Deeming Award scheme started. The 1950's in Japan were a period of consolidating the home market, adding value to products and copying ideas from the rest of the world. The low base of the 1960's enabled Japan

to export worldwide, continuously adapting and exploiting markets.[ ]

The western perception was still one of poor quality goods. In the following twenty years the perception of Japanese goods and services has changed to that of reliability, good value for money, with the result that the economic balance of power has shifted to Japan and the East in such industries as motor vehicles, shipbuilding, electrical consumer goods, electronic components, textiles, banking and financial services, photographic, video, watch making and many others.[7]

In the 1960s the introduction of quality circles become a logical, natural phenomenon.
Quality circle in Japanese is "The gathering of the wisdom of the people." The foremen or supervisors were trained to become leaders with a knack for spotting quality problems and ways of eliminating them in their work place and also encouraging their operatives to do the same.

The American Experience: A parallel course in the United States indicated a slow development of conventional quality control techniques with a transfer of quality circles during the mid 1960s. In the 1970s it began to realize the need to draw upon the knowledge and expertise available on the shopfloor in order to identify and solve everyday problems in

production. It was not until the end of the 1970s that the first fortune 500 companies took on the organization-wide quality management processes and total quality management concept was revitalized by Tom Peters with his book "In search for Excellence".

Today the Quality Product Concept operates in USA effectively but in Japan it has become a natural extension of corporate practice.[ ]

The British Approach: In the United Kingdom in 1963, quality management was promoted by the National Productivity Council through its far-seeing film 'Right First Time' but it was ignored. The year 1960 was National Quality and Reliability year which raised awareness of the value of quality. The following year, however was productivity year and the focus was lost. In 1978 the National strategy for quality was developed based on the government's notion that 10 billion pounds was being wasted every year due to bad quality. The campaign went out with the labour government in 1979, but was replaced four years later with National quality campaign which continues to this day to be the most sustained programme(4).

British Industries have come to accept that initiative must be at the shop floor level where quality can be controlled and improved upon.

project-by-project implementation. Croby's improvement processes characterized by the attention he gives to transforming the quality culture.

Experience has shown that organizations benefit most from the export approach that is most consistent with their own culture and quality philosophy. No restrictions should be placed on organisations using a combination of the best directions from these three foundations. More and more organizations are now developing their own unique approach to total quality management.

In the definition of total quality management there are probably four elements in the definition which stand out as being important.

Continuously. TQM is not a one of short-term programme or project, but a new way for operating for all time.

Customers are both external and internal, and in order to agree to requirements it is necessary to state what is needed in such a way that all assumption have been removed between the customer and the supplier.

Lowest cost Means building quality into products and services. This include preventing failures from accruing and dominating financial waste. Lower cost does not necessarily mean at lowest cost to the organization overall.

Quality Circle Revolution in Africa: In the developing countries of the world and particularly in Africa the concept of total quality management is relatively new. However an encouraging trend of success is being recorded. The National economies of third world countries in Africa are laden with the burden of under development, dept repayments, declining economic growth, diseases and hunger.

In order to assess these set-backs and gain respect in the world economic circle, it is pertinent to embark on quality and productivity improvement programs for survival, growth and development. The quality concept of industrial growth and development started to gain grounds in Africa only from the 1980s.

The Nigeria Experience: In Nigeria for example, some organizations have identified the need to take to total quality management for their survival in order to meet up with the challenges of resources conversion into goods and services on a continuing basis.

The mineral sector, which in one of the oldest after the agricultural2 sector, lost its leadership role as a result of the sudden over-dependence on a mono-cultural economy which centered on oil export. Multi-National companies withdrew in the early 1970s and production and export of tin, zinc, columbite coal nose- dived to near extinction. The concept of

total quality management is therefore new, as the frameworks on which it could have been grown and nurtured collapsed. The skeletal services provided in industrial mineral development by the Nigerian Mining Corporation was laden with inefficiency, low capacity utilization and mismanagement. Naturally, therefore, the concept of total quality management could not have been properly seeded in this circumstances of industrial production.[']

Private sector participation in industrial minerals investments such as in barytes, kaolin, gemstones, talk and gypsum production etc. Started with the band in 1975 by the Federal Government in the importation of such minerals. With the present trend in mineral resources investment, embibing the concept of total quality management is of great importance for the sustenance and growth of this vital sector of the Nigerian economy.

2.2 UNDERSTANDING TOTAL QUALITY MANAGEMENT(TOM)

The modern understanding of the meaning of total quality management is derived from the works of three authors: Dr W. Edwards Deeming, Dr. Joseph M. Juan and Philip B Crosby. The concepts of these authors provides road maps for organizations to establish a quality culture.[']

Deeming's participating management style and emphasis towards the use of statistical techniques differ from the JURAN

Employees. Releasing the potentials of employees is concerned with reducing fear, and constructing a climate where suggestions are encouraged, recognized and acted upon.
Each element is vitally important. However, their strength lies in their collective synergy. Organizations achieving long-term success have not done so by choosing one or two of the elements and ignoring the rest, they have done so by vigorously pursuing each of them without compromise.
Another popularly acceptable definition of total quality management is that provided by Hernondo Marino.

According to him, total quality management is a coherent corporate philosophy aimed at constantly and fully satisfying changing needs and expectations more successfully than the competition through continuous organizational improvement with the active participation of all, for the benefit of the company and the personal development of its members, thus enhancing the quality of life of the community. An examination of the components of total quality management demonstrates this assertion.[']

Total. This means that everyone in the organization is involved in the final product or service to customer.
Quality: Its definition as "meeting" customer requirements" lives no room for subjective opinion. This makes quality measurable and verifiable. That means that we know what the

customer needs and everybody with that understanding, speaking the same language, measures and works towards the same organization goal and product excellence.

Management: This means that total quality management is a managed process in which people, tools, techniques and other resources interact within a system. It cannot happen by accident. It is therefore a planned, controlled and managed process.

Every organization has suppliers and customers. Every task undertake every responsibility held and every process of which we are part, there is or should be, somebody, somewhere who is dependent on the quality of the work carried out.

TQM examines process and the customer/supplier interaction at each state within the process (Fig 1). Understanding the needs is a prerequisite to customer satisfaction.

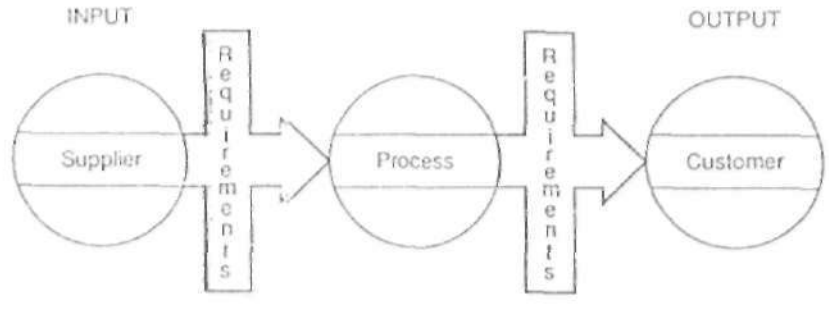


Fig.1 Establishing The Requirement (Everyone has customers and Suppliers)

Every process which flows through an organization is made up of customer supplier chains, whether it is a manufacturing process, a sales awarding process or a management reporting process(Fig 2).

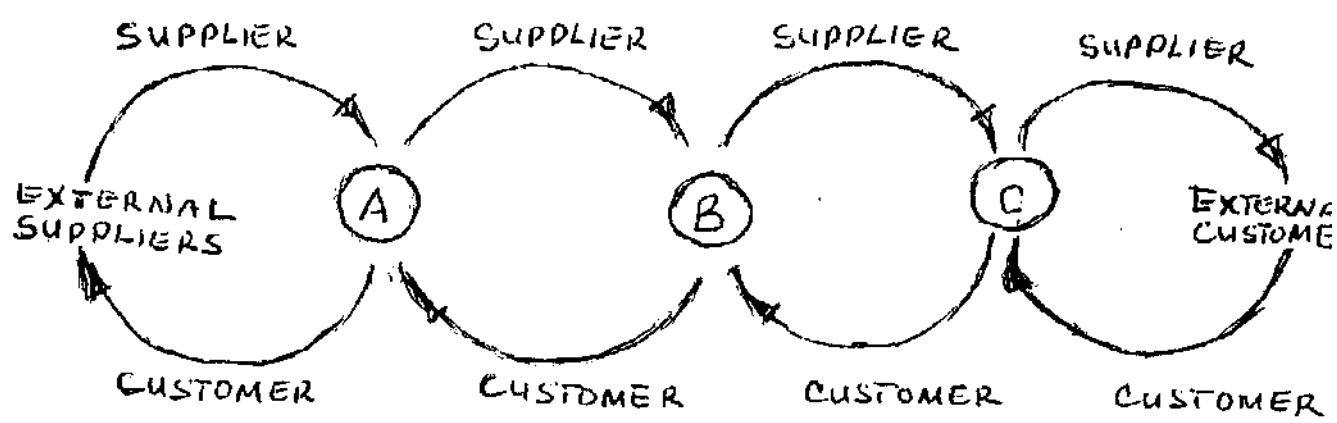


Fig 2 The customer - supplier chain.

People Make Quality. People make quality but Deeming suggests that over 85% of failures are created by management systems which have unclear requirements, inadequate training, inappropriate equipment, poor communication or no leadership.

The responsibility for developing people to become committed to total quality rests with all managers. This includes understanding and agreeing on the requirements of the job, knowing how to do the job and why it is being done, having the necessary materials, tools and information, being able to

measure improvement, and knowing what to do when things go wrong are also fundamental to this development.[7]

Teamwork. Total Quality Management emphasizes that team work is essential for success. Teams can be as broad as a business or as narrow as two or three people working together in a department. Working in teams brings benefit that individuals can not necessarily achieve, and maximizes the use of skills resulting in better decisions. Leading commercial companies have found that cross functional teams provided 80% plus of the benefits. This is not unreasonable as the major processes in an organization usually involves more than one function.

Effective communication. The possibility of misinterpretation from the sender to the receiver is substantial in any communication. Workers have the need to communicate with each other to explain workers requirements to give feed back, to suggest ideas, to raise problem and so on. Effective communication requires sufficient fore thought in order to eliminate assumptions on both sides.

The two-dimensional model of communication up and down, must be extended to include communication across the organization, thus breaking down artificial boundaries (Fig 3). Requirements, plans, changes, goals and objectives, progress, should all be considered within the scope of effective communication.

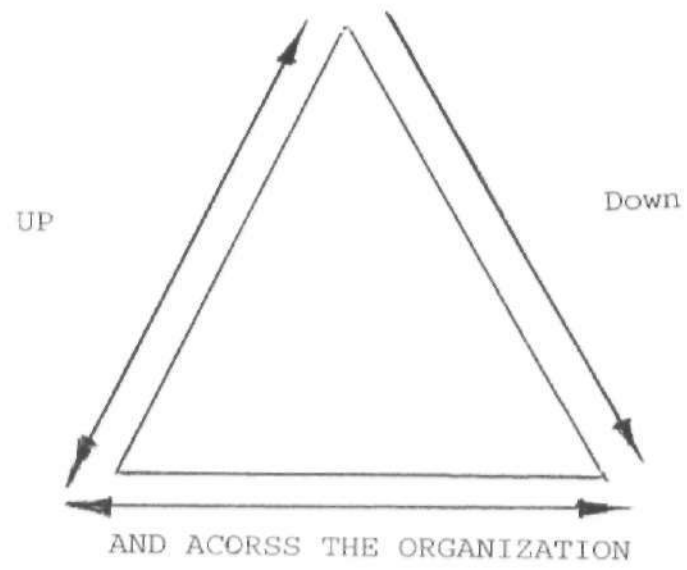


Fig 3. Three-Dimensional model of communication

Effective organization. Effectiveness is doing the right things. The key elements of effectiveness improvement include:-

1. Statement of a vision: how an organization sees itself in the future, this, together with a mission, focuses the whole organization on a clear direction.
2. Identification of key processes: for delivering the mission, and challenging the need to continue with processes which do not add value.
3. Identification of customer/supplier relationships: deciding who is the customer and their requirements.
4. Measurement of performance: develops the understanding of how services will be measured leading to internal contracts.
5. Clarity of authority and responsibility; establishes who are owners and who are the contributors to a process and identifies weakness in the roles and responsibilities context. [4]

2.4 OBJECTIVES OF TOTAL QUALITY MANAGEMENT

The central objectives of TQM can briefly be summarized as follows:-

a. Doing right things right, first time and every time.

b. Meeting customer expectation and even exceeding them.

c. To be quality driven in all aspects of ones job.

d. Everyone should be custodian of his job process and a quality manager.

e. To reduce errors, waste, frustration and crisis.

f. Profitability, productivity, competitiveness and better image.

g. To make everyone important i.e cooperation and team work.

h. Continuous process improvement and problem solving.

i. For survival and excellence the above mentioned points gives room to assert that total quality management is a customer -centered performance enhancing tool that aims at balancing and aligning the diverse elements of business as follows:-

1. Leadership.

2. Strategic planning and policy.

4. Human resource development management.

4. Work processes.
5. Management information systems.
6. External customer.
7. Employees.
8. Stock holders and
9. Financial management.

2.5 THE NATURE OF TOTAL QUALITY MANAGEMENT (TQM)

Total quality management which is a customer focused performance enhancing tool, can be applied to any type of organization. TQM balances the diverse elements of business and aligns them to achieve excellent business results.
The nature and goals of this revolutionary management tool has successfully secured for its committed practitioners phenomenal benefits and organizational excellence.

The total understanding of its contributions can only be achieved by unveiling the core concepts which serves as the pillars on which TQM stands:

a. Do the right things right, first time and always.
b. Continuously strive for improvement.
c. Achieve quality in every thing people, processes, products and services.
d. Strengthen the supplier customer chain.
e. Have visceral commitment to and obsession for customers who are both internal and external.

f. Use a structure process when solving business problems which should be tackled probatively and reactively.

g. Manage business through team building and team working.

h. Provide quality leadership and motivation to enable all employees commit to total quality process.

i. Use total quality tools to generate hard facts to manage business rather than depend on opinions or whims.

2.5.1 DO THE RIGHT THINGS RIGHT, FIRST TIME, AND ALWAYS

Doing right things right, first time and ways is the cardinal yardstick for assessing the state of seriousness or other wise of the commitment of any organization to total quality.

Management: The right things are judged strictly from the perspective of the customer. That is only activities that are geared towards customer satisfaction are considered acceptable. Any activity product or service that has no customer consideration is considered unacceptable and would be summarily discontinued. [']

According to one chief executive of Rank Xerox "any time a meeting is scheduled we make it a prerequisite that two questions must be answered.

1. *Who is the customer?*
2. What are the customer's requirements?

Following this routine development, all meetings, that can not identify a customer were to be dissolved. Suddenly people

begun to find time to do meaningful things. In total quality management, organization therefore, it is important to note this culture is always identifying who the customer is for an active product or service. It would never expend its energy on discussing activities that cannot push its business forward. When management fails to understand customers desire for services they require, a chain reacting mistakes are likely to follow. The wrong type of performance measurement, the wrong type of advertisement, the wrong working capital and many others. Having identified the right things to do, a structured process is used to ensure that all associated activities are correctly performed.

This is done right, so that output meet the customers requirements first time and always.

2.5.2. CONTINUOUSLY STRIVE FOR IMPROVEMENT

In organization that Total Quality management has been introduced for the purpose of achieving excellence and continuously strive for improvement to constantly attain Quality, there is no room for complacency with current performance.

The point is that regardless of how good present performance may be, there ought to be that culture that it can still be improved upon. Thus, the culture of aiming at perfection and accepting it as a credo is best articulated in the immortal

wards of the former chief executive of IBM Mr Thomas J. Watson which states that "it is better to aim at perfection and miss than to aim at imperfection and hit".

The use of Quality improvement Teams (QIT) is pervasive and well entrenched in TQM based organizations. Implementing a QIT culture into the organization is a key factor in re-ensuring that the Quality improvement process does not tail off after the initial enthusiasm. The requirement is to obtain 100% employee involvement in improvement teams. The Top Team need to have a member who is responsible for Quality improvement teams. It is the responsibility of his to define policies, plans and action which need to be taken to obtain 100% involvement. The accepted plans are to be in turn implemented by all members of the Top Team.

The teams are perpetually looking for problems in processes and outputs (proactive management) before the problem looks for them(Reactive management or fire tightening), which if eliminated raises Quality of their customers admiration at the lowest cost.

2.5.3 HAVE VISCERAL OBSESSION FOR CUSTOMER

Organization that have imbibe the concept of Total Quality Management have come to terms with the fact that a casual relationship exists between the way the employees are treated

and the development and growth of external customership and consequently, the fortunes of the business. TQM tool enables organization to recognize that the employee is the internal customer of management and that organizational excellence can only be achieved if the internal customers are treated well.

This idea is succinctly stated by the American Society for Quality control that The frontline providers of service treat customers the same way they treat the employees. Thus TQM organizations use external customers and employee surveys, face-to-face discussions, focus groups, advisory panel, market research etc. literally to listen to their customers.

David Kearns also observing the importance of customer listening in his statement that, "we got into big trouble mostly because we stopped listening to the customer. Sooner or later that sort of deafness can be total. To crown it all, Tom Peters agrees that, "I can think of no company that has found a way to look after external customers while abusing internal customers. The process of meeting customers needs begin within."[7]

2.5.4 QUALITY IN EVERYTHING PEOPLE PROCESS AND SERVICE

Quality in everything people process and service can only be achieved in organizations with a clear and unambiguous policy on Quality. This is attainable in the process of providing

answers to the following basic questions:-

1. What is the company's policy on Quality ?
2. What does the company mean when the word quality is used
3. Is the company a Quality company ?

These questions must all be answered by the TOP Team (Chief Executive Managing Director or General Manger) and clear and unambiguous answers provided for all the people that work in the company or organization.

Achieving Quality ino people calls for Quality in recruitment and selection.

Quality in human relations, Quality in appraisals, Quality in promotions, rewards, and Quality in human resource development and management. It also calls for Quality leadership at all levels of the organization that can motivate their followers to peak performance through crating room for inovativness inspiring shared vision and empowerment.

2.5.5 MANAGEMENT/STAFF CONCENUS

All elements of management should be well briefed and they should agree on the strategies to be adopted. The action that are followed must be consistent and they should also follow previously agreed procedures. Organizational hierarchies and structures may arrive at a consensus. Management may have to be patient to arrive at the consensus and should be willing to consider the opinion of lower staff.

2.6 THE OPERATION OF TOTAL QUALITY MANAGEMENT IN AN ORGANIZATION

The Implementation Process

The process leading to the implementation of total Quality Management in an organization includes the following:-

i. Formation of policy statement.
ii. Awareness campaign on new policy.
iii. Diagnosis of corporate performance.
iv. Initial strategy of policy accomplishment.
v. Management/Staff consensus.
vi. Launching of the new concept.

2.6.1 FORMULATION OF POLICY STATEMENT.

The very first step in the implementation of Total Quality management is in the formulation of a policy statement. The statement may be akin to the corporate mission. The policy statement is to be formulated and discussed at the first TOP Team planning meeting. It is important that the state is exhaustively by deliberated upon before sharing and brainstorming with other TOP Team members to obtain agreement. This invigorates leadership by example. [9]

The TQM policy statement is the philosophical guide for every element process within the organization. The notion to formulate a policy statement may be driven by either competition forces from similar organization(s) or at the realization of apparent inefficiencies in organizational processes. In some cases TQP may be adopted by an organization because it is the latest management style in town. The varying causative factors not withstanding however, management is focusing itself towards increasing quality as defined by the customer through the overall increased performance of all employees and organizational processes.

The envisaged changes to be effected, the strategies to be adopted and the goals to be achieved must be clearly defined in this initial policy statement.

2.6.2 INITIAL STRATEGY FOR POLICY IMPLEMENTATION

The adoption of the initial strategy to ensure the accomplishment of the formulated policy statement is done in two stages.

1. By adoption of key concepts and
2. By addressing the management elements.

Adoption of key concepts can be done using four key concepts as follows:-

i. Defining the customers-external and internal. As it was highlighted earlier external customer are the final

consumers of the products or services. The internal customers are the process owners within the organization.

ii. TQM improvement is a continuous process.
In Total Quality management, the attainment of perfection is a mirage, thus, the objective is on continuous improvement of the processes.

iii. Control of business process: this entails identifying all work processes deemed as critical and also identifying and assigning staff to clearly defined jobs.

iv. Leadership and Treatment: For Total Quality Management to be successful, in an organization a high degree of commitment, leadership, and team work is required. The extensive involvement of all staff in decision making and problem solving will help in building a common team spirit. Leadership in this regard, is the key to realigning the potentials of all employees.

The Management elements to be addressed are:-

i. Communication of mission, aims and objectives.

ii. Collection of external and internal intelligence. This include the market, customer attitudes and needs, comparism with competitors and the business environment.

iii. Measurement of internal performance. This will usually cover, the organization, development group, individual process, and product/service.

iv. Identification of improvement opportunities. This involves no blame to culture, prioritization of ideas and involvement of everyone.

v. Implementation of changes. This will usually cover within own group, leadership style, team work method and process management.

2.6.3 AWARENESS CAMPAIGN ON NEW POLICY

The purpose is to designate information amongst all employees on the new policy statement. Open or face-to-face methods of communication with all elements within the organization at this stage must be used. Total Quality Management should be pursed at this stage more as an individual process rather than a departmental initiative.

That is to say that everyone engaged in a specific work must be fully involved.

The idea is to drive the message to both management, and senior and junior employees to see that the new concept is beneficial to the organization and to all and sundry. Perhaps management may require initial training on communication to help spread the idea through all levels within t he organisation. In cases were constraints abound, the services of consultants can be implied. At this stage the consent of union leadership ought to be sought in order to maintain the principles of industrial democracy.

2.6.4 DIAGNOSIS OF CORPORATE PERFORMANCE.

The initial step towards diagnosis of organizational performance is to identify and prioritized the key issues to be addressed in line with the new policy statement. The first and foremost diagnosis to be carried out is the weight present performance of the organization vis-a-vis expected standards already spelt out. the strengths and weakness of the organization are fully identified.

Traditionally, management of standards has been mostly left to cost accountants who execute their work only by assessing financial information. In modern management, such procedures are deficient because they do not effect on whom the final judgement of quality lies. That a company has reduced or streamlined its costs does not in any way mean that its products or services have customers. Thus in TQM the emphasis in on assessing performance against desired standards. The responsibility of defining performance standards that best reflect customer demand or satisfaction lies on Process Owners, Top Management and recently TQM coordinators.[5]

In the diagnosis, attention should specially be directed at the customer, employees, systems audit, cost of quality and tracking of some inherent production problems.

Customers: An assessment of customer requirements and a review of how the organization satisfies them. For this task to be

positively accomplished, it may require a face-to-face interviews with the customers. This will eliminate errors associated with questions as a result of misunderstanding or misrepresentation by the customer(s).

Employees: This has to do with assessment of employee attitudes and perceptions towards the organization and its approach to customers/employees.

At this juncture the experience and expertise of the older employees becomes a great asset which must be exploited for the purpose of achieving organizational goals.
Just as it is with the customer assessment. a face-to-face interview with the employees will be of paramount importance.

System Audit: This is an audit of the system and processes that affect Quality. Usually it should include all existing Quality system and indeed, any process or system that impacts on quality and service. The focus of the audit is to identify how the processes impact on the customer and employees.

Cost of Quality: The cost of quality is an assessment of what quality or the lack of it is presently costing the organization. These assessment will identify three components these are:- Cost prevention, cost appraisal and cost failure. The cost prevention is the associated with trying to get "things right the first time".

The cost of prevention is the costs associated with checking whether things were right the first time" . The cost of failure is the costs associated with not "getting it right the first time".

The cost of prevention is called cost conformance which literally means the cost of investing to ensure that activities are achieved to the agreed requirements and problems prevented from occurring.
The cost of failure is also called the cost of non-conformance which literally means the cost incurred by failing to achieve activities to the agreed requirements.

In general terms, two major components are associated with determination of cost of quality.

i. the hard cost are available from management accounts e.g the rework, training, costs, warranty claims etc.
ii. The soft cost which is associated with peoples time.

TRACKING OF SOME PROBLEMS

This involves identifying a small number of problems and tracking them to determine the root causes of the problems often it is discovered that major problems are made up of accumulation of small events. A diverse is said to be the accumulation of several putting always. Knowledge of present performance provides an excellent impetus for improvement,

accomplished before the organization may proceed to manage the customers under a new framework of total Quality management.

It can be argued that all activities should add value to the organization. This is possible by each person in the supply chain adding value to the process. The benefits associated with these activities may be financially quantifiable. In most cases, the benefits will be very much more subjective.

At the same time as looking inward for effectiveness, the outside world is changing all the time through product and service innovation thereby becoming more competitive.
Fig 4 encapsulates the process of attaining quality improvement in terms of a time frame.[7]

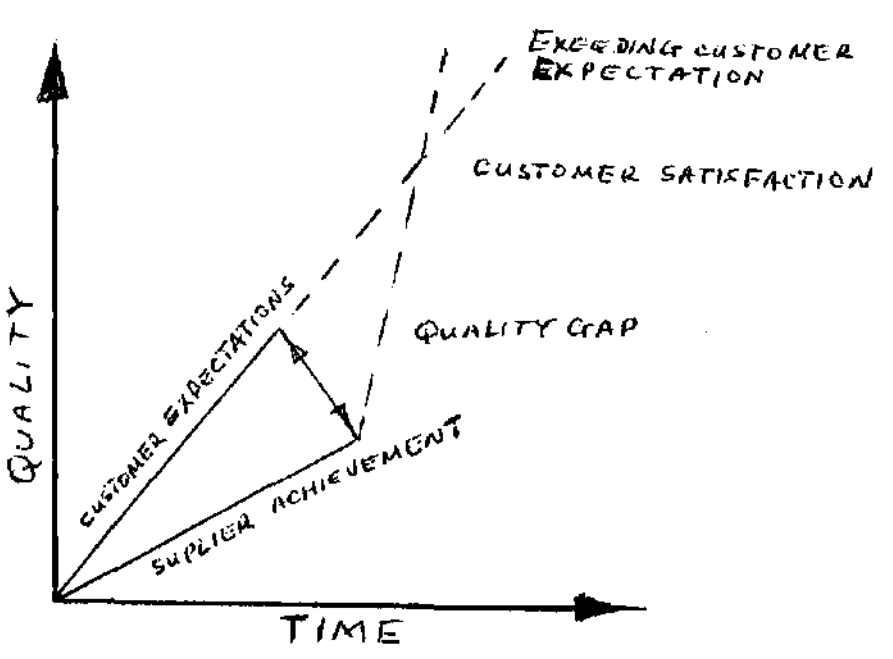


Fig 4. Attainment of Quality Improvement with time

2.7 CRITICAL DIMENSIONS OF QUALITY

The pursuit of pinpoint accuracy by the customer has forced just in time (JIT) activities on suppliers, who in turn are required to developed internal disciplines to keep the promise. It is not just a matter of on-time delivery of good and services. This is because while delivery promises are being kept, suppliers should be trying to keep the promise on all the following seven critical dimension of quality.

Performance, Reliability, Conformance, Durability, serviceability, features and Aesthetics. Some or all and of these may be important to the customer. Total Quality management requires that the to each must quality promise related to each must be fulfilled.

There is an eighth dimension of quality, which is the "perception of the customer". This is the customer's impression of a product or service formed by images, conversations, and past experience. Customer surveys have discovered that only 4 out of every 100 dissatisfied customers will complain. Each dissatisfied customers, will tell ten other consumers, but only one in Ten dissatisfied will continue to buy. It costs at least five time as much to attract new customers as it does to keep an existing one.

2.8 PROJECTS, TOOLS AND TECHNIQUES OF TOTAL QUALITY MANAGEMENT

2.8.1. PROJECTS OF TQM

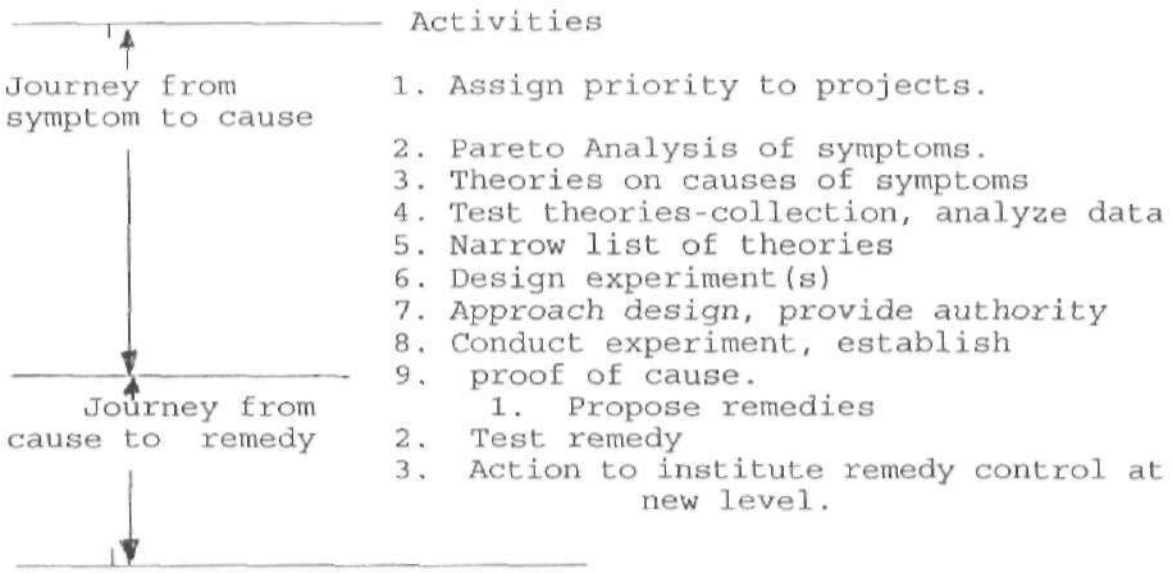
Within most organizations wastage of materials, time and human resources are an everyday reality. In the context of TQM the essential elements for improving efficiency are:-

1. Identifying /prioritizing problems or improvement opportunities
2. Project structure to address the issue.
3. Managing quality improvement projects.

Most people can see opportunities for improvement at work, either in their own jobs, own department or acros organization. A disciplined approach to capturing these ideas and systematically deciding which ideas should be worked on is vital to the success of the process.

Project teams need to be established, comprising people who are knowledgeable about the issue at hand and also those people who are effected by the eventual solution. These teams are usually disbanded when it can be legitimately claimed that the root cause(s) of the problem have not only been discovered but also success has been measured and recognition of the people concerned has taken place.

Juran's project approach which is tagged "Journey from sympton to cause" and `cause' to remedy in widely accepted and adopted.



There are other systematic methods, including the five-stage project approach:

1. Developing a project proposal.
2. Step-by-step problem analysis.
3. Educating and training-those involved and communicating the changes needed.
4. Implementation planning.
5. Implementation and follow-up.

The structure of such process deliberately counterbalances the desire to implement 'instant solutions' without having really established the root causes, the permanent solutions, and the implementation impact on the organization.

2.8.2. TOOLS AND TECHNIQUES OF TQM

Total Quality management has harnessed together tools and techniques which have a quality or statistical origin and should be considered for use during different phases of the improvement project implementation. There are about 13 different tools and techniques but this study will focus on about 10 of the popular ones. These tools are important to management and employees in TQM oriented organizations for achieving corporate goals.[''] These tools and techniques are as follows:-

1. *Process flowchart (for recruitment)*
2. Cause and effect analysis
3. Parieto analysis (80/20 rule)
4. Frequency Histograms
5. Failure Prevention analysis (FPA)
6. Solutions effect analysis
7. Force field analysis(FFA)
8. Why-why diagram
9. How-how diagram
10. Brainstorming
11. Departmental purpose analysis(DPA)
12. List reduction
13. Gratt charts.

PROCESS FLOWCHARTS

Flow charts generally show the inputs, activities, decision points and outputs for a given process. There are many

variations that have been adopted for specific purposes. For example, to show flow of papers work through an administrative system, to show movement of materials through an operational system and flow chart for recruitment of employees(Fig5)

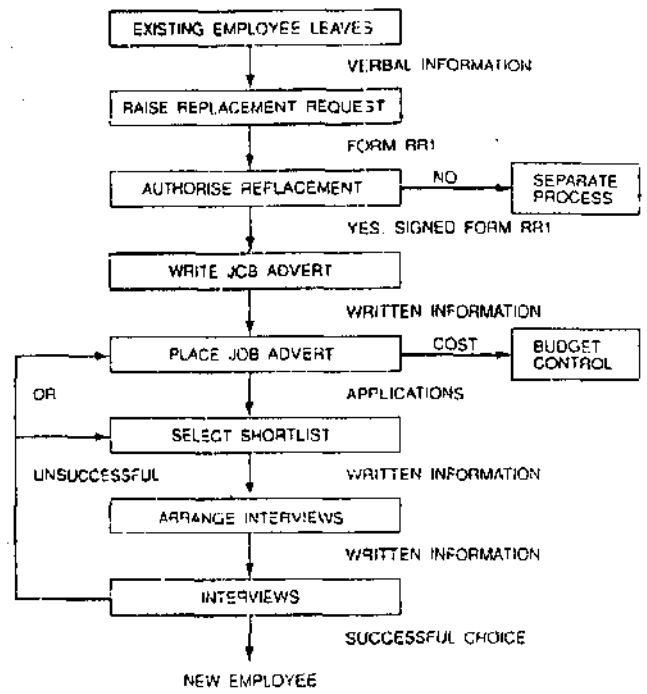
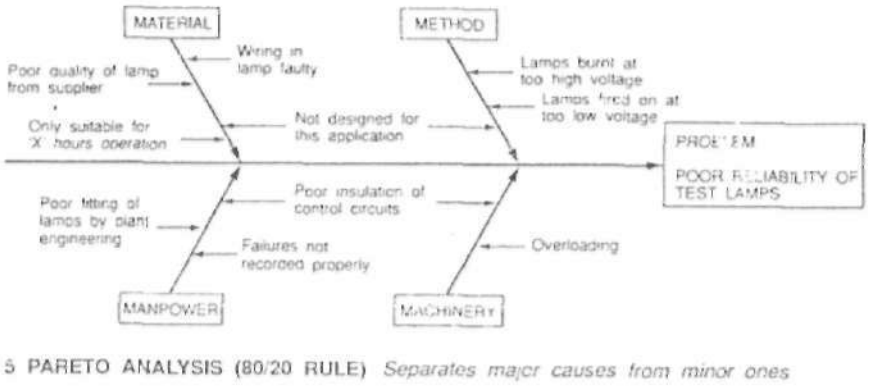


Fig 5 PROCESS FLOWCHART(for Employment)

CAUSE AND EFFECT ANALYSIS

The cause and effect analysis attempts to evaluate "If the problem is..... then the likely causes are .....cause and effect analysis is a systematic way of looking at effects contribute to specified effects. The cause and effect analysis is also called Ishikawa diagrams, after its Japanese inventor Dr Kaory Ishikawa. The effect being

analyzed can be expressed as a problem or as desired state and the steps that have to be taken for an organization to get to the desired goal. It is therefore an organizing technique for processing lists of ideas in group to make understanding clearer (Fig6)



5 PARETO ANALYSIS (80/20 RULE) *Separates majcr causes from minor ones*

FIG 6 CAUSE AND EFFECT ANALYSIS

PARIETO ANALYSIS(80/20 RULE)

The parieto Analysis separates major causes from minor ones. It is a technique for recording and analyzing information which easily enables the most significant aspects to be identified. the patten has been referred to as the 80/20 rule(Fig7).

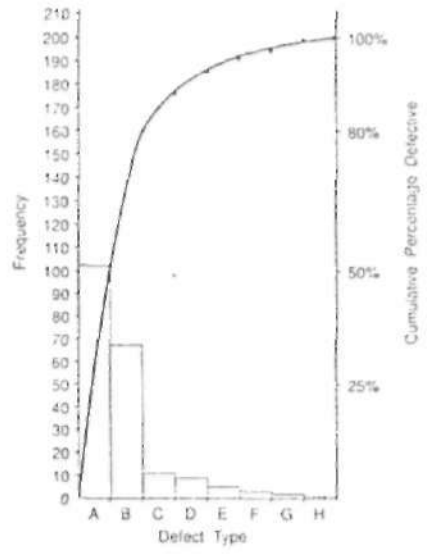


Fig.7 Parieto Analysis

FREQUENCY HISTOGRAMS

A histogram shows the frequency distribution of some characteristics over a range of values. The advantage of a histogram over a table is that of its immediate visual impact, which is more effective than a table for displaying information. The histogram is used whenever appropriate to increase the visual impact of numerical data.

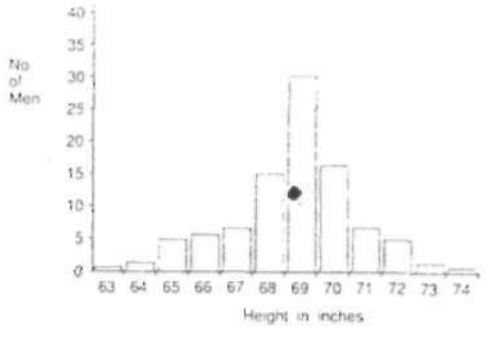


Fig8 Frequency Histogram

FAILURE PREVENTION ANALYSIS(FPA)

The failure prevention Analysis is used to anticipate the probability consequences of something going wrong.
The results of such analysis helps to warn the organization in advance that something wrong is about to happen and the likely consequences to the system(Fig9)

introduction of a new product

Possible failure	Probability	Consequence	Overall rating	Ranking
A. Late delivery of raw materials	8	1	8	6
B. Unable to obtain raw materials	1	10	10	5
C. Machine not suitable	3	10	30	2
D. Machine not available	5	10	50	1
E. Paperwork not available	6	3	18	4
F. Operator training not carried out	3			7
G. Methods of measurement not determined	3	7	21	3

FIG 9 FAILURE PREVENTION ANALYSIS(FPA)

SOLUTION EFFECT ANALYSIS

The solution effect Analysis teleguides the organization to assess the effects of an out come whose solution is known. It operates on the basis that "If the solution is.....then the effects could be..... the solution effect analysis is a technique of analyzing anticipated solutions to a problem and the likely effects of that solution to achievement or otherwise of organizational goals in Total Quality management. (Fig 10)

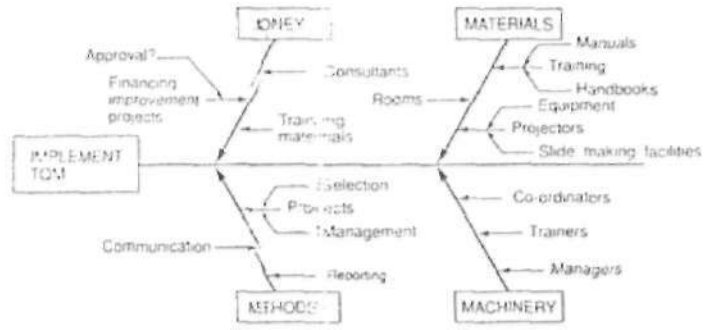
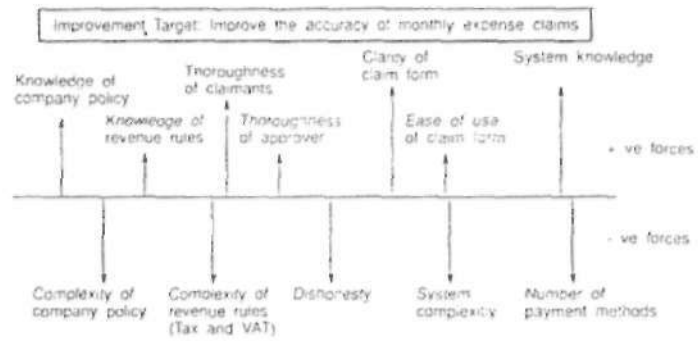


Fig 10. Solution Effect Analysis

(if the solution is.....then the effect could be.....)

FORCE FIELD ANALYSIS(FFA)

The force field analysis attempts to provide an organization with the inside of those forces that help or obstruct change during the process of adopting Total Quality Management(Fig11)



Force field analysis sheet

Positive forces				Negative forces			
Force	Ability to influence	Effect	Total	Force	Ability to influence	Effect	Total
Knowledge of company policy	5	6	11	Complexity of company policy	1	4	5
Knowledge of revenue rules	5	2	7	Complexity of system	5	2	7
Thoroughness of claimants	3	6	9	Number of payment methods	4	1	5
Thoroughness of approver	2	3	5				
Clarity of claim form	10	8	(18)				
Ease of use of claim form	8	6	(14)				
System knowledge	5	1	6				

Forces which cannot be influenced: Complexity of revenue rules
Dishonesty

Fig 11 Force Field Analysis(FFA)

(The forces that help or obstruct change)

WHY-WHY DIAGRAM

The purpose of the why-why Diagram is to provide an alternative method of identifying the root causes to a problem using divergent thinking technique.

The process involves brain storming on the causes, in order to identify the major causes(Fig12)

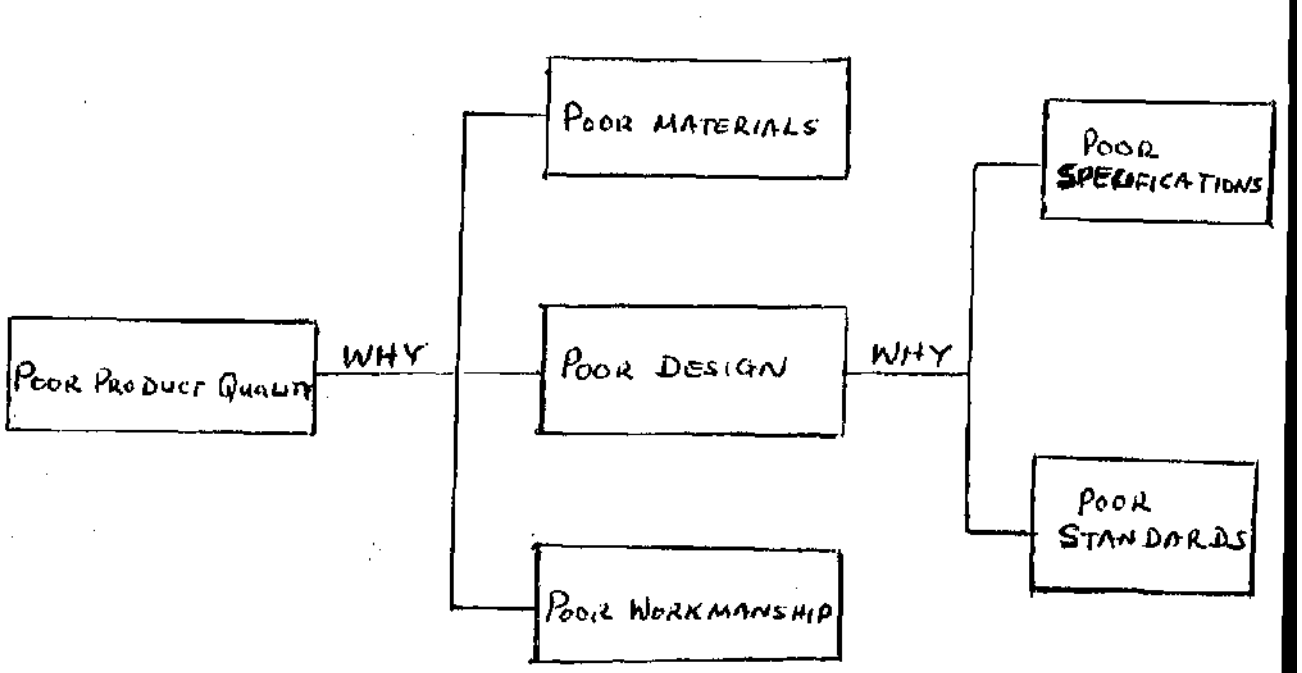


Fig 12 WHY-WHY-DIAGRAM

source: World class performance through TQM

HOW-HOW DIAGRAM

The purpose of how-how diagram is to creatively explore and consider numerous solution alternatives instead of jumping to the obvious solutions. It also assists members determine the specific steps that should be taken to implement a solution and hence formulate a specific action plan.

Furthermore it helps organization to practice a divergent technique of proffering solution to problems affecting the process of imbibing total quality management.(Fig13)

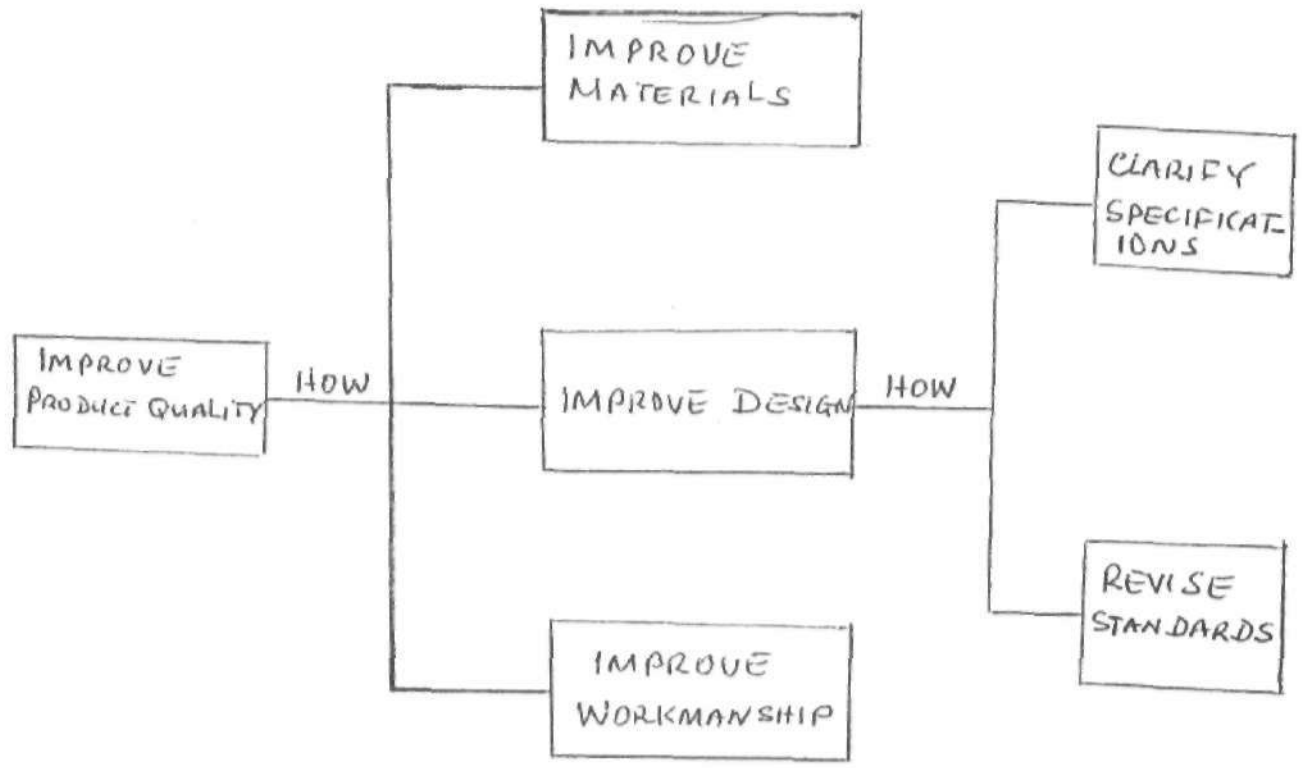


Fig13. HOW-HOW DIAGRAM

Source. World class performance Trough TQM.

DEPARTMENTAL PURPOSE ANALYSIS(DPA)

Departmental purpose Analysis is a technique of giving a practical approach to improving effectiveness (Fig14)

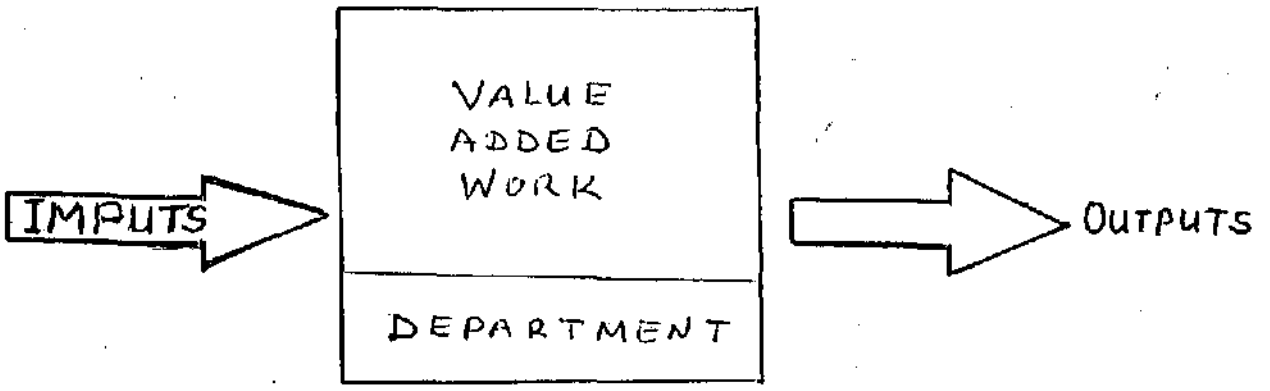


Fig.14 Departmental Purpose Analysis(DPA)

The first part of this is a structural review defining the role and responsibilities of each function in relation to the mission.

The second part looks at the customer/suppliers relationship and identifies value added processes or opportunities for quality improvement. The third and fourth stages quantify the cost of quality opportunity and an action plan to gain measurable improvement.

CHAPTER THREE

TRENDS OF MINING ACTIVITIES IN NIGERIA

3.1 HISTORICAL PROSPECTIVE

The post-independence period in Nigeria experienced an upsurge in international investments. Nigeria as many governments provided favorable monetary and fiscal incentives to attract foreign investments. protection of foreign investments was also guaranteed through trade agreements like the IBRD convention of 1965 which Nigeria participated in to settle investment disputes and guard against exploration. This was the environment that induced activities of the minerals exploration in Nigeria. This culminated in the exploration of tin, columbine, coal etc and contributing significantly to the natural income development.[*]

The blossom in the minerals was short lived as Nigeria noticed sharp decline in minerals production partly as a result of the civil war and partly by the indeginization decree of 1972.

The situation became compounded with the crash of the International Tin Buffer stock in 1985. Ultimately, the multinationals and their expatriate professionals left, leaving the bulk of activities in the sub-sector on indigenous operators who were limited in capital outlay and technology.

In consequence, these small miners shifted their activities to the production of industrial non-metallic minerals such as marble, limestone, barytes, granite, etc. needed for construction and domestic industries.
In an attempt to see the decline, the Federal Government promulgated a new policy on mineral development in 1971, with the main objective of rapid development, diversification, conservation and utilization of mineral resources in the country.

Government decided to act as a catalyst in the mining sub-sector through its active participation in both exploration extraction and trade in the minerals industry using public funds. In order to achieve this objective, the Nigerian Mining Corporation was established in 1972 to lead mineral development in the country. Even with this creation, the mineral sub-sector continued to show sluggish performance as it shows only 0.3%, 0.2%, 0.2% in 1990, 1992 and 1994 respectively.

Coinciding with the decline in minerals production was the rising impact of mineral oil as major provider of funds for the socio-economic development of the nation. Whereas the petroleum industry continued to show a domineering influence on the economy, the mining sub-sector records a declining sectoral growth rate. The result is that the country became

vulnerable to the vigaries of the international oil process. When the crude oil market softened in the mid-1970s and virtually collapsed in early 1980s, the country did not have alternative to cushion the global depression. The overall effect is presently marked by a serious lack of liquidity to sustain the economy.

The down-turn in the economy adversely further became disorderly due to the following:-

a. Badly structured and ill-equipped mining inspectorate to carry out surveillance of the mines fields.
b. Disorder in the mine fields accessioned by illegal miming and speculative pegging of tittle deeds.
c. Cumbersome procedure in processing mining applications due to obsolete mining laws and regulations.
d. Multiplicity of government functions in supervising the mining industry.
e. Lack of enough tools and funding in the acquisition of mineral.
f. Inadequate manpower to sustain the development and challenges of the Industry and
g. Lack of awareness on the investment opportunities that exist in the mineral sub-sector.

2.2 TRENDS IN SOLID MINERALS DEVELOPMENT

Inspite of the relatively long history of the discovery of minerals in Nigeria, the trends in mineral resources

development have not been outstanding. Poor capital base, weak technological and infrastrctural base, inefficient management and policy implementation are identified as the major impediments to the much needed investment required for effective development of the sub-sector.

3.2.1 MINING OF INDUSTRIAL MINERALS

Industrial minerals are those class of minerals that find usage in manufacturing industries. These includes limestone, barites, kaolin etc.

A considerable number and variety of local occurrences of these minerals have long been identified(Anon,1987). Earlier records merely classify the reserves of several Nigeria's non-metallic mineral deposits as large or vary large(Anon-1989).

However in recent times there have been some mineral reserves estimation with regards to Kaolin, Talc, gypsum, Feldspar, Bentonite, Barrytes, Marble, granite, silica, sand, kynite and limestone(Table 1 and 2)

TABLE 1: NON-METALLIC MINERALS IN NIGERIA

S/N	MINERAL	LOCATION	ESTIMATED RESERVE	USER INDUSTRIES	EXPLOITATION	QUALITY
1	Trona (for soda ash)	Gashua and Nguru (Yobe State), Zumo (Adamawa State)		Manufacturers of glass, chemicals, caustic soda, alumina, paper. Also used for petroleum refining		62% sodium carbonate
2	Kaolin	Kankara (Katsina State) Major Porter (Plateau State) Ibeshe (Ogun State) Darazo, Alkaleri (Bauchi State), Ifon, Ijero Akure (Ondo State)	3,400,000 190,000,000	Paint, rubber and paper industries (as fillers) cement, cosmetics, ceramic and abrasives manufacturers	Six plants exist with a total annual capacity of 150,000 tonnes	Purity is as high as 90%
3	Talc	Kagara (Niger State) Ilesha (Osun State)	40,000,000	Paint, cement, cosmetics, ceramics, and insecticides	One known plant exists with a 3,000 tonnes per annum	72% of Alluminium silicate.
4	Phosphate	Sokoto (Sokoto State); Ilaro (Ogun State)		Phosphate fertilizers, phosphorous and phosphoric acid manufacturers.	One beneficiation plant of 3,000 tonnes per annum capacity	34 - 36% as P_2O_5
5	Limestone	Mfamosing (Cross River State); Ewekoro, Sagamu (Ogun State); Nkalagu (Enugu State) Ukpilla (Edo State); Yandev (Benue State); Bauchi (Bauchi State); Sokoto (Sokoto State)	1,200,000,000	Cement, calcium carbonate and hydrated lime manufacturers	Seven cement manufacturers are currently producing about 2,000,000 tonnes per annum	85 - 95 % as calcium carbonate.
6	Gypsum	Potiskum, Damboa (Yobe State); Wurno (Sokoto State) Shefleng (Adamawa State) Bauchi (Bauchi State) Ifo (Ogun Stae) Plateau, Imo, Edo and Benue States)	200,000,000	Cement, chalk and plaster of paris manufacturers	The cement manufacturers consume about 100,000 tonnes	
7	Feldspar	Baro (Niger State); Alawa (Niger State); Oshogbo (Osun State) Okene (Kogi State) Kwara and Ogun States.	1,200,000	For drilling mud in petroleum industy	Three companies produce drilling mud with a capacity of 40,000 tonnes per annum	
8	Bentonite	Gashua (Yobe State) Ishiagu (Abia State) Anambra and Adamawa State	1,200,000	For drilling mud in petroleum industry	Three companies produce driling mud with a capacity of 40,000 tonnes per annum	80% sodium/ calcium montmorillonite
9	Barytes	Azara, Awe (Plateau State) Wukari (Adamawa State); Abakaliki (Enugu State) Cross River State.	2,000,000	Petroleum well drilling companies	Three companies are exploiting some of the deposits. Total output is about 30,000 tonnes per annum	Specific gravity of 4.09

10	Salt	Salt spring at Awe (Plateau); Abakaliki (Enugu State) and Uburu (Imo State) Rock salt in Benue State		Industrial and domestic uses	The salt deposits are not being exploited.	
11	Gemstones	Plateau, Bauchi, Yobe, Borno, Ogun, Ondo, Imo, Kaduna, Kano, Oyo and Osun States. Gemstones such as Aquamarine, Topaz, Beryl, Agate and Tourmaline are found in the States.	The reserves are yet to be determined	Ornamental, jewellery industries and electronic industries.	Very few cutting and polishing plants have been established. Gemstones are otherwise exported as found in nature	High purity
12	Coal	Enugu State Plateau State Kogi State Taraba State Bauchi State Anambra State Abia State Edo State	500,000,000	As fuel and for production of tar, gases and oils. Cement, steel mills, industrial boilers, carbonization plants.	Annual production is as low as 25,000 tonnes.	High grade.
13	Marble	Kogi, Oyo, Edo, Benue and Plateau States.	200,000,000	Cement and hydrated lime production. Also used in metallurgical bbuilding, construciton and chemical industries.	The industries utilising marble consume a quantityi that is less than 100,000 tonnes per annum	
14	Granite	Plateau, Ondo, Bauchi, Abuja (FCT), Kogi, Cross River, Oyo, and Imo States	300,000,000	Decorative stones in homes and offices. Also used for other purposes in building construction industry.	The three granite cutting and polishing plants in the country utilize about 60,000 tonnes per annum.	High grade
15	Sand	Glass sand in Ondo, Plateau, Lagos, Enugu, Anambra, Rivers and Delta States. Foundry sand in Ondo and Kogi States.	150,000,000	Glass manufacturers. Foundry and ceramic industries.	The five glass plants in the country currently utilize 120,000 tonnes per annum	High silica (S.O.)
16	Kyanite	Binin Gwari (Kaduna State); Masuku, and Kuta (Niger State)	20,000,000	Used in cement industry and for manufacture of refractory bricks and mortals	The level of exploitation is very low. About 10,000 tones are being produced annually.	
17	Diatomite	Borno State	Commercial quantities	For insecticides, filter medium and polishing compounds		

SOURCE: Aliyu A (1996)

TABLE 2: METALLIC MINERALS IN NIGERIA

S/N	MINERAL	LOCATION	ESTIMATED RESERVE	USER INDUSTRIES	EXPLOITATION	QUALITY
1	Gold	Ilesha (Osun State) Niger State Igarra (Edo State) Sokoto State Kaduna State Kwara State		Jewellery and ornament industries	Most of the deposits are not exploited.	
2	Lead-Zinc Ore (Galena)	Rifiwai (Kano State) Zuru (Kebbi State) Wase (Plateau State) Abakaliki (Enugu State) Ohaozara, Ishiagu (Abia) BBauchi, Kogi and Cross River States	1,200,000 (in Abakaliki) other deposits are yet to be analysed	Lead and Zinc for battery manufacturing and engineering industries	Most of the deposits are not being exploited.	Lead (Pb) 70% Zinc (Zn) 29%
3	Iron Ore	Itakpe (Kogi State) Benue State Sokoto State Bauchi State Borno State Plateau State Enugu State	2,500,000,000	Steem manufacture and engineering works.	Steel manufacturing and steel rolling mills have been establshed to exploit some of the deposits.	
4	Columbite	Plateau State Kaduna State Bauchi State Kano State Akwa-Ibom State		Used for producing special steels, ferro-alloys, electronic tubbe filaments (in rocket and aircraft manufacture)	Small quantities are being exploited. Level of exploitation is low.	High grade.
5	Ilmenite	Jos, Plateau State, Abakaliki		Production of titanium dioxide pigment, and in steel industrie	Lack of appropriate technology that can convert ilmenite proven on the Jos Plateau	
6	Cassiterite	Jos, Plateau State, Kwara, Benue, Niger and Ondo States		Tin plating, hardening of copper and lead in alloys	Partial exploration and exploiration	High grade
7	Uranium	Ammonition, defence industries, generating electricity			Very low exploration, investigation and exploitation	
8	Copper	Rish (Bauchi) Zakare, and Banka in Kano State		Used in ammoniton, communication and steel industreis	Deetailed exploration and evaluation required.	
9.	Molybdenite	Kigom, Plateau State and Ondo State		Special steel, rado equipment, chemicaland paint industries	Detail exploration and evaluation required	
10	Manganese		Kaduna, Niger and Sokoto States	Special steel alloys, abrasives, etc.	Lack of detailed exploration and development	
11	Wolframite	Electrical and electronic industries		Used in electrical and electronic industries	More detailed exploration and evaluation needed	Good quality
12	Rutile and Thorite	Plateau and Kaduna States		Used in stainless and special steel for military hard wares; also as fillers	Lack of detailed investigation	High grade.

SOURCE: Aliyu A (1996)

of its products as compared to imported finished products. The import culture of the Nigeria industrialist also contributed to the slow growth of the markets.

Small scale mineral most of whom operate illegally, are known to engage in winning gemstone, kaolin, gypsum, barytes in several parts of the country. Notably amongst the gemstones known to occur in the pegmatities of central Nigeria includes aquamarine, emeralds, sapphire, ruby, topaz, tourmaline, zircon and almandine.

3.2.2 COAL MINING

Nigeria has an enormous coal reserves, however the rate and level of actual production has remained very low since after the Nigerian civil war(Alexius, 1989).
Mechanical longwall mining was introduced for the extraction of Enugu coal in 1976.

The mechanization programme was aimed at increasing production from about 250,000 tonnes to 1 million tonnes per annum. The technical support of polish engineers and supervision did not stop the production from declining from about 250,000 tonnes in 1976 to 52,000 tonnes in 1983.

Mining operations were reverted to manual and production appreciated, attaining 150,000 tonnes in 1986 but fell to an

average of 100,000 tonnes between 1987 and 1988. Ever since then, coal production in Nigeria has been eratic, until recently when an misignificantly quantity was shipped to Italy.

Various reasons have been given for the failure of the mechanization programme which include the following (Alexius, 1989).

a. The machinery/equipment installed did not function as expect due to excessive wear and tear, requiring proportionate supply of spare parts which were not delivered on time.

b. Electricity supply and distribution were inadequate and irregular, resulting in frequent shut downs and flooding of the mines.

c. Indigenous personnel lacked the expertise to handle breakdowns and, in some cases, manipulation of the machines.

The total domestic coal demand for 1990 was estimated to be over 4 million tonnes. Coal-based power plants at Oji River, Makurdi and Onitsha were expected to consume about 0.6 mt/y. 1.5 mt/y and 2.0 mt/y respectively. The Nigerian cement company Nkalagu was expected to consume 9000 to per month to fire its kilns.

Coal plants when blended with imported coking coal can be used in the Nigerian steel Industry. Other products of the

carbonization plant include light oil ammonia, hydrogen sulphide and liquor which are used as industrial raw materials and tar for road construction.

Export enquiries for Nigerian's coal have been estimated at millions of tonnes annually. The total production from Enugu coal mimes has been very much below expected tonnages and the performance of Okaba surface mine has been of little significance.

3.2.3 IRON AND STEEL

The primary raw material in the manufacture of iron and steel is Iron Ore. Mine development and production of this Ore started at Itakpe, Kogi State in 1978.

The work was started by the National Iron Ore Mining Project (NIOMP) with sofrims of Frances as consultants, The project was set up to supply 100% of Iron concentrate, meeting 64% Fe requirements for Ajaokuta Steel Project as well as meeting 40 percent of the Delta Steel company's (68% Fe) super concentrate requirements.

Between 1978 and 1993 a total of about 2.30 million tonnes of run-of-mine ore and 6.0 million tonnes of waste were exploited (Famuboni, 1993).

The essence of the Itakpe Iron Ore Mining Project, is to produce 2.15 million tonnes of 63-64% Fe concentrates and 0.55

Million tonnes of 67-68% Fe super-concentrates annually, for use as feeds to Ajaokuta Blast Furnace and Delta Steel direct reduction plant respectively from a reserve of about 200 million tonnes of Iron Ore deposit, averaging 36% Fe.

In march 1992 NIOMCO was redesignated a project in order to facilitate funding and supervision. As a result of this the tempo of work increased and by December, 1992 3 lines of Beneficiation plant was commissioned.

This led to the supply of the first batch of concentrate to Ajaokuta Steel company on the 7th April, 1993.
Total delivery to ASCL stood at 11,857.705 tonnes in 1993. While 95,720 tonnes and 54,534 tonnes of concentrate were produced in 1993 and 1994 respectively(Turaki, 1997).

3.2.4 NON-FERROUS METALS

Notably amongst non-ferrous metals that have been exploited in various quantities include Tin, columbine, lead, zinc and copper.
In 1971 Nigeria rouse to the sixth position in world in tin production.
During same year it was the leading producer of columbine.
Tin mining was then a private sector affair and many foreign and indigenous mining companies operated profitably.
The government concerned itself with providing suitable

environment and necessary infrastructure in the mines field and collected royalties rents and related rates.
Administrative requirements were treated with despatch and reports and permits were issued promptly.

The mining operations were also effectively monitored by the then mines inspectors division to ensure compliance with safety and operational guidelines.
The 1972 indigenisation programme introduced by Government has contributed to the down-turn in tin mining activities. In 1980 the tin market at the London metal market collapsed, this further worsen investments in tin mining. This situations led to the eventual merger of all the foreign tin mining companies. In recent times, even the biggest tin mining operators such as consolidated tin mining company have resorted to mine production trough contractors.

This situation has led to the minesfield being dominated by small scale miners most of whom are illegal operators.
The following reasons have also contributed to the decline of tin mining in Nigeria:-

a. High production cost.
b. Exhaustion of the more attractive and shallower reserves leaving mostly the sub basalt deposits.
c. Lack of finance for the importation of mining equipment, machinery and spare parts (Adamu 1993).

At least 80% of Nigeria's tin is sold overseas, while the balance is used locally for the production of white metal bearings, steel balance weights and solders.

Lead and zinc deposits were discovered at Ameka, and Zurak as far back as 1960. These deposits were skeletally developed by foreign investors before the second world war. As at 1984 these mines were still undergoing appraisal by Nigeria Mining Corporation. Some Traces of various Ore of Copper have been observed at Ririwai, Zarara, Rishi, Banke Hills and Babban Tsauri areas of Bauchi and Kano States. Most of these deposits have been considered to be of uneconomic grades as to arouse much interest (Anon,1989)

Traces of ferro alloy elements occur in various parts of the county but need further investigation. These include manganese, vanadium, nickle, chromite, molybdenum and wolfram, columbite, tantalum and zircon are being extracted as by products in tin fields.

3.2.5 CONTRIBUTIONS OF THE MINERAL SECTOR TO THE NIGERIAN ECONOMY.

From the forgoing analysis of the trends in solid mineral development, the values and contributions of the sector to the national economy is most appreciated in terms of foreign exchange earnings and revenue accruable to government account. Some important contributions are as follows:-

1. Contribution to the Gross Domestic product.

2. Contribution to Government Revenue.
3. Contribution to Foreign Exchange Earnings
4. Development of infrastructure.
5. Development of manpower.
6. Utilization of local Resources-Agriculture, oil refining, building/construction industry, feedstock etc.
7. Employment Generation and moderate relative income.
8. Diversification of the Economy.
9. Conservation of scarce foreign exchange.
10. Overall promotion of economic and social Development - through VAT and Education Tax.

3.2.6 PROBLEMS OF THE MINERALS INDUSTRY.

Despite its laudable contribution to the national economy, the minerals sector is not without problems. some of these include:-

1. Inadequate capital investment into the sector especially by the organised private sector.
2. Inadequate development of marketing organization for export as well as domestic markets.
3. Lack of adequate foreign trained and experienced technicians, engineers and managers.
4. High cost of foreign exchange in acquiring of technical equipment and facilities for exploration and mining activities.
5. Insufficient resources for research and development activities.

6. Poor infrastructural facilities.
7. Lack of required raw materials for laboratory researches eg. chemicals.
8. Activities of illegal miners and smugglers.
9. Incessant labour interest.
10. Uncooperative attitudes of foreign companies towards the development of the Nigerian Economy.

3.3 MANPOWER DEVELOPMENT IN THE MINERAL INDUSTRY

Manpower in the mineral industry is required to explore, exploit, process, research, market, and utilize the available mineral resources.

The concept of Total Quality management as it affects manpower development in the mineral industry shall be revived from two broad perspectives:-

1. The Federal Ministry of solid minerals Development as an organ of policy development.
2. Mineral investment business concerns.

In both cases education and training forms the basic requisite for growth and advancement. The education requirement is to ensure that everyone in the organization knows what is required of him/her, and why. The training requirements is to ensue that everyone is capable of solving the problems that inhibit the achievement of their objectives before any decision is made to develop a mineral deposit, a study team

usually goes through several stages of information collection and planning. Economic feasibility studies are performed at each stage as an integral of review and planing procedures and the study team proceed to the successive stage only if the project is economically viable. During these stages, professionals such as geologist, geophysics, field workers, environmental engineers and economic consultants are engaged. The mining or exploitation of minerals require the services of mining engineers, metallurgical engineers, mechanical engineers and technicians. This stage usually involves choosing the appropriate mining method, equipments, cost estimation for construction and operations of mine plant and support facilities. Mine output tonnage need to be determined taking into account product demand and quality of reserves, mechanical operation, such as drilling, scrapping, ripping, bulldozing would be required.[1]

Mineral processing which encompasses beneficiation, smelting, polishing, crushing and milling is carried out to upgrade and refine the quality of the mineral, lessen the cost of handling large tones of rock and improve recovery.

The full utilization of mineral processing facilities enhances the value added to exports and uplifts the acquisition of technology in exploration, mining, mineral processing and handling and marketing.

In these areas, geologists, chemical engineers, mining engineers, electrical engineers mineral processing engineers civil engineers etc are required.
Also needed are consultants and technically skilled workers for planning and operation of machines.

The usefulness of these various professionals is required in seeking alternative uses of minerals investigating ways of improving mineral quality and output, mineral waste control (through reyclng), developing technology and creating awareness of research findings, which assist investments on solid minerals.
Marketing requires the presence of good sales representatives and economist. They should be conversant with the economic environment of the nation, make good sale deals be able to package their products in ways that would make it easy for buyers to handle as well as being able to seek out good outlets for products locally and internationally. They should be able to obtain and evaluate product market information.

A rapid upgrading of professional strength and quality of the scientist in the ministry, institutes and parastatals are critical for the successful geological mapping of the country. Detail mineral exploration and investigations required to facilitate private initiative and build up dissemination of accurate and up to date information data on solid mineral

resources, need to be carried out. Mining and processing is associated with health hazard, therefore training in health and safety procedures and methods reduces incidence of health dangers and accident occurrence.

Training of manpower for solid mineral development is important and of benefit for the following reasons:-

1. Increases chances for better exploration work and harnessing of mineral resources.
2. Exposes individuals and corporate bodies to new technological and operation procedures and methods for planning and development.
3. Minimizes damage to plants and errors in planning and execution of machines and field operations.
4. Increases productivity and output and makes allowance for more creativity.
5. Creates a practical orientation prospective. Effective application of practical skill to jobs.
6. Creates awareness of new safety, health and environmental procedures, which help to reduce degradation of environment.
7. Enhance a better stand for financial assistance as the funding agent is aware that the recipient is trained and knowledgeable, concerning the project for execution.
8. Enhances profit maximization through equitable management of resources.

The areas requiring manpower development/training are in the following fields:-

1. Exploration
2. Mining/mineral processing and research.
3. Machine design and fabrication.
4. Mine supervision, planning and development.
5. Equipment and machine operation and maintenance.
6. Safety and environmental protection methods.
7. Computer training in the area of drilling recording contour mapping and ore reserve calculation.
8. Mineral economics and marketing.

3.4 MINERAL POLICY

All countries of the world develop their mineral potentials within the frame work of a plan or course of action that ensures profitable and environmentally friendly development and mining of their mineral resources.

Nigerians new mineral policy is aimed at stimulating greater local and foreign investment in the mineral sub-sector with government acting essentially as a "catalyst through its participation in exploration, extractions and trade in the minerals"(Kaloma Ali, 1997).

The emerging global economy forces a conducive policy environment to produce investments for economic growth.

Liberal policy framework anchored on deregulation and free markets are being introduced to meet the intense competitions among regional blocks for investment funds. The tendency of the mineral policy is to encourage bilateral investment treaties and multilateral arrangements to eliminate trade barriers and enhance export.

Generally investment in Nigeria is governed by the Nigerian Investment promotion Decree No 16 of 1995 and the foreign Exchange Miscellaneous Decree No 17 of 1995. These Decrees provide the initial encouragement for investment in the minerals sub-sector as they contain liberal reforms to boost confidence of private investors.

The draft policy which is being considered by government for possible promulgation into law has the following general objections:-

a. Increasing the public awareness on the endowment of mineral resources and their strategic role in the socio-economic and industrial development of the country.
b. Acquisition and dissemination of detailed and reliable information on the geology of the country establishing the quantity and quality of minerals endowment
c. Orderly development of these resources for real economic growth, improvement of the living standard of the people and creation of a favourable investment climate.
d. Diversification of the primary mineral products through exploration and establishment of reserves.

e. Enhancing the utilization of the mineral resources through research into efficient extraction methods and wider application and use of minerals as raw materials.

f. Ensuring adequate supply of mineral resources for industrial development and for maintenance of national security.

g. Encouragement of the private sector to take the leadership role in the expansion of the sector on being assured of reasonable returns on the investment.

h. Encouragement of the acquisition of technology by indigenous operators for the overall development of the country's mineral resources.

i. Accelerating the development and utilization of technical and professional manpower resources.

j. Ensuring adequate production for health safety, and minimizing environmental deration of minesfields.

3.4.1 RESTRUCTURING OF DEPARTMENTS OF THE FEDERAL MINISTRY

The major objective of the national mineral policy is to ensure an orderly and accelerated development of the minerals potentials of the country.

Consequently it provides a clear pattern for coherent exploitation of mineral resources of the country and also addresses the requisite laws and regulation. This new procedure ensures adequate harnessment of the country's minerals wealth.

The current procedure for mining application is cumbersome and highly centralized at the Federal Ministry of Solid minerals. In order to speed up the processing of application and to provide for efficient and effective control of the operation, the policy advocates for the establishment of the mineral resources committee in each state of the Federation comprising:-

a. The state commissioner responsible for mineral-related matters(chairman)
b. The residents Federal mines officer (secretary).
c. The Director-general of the state ministry of *Agriculture/Forestry (Member)*.
d. The state Surveyor-General (Member).
e. Appropriate representative of the local government authority (member).

The committee is expected to meet on a monthly basis to process minesfield application. Its recommendation will be forwarded to the Honourable Minister for consideration for the issuance of permits, licenses and leases. In the new dispensation Quarrying Licenses and prospecting rights will continue to be issued by the Federal mines officer.

The mines department and the geological survey is to be restructured with the sole aim of making these organs of government ministry more productive and efficient. The mines department shall be expanded and financially and humanly

strengthened in order to effectively carry out its primary responsibility as inspectorate and regulating arm of the mineral industry. More departments are being created to cover such vital areas as mines and Environment, Engineering services, Training and Research.

Investment and parastatals and Quarries and explosives.
The Geological survey has been starved financially for several decades thereby loosing its leading position of mineral pathfinder for the mineral sector. In recognition of this, the Geological survey is to be adequately funded to achieve national targets in mineral survey and quantification. In this light, three more departments are to be created from the existing geological survey of Nigeria.
With the creation of more states in Federation, the Federal Ministry of solid minerals development has in the new policy a provision for opening mines offices in all the new state capitals.
This arrangement is meant to provide closer supervision of the minesfiled, enhance data collection and facilities. The Nigerian Mining Authority.

3.4.2 COMMERCIALIZATION AND PRIVATIZATION OF MINING VENTURES

The Government has positively considered the recommendation of the bureau of public enterprises (BPE) as regards the Nigerian Mining corporation and the coal corporation.[1]

The Bureau has revived the activities of these parastatals and recommended that Nigerian Mining corporation operates a holding company and divests itself off its investment in the subsidiaries at a level of not more than 40 percent. The coal corporation was also requested by the Bureau to commercialize its activities and divest to no more than 40 percent ventures. In an effort to promote investments in the Industry suitable framework has been concluded for the government and the private sector joint venture participation in the development of the following minerals:-

a. The Darazo and Kaolin project in Bauchi state.

b. The Abakaliki lead/zinc project in Ebonyi State.

c. The Iperindo Gold project in Osun state.

d. The magnetite project in Isakasimata in Adamawa state.

3.4.3 PRIVATE SECTOR PARTICIPATION

The new policy is geared towards encouraging a private sector participation in the development of the mineral industry. As articulated in the policy, the private sector is expected to collaborate with the ministry and take advantage of findings on mineral exploration, reserve estimation and mining/processing of minerals.

The private sector is expected to establish raw material testing centres and processing facilities not only to enhance the value added to exports but also to uplift the acquisition of technology in the processing and handling of minerals.

The small scale operators provide employment opportunities and also generate the diffusion of technology for operational advancement.

By their mode of operation they handle minor deposits which may not necessary be of interest to large scale mining investors.

Mineral investment financing is a critical issue associated with the mineral industry. The high capital intensiveness of such ventures coupled with high risk and long gestation periods of investment provides the major bottle neck in mining project financing. In this light, financial and Institutional investors are expected to draw up programs of assistance for the mining, product handling, micro-processing and marketing of their products.

Government intends to grant adequate concessions to encourage private sector participation as follows:-

a. The granting of appropriate tax holidays.
b. Deferred royalty payment depending on the magnitude of investment and strategic nature of the pr2oject.
c. Special favorable income tax provision for mining companies possible capitalization of expenditure on exploration and prospecting operations.

3.4.4 THE NIGERIAN MINERALS APPRAISAL AND MONETIZATION PROGRAMME(NIMAMOP)

The mineral appraisal and monetization programme involves the

creation of mineral blocks in which all known minerals in the country are shared into blocks and sold or leased through a monetization programme.

This new policy which is expected to stimulate private foreign investment requires less cumbersome mining laws and regulations. In this regards, the hitherto cumbersome mining laws and regulations have been reviewed.

The new minerals Act is expected to respond favorably to the new challenges of the minerals sub-sector.

The Ministry is also planning to establish a liable data bank in Nigerian Minerals. Geological information in known Nigerian minerals shall be collated and stored in appropriate computer network. Such information shall be retrieved and made available to prospective investors on terms that would facilitate early investment decisions. [1]

3.4.5 MANPOWER DEVELOPMENT

The Government has reintegrated its commitment to manpower development in the mineral industry. The dearth of professionals in the industry constitutes an impediment to mineral developmental progress. As part of its aggressive posture, the Ministry is planning to upgrade and rename the present school of mines, Jos to the National Mining and Geological Institute.

The Institution is expected to run specialized courses and offer advanced field and laboratory services for rock and mineral identification and beneficiation to both the private and public.

The ministry intends to promote new technology in the development of the Industry.[']

CHAPTER FOUR

4.0 FINANCING OF MINERAL RESOURCES INVESTMENT PROJECTS

4.1 GENESIS OF PROJECT FINANCING IN NIGERIA

Government economic polices in recent times reflects a conscious effort to redirect the productive energies of the Nigerian economy from its near total dependence on public sector to the now generally accepted path of private sector or market driven economy.

The basic shift in economic philosophy was formalized in 1986. in the structural Adjustment Programme (SAP). The cardinal point in this new policy was the shift in emphasis from large scale turnkey industrial projects which is characterized by high level of government participation to the promotion of private sector driven small and medium scale enterprises(SMEs). The rationale behind the shift in emphasis to the promotion of SMEs was informed by world wide trends[3].

1. The ability of SMEs to compete effectively alongside the renown product leaders.
2. The ability of SMES to break down the production process of final goods through the production of intermediate goods, thus invigorating the learning process technological/industrial development.
3. SMEs also enhance regional economic balance through industrial dispersal and the promotion of domestic resources utilization.

4. SMEs promote managerial training and excellence while enhancing training of both skilled and unskilled manpower.

The SME sub-sector of which the mineral industry belongs is however beset with several problems which severely limit their ability to play their central role in the economy. Some of these problems include under capitalization of SMEs, small size of the average firm, the dearth of legible assets high mortality rates and low productivity.

Perhaps the most debilitating and well known of these problems is the problem of under capitalization.
In Nigeria, this short comings accentuated by a variety of factors which range from the usual unwillingness to broaden ownership to the high risk rating by institutional lenders. There is also a perceived high degree of loan diversion and default in repayment.

4.2 FINANCING SMEs IN NIGERIA

Arrangements for financing of small and medium scale enterprises started in the second national development plan period. The policy formulators attempted to address the problem of institutional credit delivery to SMEs by beginning with guidelines. These guidelines stipulated minimum levels of credit exposure by institutional lenders to SMEs. The policy

mix has been broaden over the years to included a wide array of legislated development for financial institution whose primary objectives is the provision of soft-medium to long-term credit to SMEs.

In 1971, the government introduced small scale industries credit scheme(SSICS) which was jointly operated by the Federal Government. Inadequate funding and mismanagement led to the withdrawal of the Federal Government from the scheme in 1973 to establish the Nigerian Bank for commerce and Industries(NBCI).

There has been a down-turn in mineral resources investments in Nigeria. Many projects have either closed down or have recorded a drastic reduction in capacity utilization. There are various reasons attributed to this down trend, however the principle one are investment capital political instabilit$y and inefficient management of the mineral industry.

Finance is required for the acquisition of machinery and equipment, mine exploration, mine development, construction of factory buildings, amortization of equipment, energy and materials, salaries and wages, freight charges etc. Usually the use to which the fund is to be put, would determine the type of finance to seek.

Mineral resources exploitation are characterized by high capital requirements. Mineral exploitation alone could write-

off a substantial part of an investment budget without any returns. Funds, required for mineral exploration and exploitation are normally far in excess of normal budgetary provision of the country.

The governments obligation to other sectors of the national economy, leaves limited resources allocation for mineral development.

Consequently, mining projects are financed by the private sector and in most cases through share capital investments the average Nigerian entrepreneur would not normally want to take risks of investments in the mineral sector especially when there are safer and more lucrative business investments that provide quick returns. Many local private investors who have shown some interest and venturred into mineral investment without adequate expert advice have been frequently frustrated out by the financial, technical, legal and in some instance even cultural demands.[1]

In recent times, there has been a boom in the industrial mineral investments. However, the mining of such minerals have largely been due to illegal mining which is inefficient and counter productive as the procedure usually leads to unsystematic exploration and quantification of mineral exploitation, sales and export.

4.3 SOURCES OF FINANCE

The sources of finance for mineral resources development are numerous these include: Borrowing, Equity participation, joint venture finance and equipment leasing.

The capital intensives of mineral investments coupled with the strategic importance of some minerals leads to categorizing sources of funds into two main categories:-

1. Internally
2. Externally.

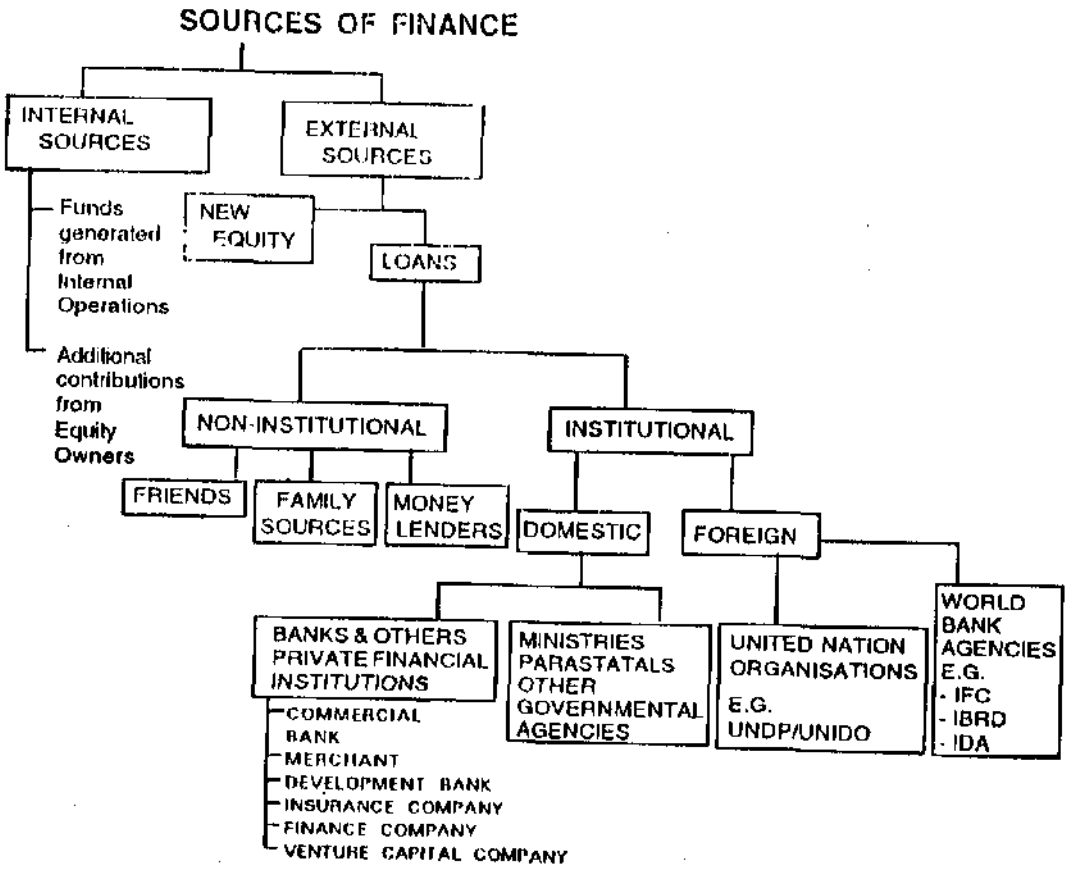


Fig 15 Sources of Finance

In both cases depending on the type of projects the funds resources by investors can either be on short-term, medium - term or long-term loans.

In sourcing investment funds the mineral investor must compete with investors with more competing power from other sectors of the economy. The mineral investor may not find such facilities easy because of its newness in the Nigerian financial circles.

4.3.1 SHORT-TERM LOANS

Short-term loans are usually extended to investors for a period of one year or less. These loans by there period of payments are not conducive for large mineral investments whose gestation periods may be in excess of ten years such loan therefore can only be acquired for the purpose of trading in mineral such on tin, gemstones, hold, barytes etc. They can also be utilized for temporary uses such as increasing inventories in order to accommodate increase production/sales volume, payment of salaries, taxes and other over-heads.

Consequently in order that short-term loans can be meaningful in mineral investment, the project must have been already established. However such loans could accommodate small - scale mineral processing ventures such as the processing of Kaolin, barytes etc.

If however the loan is to remain in force for longer time, a more permanent form of fund is required. Usually, collateral for such loans are inventory accounts receivable, warehouse receipts and marketable securities.

4.3.2 MEDIUM-TERM LOANS

Medium-term loans are facilities granted by financial institutions which are payable between one to five years. If is often amortized, that is paid back in installments over the life of the loan. Such loans are used for modernizing mining machinery/equipment, providing additional working capital, which can be used to increase production, sale and revenues. The increase in capacity utilization leads to increase in revenue while is used to service the loan.

4.3.3 LONG-TERM LOANS

Long-term loans are issued out to mineral investors for a period beyond 5 years. This long repayment period is very adequate for mineral investments which characteristically have longer than 5 years gestation period. Long-term loans, which is also known as capital loan can be source from the capital market.

The procedures of processing long -term loans and their requirements are more demanding and involving than for the short and medium -term loans. Principal amongst several other

conditions to be met are a submission of bankable document indicating mineral reserves and an indepth financial analysis to substantiate any claim of viability of the project.

Funds raised from such loans are used to finance fixed assets, infrastructural developments, machinery and equipment, mine development, exploitation, mineral processing and other developmental purposes. The nature of such loans require tangible collatarals such as mortgages and fixed assets.

The banks or financial institution, management would consider the application through the desk officers individual assessment and investigation. This is followed by committee consideration, top management and in most cases, even boards consideration before loans are approved. Other procedural requirements such as signing of agreements, bonds, guarantees, submission of mortgages and collateral, security evidence etc are to be duly certified before the loans are disbursed, usually in accordance with the loan disbursement schedules. Mineral investment projects are usually large in scope and scale, the funds are disbursed in phases as the project progress. This is to ensure proper utilization of the project by the financing institution.

4.4 INSTITUTIONAL SOURCES OF MINERAL RESOURCES FINANCING

The study shall focus primary on institutional mineral resources financing. Non institutional financial sources shall be excluded from this study as they are only rudimentary are void of scientific approach.

For the purpose of clearity, and scope of operation the institutional source shall be further categorized into domestic and foreign sources of financing.

Availability of loanable funds from these identified sources are based on guidelines set by the controlling authorities external to it, as well as its own internal authority.

The monetary, fiscal and lending regulations of the Federal Ministry of Finance(FMF), central Bank of Nigerian (CBN) and Nigerian Deposit insurance corporation (NDIC) prevailing at the time of request for loans by the mineral resources investor may determine availability of loanable funds from the identified domestic sources.

4.4.1 THE NIGERIAN BANK FOR COMMERCE AND INDUSTRIES (NBCI)

The Nigerian Bank for commerce and Industries was established by the Federal Government and the central Bank in 1973 as an apex institution for financing small and medium scale Enterprises. In addition to its primary objective of administering credit to SMEs it was also saddled with the responsibility of administering the Federal Industry's special fund for small scale Enterprises under a soft loan arrangement.

The NBCI in funded by the Federal Government, the central Bank and from penalties of banks which failed to meet the required minimum exposure to SMEs in their normal lending operations. The NBCI raises its foreign currency lending requirements from multilateral lending agencies such as African Development Bank ADB.

4.4.2 THE NIGERIAN INDUSTRIAL DEVELOPMENT BANK(NIDB)

The Nigerian Industrial Development Bank which is the oldest development bank in Nigerian was established in 1964, initially as a private long-term finance institution. NIDB is funded from the public treasury. This is supplemented with foreign credit line from multilateral agencies.

4.4.3 THE NATIONAL ECONOMIC RECONSTRUCTION FUND(NERFUND)

The National Economic Reconstruction Fund was established in 1989, for the purpose of providing medium to long-term loans to small and medium scale industries.

The aims and objectives of NERFUND as spelt out in the Decree included the following:-

1. The provision of medium long-term loans to participating banks for lending to small scale enterprises for the promotion and acceleration of productive activities in such enterprises.
2. To facilitate the provision of loans of five to ten years maturity including a grace period of one to three years depending on the nature of the enterprises.

3. To correct any observed inadequacies in the provision of medium to long-term financing to small and medium scale enterprises especially manufacturing, agro-allied enterprises, mining, quarrying and industrial support services.

NERFUND draws its pool of resources from a capital base of #325million contributed by the Federal Government and the central Bank of Nigeria, and a US$148 million line of credit from the African Development Bank.

NERFUND lends subject to a fixed asset limit of #360 million. The fund further requires that the project at least 60 percent by values of its raw materials locally. NERFUND's current lending limit is US$1.2 million, while the local currency resources are applied to service smaller projects in the #3 million to #5 million range. The terms of lending appear to be the softest, with a minimum of 5 years repayment period, with a mandatory moratorium of 1 to 3 years. The interest rates on foreign currency loans attract a rate of 15.5 per cent per annum.

Since inception, NERFUND has financed a total of 39 projects in the solid mineral sub-sector (6). Of these projects, majority are in the upstream segments of the industry engaged in activities ranging from the extraction of kaolin, granite, tin and columbite to the production of ceramic wares.

Total commitment to the sector currently stands at the equivalent of #2.7 billion, which breaks down to local currency component of #123.9 million, and foreign currency component of US$31.9 million disbursement to the sector stands at US 7.7 million and #37.8 million.

4.4.4 THE NIGERIAN EXPORT-IMPORT BANK (NEXIM)

The Nigerian Export -Import Bank was established in 1990 to provide credit facilities specially designed to boost non-oil exports. It replaced the Nigerian Export credit Guarantee scheme Fund which was established by Decree in 1988. It was established to provide investment funds for small and medium scale Enterprises.

It is designed to cushion these enterprises against harsh realities of the operating environment.

NEXIM's initial funding was jointly provided by the Federal Government and the Central Bank of Nigeria. In addition NEXIM also draws its foreign currencies from multilateral/bilateral lending agencies.

4.5 DOMESTIC SOURCES OF FINANCES

The domestic sources of mineral resources financing include:-

1. Financial Institutions
2. Banks and other private sector financial institutions,
3. Governmental Agencies Ministries and parastatals.

4.5.1 **FINANCIAL INSTITUTIONS**: Major sources of financing mineral projects, in Nigeria are from the following financial institutions: Commercial Banks, Merchant Banks, Development Banks, Insurance Companies, Finance companies, and venture capital companies. Commercial banks and fiance houses provide mostly short-term loans. Merchant banks prefer to provide mainly short and medium-term credits while the development banks like the Nigerian industrial Development Bank (NIDB) provides medium and long-term credit facilities. Venture capital companies, by virtue of their mandate, offer long-term finances especially for capital projects which are usually risky and have long gestation periods.

Furthermore, investments funds can be source from Small Industries Credit Fund(SICF), SME Apex Unit loan scheme, National Economic Reconstruction Fund(NERFUND) and Nigerian Export-Import (NEXIM) bank, many of which are aimed at promoting small-scale enterprises.

In recent times calls have been made by small-scale mining investors and the Nigerian society of mining Engineers for government to establish a mineral resources Development Bank (MRDB) similar to Nigerian Agricultural and Cooperative Bank(NACB) and Nigerian Bank for Commerce and Industry (NBCI). Such calls has not been reciprocated by government, invariably as a result of the failure of the Nigerian Agricultural and cooperative Bank(NACB). It is envisaged that in view of the

enormous resources required by mineral investment projects, a critical assessment will be necessary to ascertain work ability, and viability of such a specialized bank, as against the NACB experience.

The availability and usefulness of resources financing are greatly hampered by the high risks involved, inadequate assessment of economic viability of mining concerns and unpredictable market potentials.

Table(3) indicates the financial assistance rendered to some mineral projects by NIDB.

TABLE 3 CUMULATIVE SUB-SECTORAL DISTRIBUTION OF NIDB SANCTIONS JAN. 1964-DECEMBER, 1995 VALUE IN (N'000)

	SUB SECTOR	NO. OF PROJECTS	PROJECT COST			NIDB PARTICIPATION			% OF TOTAL	% OF PROJECT COST
			EQUITY	LOAN	TOTAL	EQUITY	LOAN	TOTAL		
1	FOOD	135	828,950.7	1,268,895.4	2,097,846.1	6,870.4	725,139.8	732,010.2	13.4	34.9
2	BEVERAGES	54	230,187.1	470,659.2	700,846.3	14,311.4	203,210.4	217,521.8	4.0	31.0
3	TEXTILES	125	1,080,672.3	2,283,222.7	3,363,895.0	12,393.8	1,098,914.0	1,111,307.8	20.3	33.0
4	FOOTWEAR & LEATHER PRTDS.	14	39,138.9	74,723.0	113,861.9	412.0	56,787.0	57,199.0	1.0	50.2
5	WOOD PRDTS & FUTNITURE	50	66,405.0	102,283.7	168,689.3	2,089.1	59,281.1	61,370.2	1.1	36.4
6	PAPER & PAPER PRTDS	56	136,982.5	341,326.5	478,309.0	525.2	281,518.8	282,044.0	5.1	59.0
7	CHEMICAL & PETROCHEM PRDTS.	171	4,087,277.4	2,862,833.2	6,950,110.6	8,546.5	1,631,707.7	1,640,254.2	29.9	23.6
8	RUBBER PRODUCTS	13	46,778.7	140,324.1	187,102.8	108.0	70,301.0	70,409.0	1.3	37.6
9	CEMENT	6	82,800.0	341,922.7	424,722.7	1,146.0	61,869.0	63,015.0	1.1	14.8
10	GLASS, CLAY & STONE PRDTS.	69	260,748.0	568,912.7	829,660.7	8,391.8	211,077.6	219,469.4	4.0	26.5
11	IRON & STEEL	5	6,782.0	14,808.0	21,590.0	200.0	8,800.0	9,000.0	0.2	41.7
12	METAL FABRICATION	98	114,428.4	402,326.7	516,755.1	1,578.0	201,243.0	202,821.0	3.7	39.2
13	ELECTRONICS & ELECT. APPL.	18	127,007.4	322,997.8	450,085.2	520.0	128,255.0	128,775.0	2.3	28.6
14	TRANSPORT & EQUIPMENTS	15	87,656.8	212,614.2	300,271.0	2,146.7	75,689.7	77,836.4	1.4	25.9
15	MINING & QUARRYING	13	59,079.4	111,564.0	170,643.4	1,259.5	105,264.0	106,523.5	1.9	62.4
16	HOTEL & TOURISM	47	162,057.0	354,725.8	516,782.8	15,336.6	95,155.0	110,491.6	2.0	21.4
17	MISCELLANEOUS	86	93,498.6	410,790.7	504,289.3	6,821.5	383,902.8	390,724.3	7.1	77.5
	TOTAL	975	7,510,530.8	10,284,930.4	17,795,461.2	82,656.5	5,398,115.9	5,480,772.4	100.0	30.8

SOURCE: NIGERIAN INDUSTRIAL DEVELOPMENT BANK (NIDB)

4.5.2 REQUIREMENTS OF PROJECTS PROPOSALS BY FINANCIERS

The mineral resources investment firm wishing to secure a loan would normally furnish the financial institution with the following information but not limited to:-

1. The state of the company. This include its history, areas of activity, financial status etc.
2. Provision of a standard feasibility study which should pass for a bankable document.
3. Biodata of the promoter(s), Directors of the company, handlers and co-financiers of the proposed project.
4. Management profile of the company.
5. Availability of collateral security and their values with valuation certificates as may be demanded by the prospective financiers, and
6. Guarantees and Guarantors.

Mineral resources investments are relatively unknown in this country until recently after the creation of the Federal ministry of solid minerals. Consequently, commercial and Merchant banks do not consider mineral resources financing amongst their lucrative areas of financing. The following reason may be attributable to their partial involvement in mining projects financing:-

1. Absence of acceptable collateral security which are highly liquid or posses money value such as government bonds, debentures, treasury bills etc.
2. Commercial reality feasibility proposals with their attendant financial projection may prove repayment

capacity of small and medium scale mineral resources concerns to be questionable.

3. The common trend of Nigerian business men to present a fietitious financial facet makes assessment of the personal integrity of promoters difficult by the issuing banks.

This is especially with regards to first-time loan applicants.

4. The absence of government and CBN policy/guidelines on specific loan incentives on minerals resources investments, unlike those on Agricultural Development projects.

4.6 VENTURE CAPITAL COMPANIES

Venture capital institutions by their mode of operation are able to provide long-term loans such as is associated with mineral resources investments. These financial institutions are alien to the Nigerian economy.

The first venture capital company in Nigeria, the National risk Fund (NRF) was establish and natured under the raw materials research and Development council over a period of 5 years before it started autonomous operation in December 28, 1993.

The National Risk Fund was established with an initial capital base of #750 million and is charged with the responsibility of considering commacerialisable research results and other

relevant project proposals with a view to providing funds for their execution.

Conventional banks and financial institutions appear to shy away from mineral resources development projects as a result of their long-gestation periods. It is intended, therefore, that NRF would come to the assistance of mineral investment projects through requisite funding.

Similar financial institutions such as the National Unit Trust, the Petroleum (special) Trust Fund and the proposed National Pension Fund Scheme can be appropriately directed to provide the much needed investments funds for solid mineral development.

The unit Trust Fund Scheme is a vehicle established to enable many small investors pool their assets together to enjoy the benefits of diversification and professional management at the lowest possible costs, without imparrying the liquidity and safety of their investment.

4.7 GOVERNMENTAL AGENCIES, PARASTATALS AND MINISTRIES

Mineral resources investment projects can source funds from Governmental Agencies parastatals and ministries, for the purpose of providing investment funds, especially for the upstream (exploration) stage. The upstream stage of mineral investment is most risky as it involves mineral search and

quantification which most commercial banks are reluctant to finance.

There are some government establishments which were set-up to serve as catalysts (or race setter) in the upstream and the down stream (mineral processing) stages of mineral investments.

Government provides funds to be disbursed to build factories, purchase machinery and equipment, payment of professional and consultancy fees and also for the purchase of raw materials. Government Agencies like the Raw Materials Research and Development Council, Federal Ministry of solid mineral Development, Federal ministry of science and technology the ministry of finance incorporated(MOFI). Table (4) show the extent of Federal Government financial commitment to manufacturing, mining and quarrying, among other government finances between 1983 and 1991.

Government Agencies, parastatals and ministries fund mineral investment projects in a different way from that of the financial institutions. Financial proposals are forwarded to the budget office, through the relevant controlling government Agency for consideration either during the normal annual budget discussion or within the year. To ensure that all expenditures are consolidated budget office usually insists on such projects being in the current three-year plan and the

current year's budget. All corporations under the supervision of the ministry of finance incorporated, are usually expected to sent a copy of their project proposals to MOFI for analytical review and advice to government.

TABLE 4: FEDERAL GOVERNEMNT CAPITAL EXPENDITURE

						Percentage Change Over The Preceeding Year				Percentage of Total				
Capital Expenditure	1990 (1)	1991 (2)	1992 (3)	1993 (4)	1994 (5)	1991 (6)	1992 (7)	1993 (8)	1994 (9)	1990 (10)	1991 (11)	1992 (12)	1993 (13)	1994 (14)
Administration	2,919.9	3,345.0	5,118.5	8.8081.7	8,785.1	14.6	53.0	57.9	8.7	12.1	11.8	12.9	19.6	16.9
General Administration	2,152.2	2,107.1	1,724.0	5,807.1	5,218.7	-2.1	-18.2	236.8	-10.1	8.9	7.8	4.3	14.1	10.0
Defence	524.7	877.7	2,067.9	1,736.9	2,402.6	67.3	135.6	-16.0	38.3	2.2	3.1	5.2	4.2	4.6
Internal Security	243.0	360.2	1,326.6	537.7	1,163.8	48.2	268.3	-59.5	116.4	1.0	1.3	3.3	12.1	2.2
Economic Services	3,485.7	3,145.0	2,336.7	4,975.3	7,276.4	-9.8	-25.7	112.9	46.3	6.6	11.1	5.9	2.0	14.0
Agric & Natural Resources	1,598.2	1,219.0	941.3	1,824.4	2,178.8	-23.7	-22.8	93.8	19.8	3.8	4.3	2.4	5.4	4.2
Manuf. Mining & Quarrying	903.9	628.1	540.1	2,223.8	3,320.7	-30.5	- 100.0	311.7	49.3	1.3	2.2	1.4	0.0	6.4
Transport & Communications	426.9	451.8	349.3	803.2	1,070.1	5.8	79.7	129.9	33.2	-	1.6	0.9	0.3	2.1
Special Projects	108.3	564.5	-	-	-	421.2	43.0	-	-	8.7	2.0	1.3	8.7	0.0
Others	448.4	281.6	506.0	123.9	706.8	-37.2	70.8	-75.5	470.5	1.7	1.0	5.4	2.4	1.4
Social & Community Services	2,096.0	1,419.7	2,132.6	3,575.3	4,994.4	-28.8	59.4	67.6	39.7	1.3	5.3	1.3	0.6	9.6
Education	416.3	297.0	507.2	995.1	2,051.9	-28.7	27.6	96.2	106.2	5.4	1.0	0.6	4.8	3.9
Health	322.5	153.1	244.1	241.6	749.1	-52.5	68.2	-10	210.1	1.3	0.5	2.9	0.9	1.4
Housing	1,304.9	912.2	1,163.7	1,979.8	1,836.2	-30.1	48.2	70.1	-7.3	5.4	3.2	0.5	59.6	3.5
Others	52.3	129.4	217.6	358.8	357.2	147.4	429.8	64.6	-0.4	0.2	0.5	75.9	0.1	0.7
Transfer	15,547.0	20,359.2	30,175.5	24,00.1	30,036.0	31.0	52.1	-19.8	22.6	64.6	71.8	0.3	62.5	57.7
Financial Obligations	-	26.2	138.8	28.6	-	-	-44.4	-	-100.0	-	0.1	75.0	0.6	0.0
Capital Repayment	15,722.8	19,600.0	29,814.4	25,691.1	20,036.0	24.7	52.2	-13.8	-22.1	65.4	69.2	0.7	61.9	38.4
(i) Domestic	228.0	180.0	260.0	230.0	381.7	-21.1	-13.9	-11.5	66.0	0.9	0.6	74.3	0.6	0.7
(ii) Foreign	15,494.8	19,420.0	29,554.4	25,461.1	19.635.0	25.3	-52.2	-13.9	-22.9	64.4	68.5	3.3	-3.0	37.7
Out. Liabilities (Domestic)	268.0	1,515.0	1,310.8	0.0	4,354.3	487.2	-13.9	-100	-	1.1	5.3	-2.8	0.0	8.4
Net. Lending to State L.Gs/Parastetals2	-880.9	-945.3	-1,107.1	-1,222.1	5,645.0	7.3	-	10.4	-551.9	-3.7	-3.3	-2.8	-3.0	10.8
Others	447.1	163.3	18.6	2.5	20.0	-63.5	-88.6	-88.6	700.0	1.9	0.6	0.0	0.0	0.0
Total Capital Expenditure	24,048.6	28,340.9	39,763.3	41,132.4	51,091.9	17.8	40.36	3.4	24.2	100.0	100.0	100.0	100.0	98.1

SOURCE: Aliyu A (1996)

The ministry of Finance Incorporated ensures the processing of agreements, interest rates bonds, disbursement and repayment schedules to all approved proposals.
Subsequent;y as a supervising organ, MOFI has the responsibility of monitoring the progress of such projects, performance of the establishment, especially for those with government interest/participation until the loan is fully paid.

The Federal Government is also involved in providing direct subvention to government agencies such as National Iron Ore Mining (Project, Survey of Nigeria, Nigerian Mining Corporation, National Iron and Steel Council etc to enhance exploration, development exploitation and processing of Mineral Resources. Such subventions are released through the normal budgetary procedures.

4.8 FOREIGN SOURCES OF FINANCE

In the face of the prevailing realities of economic down-turn of the Nigerian economy, it appears that the option for meaningful mineral resources development is through foreign

capitalization and participation as the case may be.
It is the Foreign Financial Institution and Corporate concerns that provides the hard currency necessary for the acquisition of the much needed machinery/equipment and the import of other technical technological know-how for mineral resources development.

To on this list of international finance institutions are:

i. International Bank for Reconstruction and development
ii. African Development Bank
iii. European International Bank (EIB)
iv. International Finance Corporation (IFC).

The mode of operation of these institution is to lines of credit the national governments for the purpose of financing mineral resources concerns. In this processes the government stands as collateral, this is conducive for the international financial institutions which are reluctant to deal directly with numerous mineral investors. In some cases, they also land in cooperation with other funding agencies.
Development Banks such as the Nigerian Industrial Development Bank, are also beneficiaries of development loans from such foreign institutions.

Using this facility, the Nigerian Development Bank provides loans to its clients, part of which may include the

importation of machine and equipment The working capital is however made available to the investors of local currency. Of the above mentioned international Finance Institutions, however, the international Finance Corporation has the mandate t o finance industrial projects in collaboration with private sector entrepreneurs strictly on commercial rates of interests.

Other sources of International Finance Institutions are the United Nations Development Programme (UNDP), and the United Nations Industrial Development Organizations (UNIDO). The Internationals Development Organization (IDA), an affiliate of the World Bank is known for granting long-term soft-loans to poor countries with low per capital income. Other conditions for such includes balance of payment difficulties but the borrowing Nation must possess serious commitment pasture towards industrialization.

In Nigeria, the National Planning Commission is the government agency charged with the responsibility of liaising with the foreign institutions oh behalf of government and corporate mineral resources investors.

4.9 PRIVATIZATION AND JOINT-VENTURE PARTICIPATION

The recommendation of the Bureau of Public Enterprises (BPE) that the activities of both the Nigerian Coal Corporation

(NMC) be commercialized and diverted to no more that 40% in joint venture (Ali, 1996) is commendable, as it will attract foreign participation.

In view of the peculiarity high risks associated with mining, and of the political instability of in many developing countries, the foreign investor would always insist upon majority equity and the right to take major decisions. A minority equity share may therefore seem inevitable for government or its parastatals.

In order to ensures efficiency as a result of total equality management preferably the government should not assume an operational role. The employment of technical should be left for the participating foreign company. This is because from past experience, government wholly or partially owned enterprise, there is always strong tendency to over-staff at the expense of adequate resources monitoring and sustaining operational programmes. In many instances, management of the Solid Minerals Industry has been infested with administrative arrangement that are minimal to positive development.

At one particular time, in the guise of re-organization, the frequency and number of Chief Executive officers and other cadres within the sub-sector were excessively high. Managerial positions have also been erupted in certain cases

where they are not quite relevant to the enterprise. In addition to the excessive administration costs such a situation increases the bureaucratic outlook of the company.

Public opinion may in addition may in addition, demand that a certain level and calibre of nationals be imposed on the enterprise whereas it may not be acceptable to the foreign partner.

CHAPTER FIVE

5.0 PARTICIPATIVE ORGANS OF MINERAL RESOURCES DEVELOPMENT IN NIGERIA

5.1 Ministry of Solid Minerals Development

Introduction

The ministry of solid minerals Development was created in January, 1995. Before its creation, the affairs of minerals resources development in the country was overseen by the mines department, under the ministry of petroleum and mineral resources.

The new ministry was created as a result of its important contribution to the mineral sub-sector of the Nigerian Economy.

The ministry is charged with the responsibility of supervising all mining and quarrying operations of solid minerals throughout the federation. The ministry is the government agent for policy making, implementation of laws and regulation governing solid mineral exploration, exploitation, utilization and exportation. This would lead to the orderly development of solid mineral resources to ensure real economic growth, improvement in standard of living of the people, creation of

a favorable investment climate, boosting of employment and ensuring maximization of local and foreign revenue to the Government.

The establishment of the ministry of solid minerals development is not intended by government to increase its monopoly on mining but, rather to promote the transfer of mining exclusively to private operation, with government only providing the needed control, infrastructural support and all the wherewithal that would advance, promote and sustain investment in mining and mineral processing(Usman 1995).

The capital intensiveness of mining, coupled with associated long gestation periods attributes to the reluctance of the private sector to invest in mineral exploration, development and exploitation. This negative investment trend has made Government to take up the leading role in minerals investment by getting more actively involved in the exploration and exploitation of minerals.

It is hoped that the success of this leading role may attract private investment in the medium and down stream stages of minerals development and exploitation. There was a similar case with the cement industry. The government has chosen to register its impact through the Nigerian mining corporation and the Nigerian coal corporation, which are the two important parastatals of the ministry.

The success of Government in the expected pace-setter status aimed at attracting private participation in mineral investments will depend on its ability to effectively manage:-

1. The mines department
2. The Geological survey Department.
3. The Nigerian Mining Corporation and
4. The Nigerian Coal Corporation.

These two departments under the ministry and the two corporation are historically laden with poor financial support, poor management, poor manpower development, and in some cases outright abandonment.

In order to play an effective leadership role, the ministry will need to invest in total Quality management.

This will involve the systematic and complete diversion from the old ways of organizational management which is characterized by burocracy, inadequate manpower development, mismanagement of investment funds, and outright mischief amongst others.

The new concept of total quality management will put the organs of Government in the right corporate aura which is prerequisite to private sector participation, thereby launching the sector into the next millennium on a ripe mineral investment atmosphere.

5.1 THE MINES' DEPARTMENT

The primary duty of the mines department is to regulate and monitor the various stages of prospecting, Quarrying, mining as well as the handling, marketing and consumption of solid minerals in the country. This is accomplished through the issuance of permits licenses, leases and collection of rents, royalties and fees. The mines department has continued to discharge these responsibilities under the ambit of various laws, acts and regulations guiding its establishment and operation. The Acts and Regulations are as follows:-

1. The minerals Act of 1946(Being reviewed)
2. The coal Corporation ordinance of 1952
3. The explosives Act of 1964
4. The Quarries Act of 1969
5. The Nigerian Mining Corporation Act of 1972
6. The Gold Trading Act and
7. The diamond Trading Act.

FUNCTIONS OF THE MINES DEPARTMENT

The specific function of the mines department are as follows:-

1. To advice Government on mining policy and matters affecting Government on mining and quarrying industries in the country.
2. To advise Government on policy and matters affecting Nigeria's economic co-operation with other countries on

solid mineral development.

3. To ensure that all land to be alienated for mining and quarrying purposes contain economic mineral deposits.
4. To issue all permits and licenses pursuant to (3) above and ascertain that all licencers and lessees have both the financial resources and technical competence to carry out the mining operations.
5. To organize research and training, thereby providing useful information to both the Government and the public in general, and also assist in training the necessary manpower for the department and the mining Industry.
6. To enforce all laws made for the orderly, safe and economic exploitation of solid mineral including ancillary matters such as explosives handling, use and storage.
7. To oversee the relevant parastatals engaged in mineral exploration, mining and processing,
8. To collect all fees, rents and royalties due to government as a result of mineral prospecting and exploitation by individuals and companies.

THE STRUCTURE OF THE MINES DEPARTMENT.

The present structure of the mines department has the Director of mines as the Head of Department and a Deputy Director at the Head of each of the four divisions as follows:-

1. Parastatals Division: The role of this division is to

supervise the parastatals under the ministry namely:-

i. The Nigerian mining corporation with its subsidiaries and associated companies.

ii. The Nigerian coal corporation.

The division co-ordinates the budget, rolling plan, ministerial press briefings and progress report of the parastatals. Receipt and collation of reports from parastatals and also asses their parade audit reports. The division also undertakes the assessment/evaluation of mining project investments.

2. Explosives Division: The division enforces the explosives Act of 1964 and the explosives regulations of 1967. His main functions includes:-

i. Regulation and monitoring the use and application of commercial explosion.

ii. Control the importation of explosives and accessories.

iii. Issuance of licenses for and oversee explosives storage facilities.

iv. Enforcement of the explosives Act and Regulations.

v. Regulate and control the manufacture of explosives in the country.

vi. Training and staff Development matters are also handled under this Division.

Mineral Information and Statistics Division: The duties of this division include the following:-

1. Records and Statistics on mines and minerals.
2. Compilation and collation of minerals return.
3. Annual Reports and progress reports of the Department.
4. Departmental publication and ministerial press briefings.
5. Bilateral Relations with other countries.
6. Departmental Annual Budget Preparation.

Mining and Quarrying Division: This division is charged with the responsibility of enforcement of the minerals Act, cap 121 of 1946 and the Quarries Decree 1969 as well as seeing to the processing of minesfield application, collection of ents, fees and royalties, reclamation, and international organization. The mines Department in 1995 maintained at the state level 25 mine officers whose responsibilities are to receive, process and grant various permits and licenses. Minesland applications are received by the state officers, processed and forwarded to Abuja Headquarters, with their recommendations.

The collect Government revenue by way of rents, fees and royalties and render monthly returns in minerals and explosives statistics to the mines Department Headquarters. The state mines officers also carry out routine inspection of mines and Quarries, explosive, magazine and storage facilities. With police assistance, the undertake periodic raids on illegal miners.

The mines Department also maintain the school of mines Jos. The mining Institute, Jos is being planned to extend the manpower development of the Department into graduate and post-graduate levels.

5.1.1 AN OVERVIEW OF THE ACTIVITIES OF THE MINES DEPARTMENT

4.3.1 Permits, Licenses and Leases:

The Department monitors mineral exploration, exploitation and trade nationwide, the issuance of licenses permits and leases to enter into the mining Industry, buy and selling of minerals and acquire Quarrying and mining leases.

A five year appraisal of prospecting right issuance indicates that more investors are interested in the solid mineral sector. Taking 1991, 1992, 1993, 1994 and 1995 as an example 82, 133, 128, 150 and 300 prospecting rights were issue out to investors.

From this data it is observable that the number of prospectors increased by 62% in 1992 over that of 1991.

In 1993, there was a slight fall in the number by 4% in relation to that of 1992. This is attributable to the incessant political/industrial unrest which was witnessed in the second half of that year. 1994 recorded 17% increase over that of 1993. In 1995, there was a remarkable increase in the number of prospectors. The licenses issued were 100% over that of 1994. This means also that more revenue in terms of fees

was generated for the Government.

The details of permits, licenses and leases issued out between 1991-1995 is shown in Table 5. The revenue

TABLE 5 PERMITS/LICENSES/LEASE ISSUED(1991-1995)

PERMITS/LICENSE/LEASES ISSUED	1991	1992	1993	1994	1994
Prospecting Right	82	133	128	150	300
Entry into the Mining-Industry permit	60	59	138	66	261
License to Purchase and possess minerals(form 'K')	147	209	247	279	526
Gold Dealer's License	57	46	78	81	124
Diamond Deal's License	7	6	7	8	12
Permit to Deal in Silver	-	-	-	1	1
Permit to Buy Explosives 263	25	147	174	176	
Permit to Sell Explosives -	7	-	-	-	
Permit to Export Mineral Samples	-	-	7	17	
Blasting Certificates	704	62	659	6	719
Quarrying Licenses	1,313	276	2,015		1,815
Quarrying Leases	263	23	143	150	395
Mining Leases	-	-	-	20	46

accrued to Government from the number of permits, licenses and leases issued out to investors from 1990-1995 is #120,000, #73,500, #104,500,#123,500,#139,500, and #362,500 respectively.**SOURCE: Usman D.B. 1995)**

MINERAL PRODUCTION

An overview of the quantity of the various minerals produced in the country has shown a trend of upward improvement over the 1994 production figures. Records of mineral production have shown that there has been a systematic increase in the production of minerals such as marble, shale, feldspar, limestone, Gemstones, Gypsum, barytes and stone aggregates.(Table 6) been on the increase. The reported production figures of these minerals are 66,582 and 44,450 metric tonnes as against their 1994 figures of 7,797 and 31,979 metric tonnes respectively. This represents an increase of about 74% and 39% respectively. There has been a gradual increase in local demand for these minerals which have found uses in the building industry, production of hydrated lime and cement manufacture.[10]

Limestone production during 1995 exceeded the 1994 production by 219,085 metric tonnes or about 75%. In 1992 Government reduced the royalty on limestone from 15% of value to 10%. This incentive led to an increase in the quantity of limestone from 2,402,383 metric tonnes, in 1992 to 5,406,374 metric tonnes, in 1993-an increase of over 200%. The boom was however short lived as the figures came down to 2,908,61 metric tonnes in 1994.

Table 6 Minerals Production(1994-1995)

MINERALS	PRODUCTION(m/t)		REMARKS
	1994	1995	
Cassiterite	208.30	356.56	Metric Tonnes
Kaolin	242	11,950	-do-
Limestone	2,908,641.03	3,127,725.96	-do-
Marble	7,797	66,582.41	-do-
Shale	31,979	44.450	-do-
Clay	104,827	97,040.23	-do-
Columbite	16.99	64.80	-do-
Refined Tin	315.98	258.51	-do-
Gold	N/A	N/A	-do-
Baryte	N/A	75,000	-do-
Feldspar	N/A	3,722	-do-
Coal	N/A	N/A	-do-
Gemstones	810	4,957.087 KG.	
Aggregates & Stones	569,0363.69	3,135,359.71	Metric Tonnes
Basalt	N/A	5,347	-do-
Gypsum	N/A	1.50,000	-do-

SOURCE: MINES DEPARTMENT

Gemstone production during 1995 equally appreciated considerably by about 612% over 1994. The production figure

increased from 0.810 metric tonne in 1994 to 4.957 metric tonnes in 1995 showing an increase of about 4.147 metric tonnes. The trend has continued to increase.

The reported quality of Feldspar produced during the year 1995 was impressive. While no figures were reported in 1994, the figures for 1995 stands at 3,722 metric tonnes. This was a plus over the estimated annual production of 1000 metric tonnes. Presently the estimated annual local demand is about 15,000 metric tonnes.

The greatest increase in production was made in the production of quarriable minerals, otherwise known as aggregates and building stones.
This group of minerals include, river sand, laterite, gravel and stones. While in 1994 only 569,033 metric tonnes were produced, the reported production for 1995 was 3,135,359 metric tonnes, representing an increase of 2,566,326 or 451%. The increased activity in building and construction industry the major consumers of aggregates and construction stones accounted for this impressive output.

The production of Gypsum was greatly encouraged by the Federal Governments band on its importation. Prior to this, all the cement companies imported the commodity from overseas. The production of this mineral was therefore reported for the

first time in 1995. The reported production for the year stood at 150,00 metric tonnes.

This list of mineral production is by no means exhausted. Overall available statistics also show increases in the production of some other minerals such as coal. However, actual production figures will definitely be high than the figures reported. It is hoped that with an improved data gathering mechanism, and better equipped inspectorate field offices,the figures would have been higher, specially that mining activities and awareness is on the increase.

Available data indicate improvements in the production and export of gemstones.

The report figures are grossly on the low side, especially if viewed from the fact that there has been great increase in Gemstone mining nationwide. The true position is that most of the miners render much lower production figures in order to evade payments of royalty.

It is speculated that the number of illegal miners greatly outnumber that of the legal operation. The consequence of this trend is that the recorded production figures of various gemstones in contrast to the export figures.

For example, in 1995, 1.005kg of Aquamarine were reported produced as against an export figure 4.503 kg, showing a discrepancy of about 349%(Table 3).

The official production figures of gemstones are on the increase.

The production figures of all gemstones have been on icrease except for Zircon whose figure is not yet available. From Table 3 it is observed that for emerald, Aquamarine, Tourmaline, Amethyst and Garnet the corresponding production figures of 0.747kg, 0.724kg, 43.kg, 1139kg and 398.5kg are higher than the 1994 production figures respectively.

REVENUE GENERATION

Direct revenue is classified as fees, royalties and rents. Fees are charges paid by operations and traders in minerals to cover cost of processing of applications and preparing licenses and Tittles.

Royalties on the other hand, are percentage ad-valorem rates which operations are charged for minerals won or obtained from mining/quarrying operation. There are two forms of rents- surface rent is the levy paid by an operator for the surface area of the land an his tittle. Mineral rent is the levy the operator pays for the exclusive leases on the mineral. The provisional figure of the direct revenue for 1995 is nineteen million, thirty-five thousand, nine hundred and twenty-eight naira twenty-five kobo (#19,035,928.25).

This amount represents an increase of #2,975,137.37 or 18.52% over the 1994 revised figures, while it shows a shortfall of #2,188,389.04 or 11.5% against the 1993 figure (Table 7) It individual sub-heads are considered, the revenue figure shows an marked improvement over the 1994 except for royalty on Gold and bargte. Revenue figures form the two sub-heads are not yet available.

TABLE 7 PROJECTED/ACTUAL REVENUE- 1994-1995

SUB HEAD	DETAILS OF REVENUE	1994		1995	
		PROJECTED	ACTUAL	PROJECTED	ACTUAL
8(1)	Diamond Dealer's LC	20,000	7,750	-	16,000
8(2)	Gold Dealer's LC	20,000	25,000	125,000	37,500
9(1)	Mining Fees	4,500,000	975,209.80	15,000,000	1,673,161.67
3	Penalties for Rent Arrears	500,000	1,520.45	-	8.25
4	Prospecting Right	1,000,000	467,400.00	712,500	1,062,600.00
5	Fees for QLs/QLcs	5,500,000	1,554,990.66	10,000,000	1,820,579.63
6	Rent on Water LC	--	1,990.00	---	10,090
7	Rent on E.P.L.	50,000	49,500	125,000	166,287.04
8	Rent on Mining Rights	--	--	12,500	3,000.00
9	Rent on Mining Leases	1,000,000	330,091.85	150,000	419,015.13
10	Rent Quarrying Leases	100,000	14,390.19	25,000	53,683.90
11	Royalty on Tin	500,000	N/A	--	12,480.00
12	Royalty on Gold	100,000	30,000.00	--	N/A
13	Royalty on Columbite	8,000,000	8,079.76	200,000	102,953.00
14	Royalty on Baryte	8,000,000	16,759.76	4,600,000	N/A
20	Royalty on Marble	200,000	14,418.53	197,007	365,061.50
21	Royalty on Limestone	8,000,000	4,761,986.26	16,163,050	5,404,651.43
22	Royalty on Quarriable	20,000,000	7,359,340.46	30,000,000	6,649,710.42
23	Royalty on Gemstone	500,000	164,324.10	500,000	339,748.06
24	Other Fees	600,000	277,189.96	500,000	785,578.22
*	Royalty on Feldspar	---	---	---	12,000.00
*	Royalty on Gypsum (Yobe)	---	---	---	101,820.00
	TOTAL	59,090,000	16,060,790.88	78,060,057	19,035,928.25

SOURCE: MINES DEPARTMENT

Areas of significant improvement over the 1994 figures are in prospecting rights fees, rent on exclusive prospecting licenses, royalty on columbite, gemstones and other fees.

While the figures for these sub-heads were #467,400,#43,500 #8,079.76,#164.324.10 and #277,189.96,they are #1,062,600,#166,287.04,#102,953,#339,748 and #785,578.22 respectively in 1995. This shows increases of #595,200,#122,787.04,#94,873.24,#175,423.96 and #508,388.26 respectively the sub-heads.

This improvement when however compared with the projected figure of #78,060.057.00, the 1995 provisional figure of #19,035,928.25 is just about 24.4% of the projected figure indicating that more work needs to be done in the area of revenue collection.

Royalty on limestone has largely come from its exploitation for use in the cement manufacturing companies. In recent years the cement manufacturing companies operated under severe constraints. Several reasons have been attributed to this amongst which are machinery/equipment break-down due to lack of spare parts and black oil(LPFO).

The 1995 revenue figure from limestone was #5,404,651.43(Five Million, Four Hundred and Four Thousand Six Hundred and Fifty

One Naira Forty-Three Kobo. This is #794,037.62 or 13.5% more than the 1994 revised figures of #4,761,986.26. This figure is lower than the 1993 figure.

All the states mines offices collecting royalties on limestone recorded major improvements with the exception of Enugu and Sokoto states. The two states recorded short falls of #66,295.70 and #91,882.65 respectively against the 1994 figures.

The 1995 revenue from limestone is just 33.4% of the #16,163,050 projection for the year.(Table 5)

5.2 GEOLOGICAL SURVEY DEPARTMENT

The Geological survey Department was established in 1919 following the disbandment of the Mineral Survey of Northern and souther Nigeria in 1909 and 1913 respectively.

Statutory functions of the Geological survey are as follows:-

1. Geological investigations and production of the geological maps of the entire Nigerian territory and the discovery of mineral deposits, therein.
2. The determination of the extent and grade of known mineral station.
3. The study of the mode of occurrence and distribution of ground water.
4. The Custodian of all geological information of the country.

The Department is especially structured to undertake the following activities:-

1. Geological mapping in all sales
2. Mineral exploration in all its ramification.
3. Geophysical investigations.
4. Engineering and Hydrological investigation
5. Cartography and printing.

5.2.1 SERVICES AND FACILITIES.

1. Geological mapping.

a) Geological mapping in various scales 1:50,00 and larger.

b) Sedimentological and basical analysis.

c) Structural and stratigaphic analysis

d) Fossil-paleontological mapping

e) Production of Geological maps of states and urban areas.

f) Tectonic/Fracture maps.

2. Photogeology and Remote Sensing

a. Mineral Exploration

b. Civil Engineering works.

c. Water resources evaluation.

d. General planning.

e. Environmental monitoring.

3. Mineral Exploration

a. Geochemical stream/soil survey to unravel disseminated or hidden ore occurrences.

b. Evaluation of ore deposits.

c. Production of various maps such as mineral map of Nigeria, Geological/Mineral maps of states and Geochemical map of Nigeria.

4. Geophysical Investigations

a) Mineral Geophysical exploration.

b) Regional Geophysical survey.

c) Ground water survey.

d) Engineering Geophysical for dam sites, roads and foundation studies.

5. Engineering and Hydrogeology

a) Foundation and site investigation for dam sites.

b) Pollution investigation

c) Geologic hazards investigation

d) Production of engineering geological maps, hazard map, slope stability, foundation stability, land erosion maps.

e) Production of hydrological maps.

f) Shallow aquifer evaluation.

g) Construction of concrete cement wells for rural water supply.

h) Drilling of boreholes for water and mineral exploration.

6. Cartography and Printing

a. Production of Topical maps on various scales:

geological, mineral, township, tectonic, topographic etc.

b. Printing and binding of reports, maps and allied jobs.

c. Film processing.

e. Preparation of projector slides and view graphs.

7. Laboratory Services

a. Geochemical analysis.

b. Mineral separation.

c. Preparation of polished surfaces of rocks.

d. Petrographic and mineralogical studies

e. Preparation of this section.

f. Analysis of water, sewage and soil samples

g. Laboratory forensic examinations.

h. Identification of rocks and mineral, industry gemstone.

5.4 GOVERNMENT MINING PARASTATALS

The Federal ministry of solid minerals has two parasatals under it. These are the Nigerian Ministry Corporation(NMC) and the Nigerian Coal Corporation (NCC). The corporate head quarters of these parastatals are located in Jos and Enugu respectively.

5.4.1 THE NIGERIAN MINING CORPORATION

Following the 1971 Federal Government policy paper on the development of solid minerals, the Government opted to, among other things, to participate in mining "in the interest of the national economy".

Consequently, the Government through Decree NO. 39 of 1972 established the Nigerian mining corporation.

The corporation was charged with the following responsibility:-

a. Exploring and prospecting for, working mining or otherwise acquiring, processing and disposing of minerals of various occupancy in Nigeria other than coal and petroleum.

b. Smelting, roasting, assaying, amalgamating refining or otherwise treating the mineral aforesaid in any manner calculated to render the products and by-products of any such minerals marketable,

c. Purchasing the ores, products and by products of any of the minerals afforced form any source outside Nigeria in any case when they are not available in Nigeria.

d. Marketing the ores, products and by products of any or all the minerals aforesaid.

e. Performing the other functions considered on it by or pursuant of this Decree.

The establishment of the corporation marked on important turning point in public policy in Nigeria with regard to the general conception of the role of the Government in the sphere of commercial exploitation of Nigeria's solid mineral resources.

Through the medium of the Nigeria mining corporation, the Government took a firm resolve to henceforth make greater contribution to and play a more vitae role in the mining industry with the aim of rehicving economic control of an area of activity crucial for rapid transformation of Nigeria into an industrial state.

For its 26 years of operating the Nigerian mining corporation has established its role as the leader in establishment of organized mining outfits(subsidiaries) and a pathfinder in mineral exploration in areas where private companies had shown little interest. The NMC has therefore played the role of a catalyst in solid mineral development (KWa 1996).

5.4.2 NMC SUBSIDIARY COMPANIES

The Nigerian mining corporation has 8 wholly owned subsidiary companies as follows:-

1. NIMCO Quarry product limited.
2. NIMCO Terrazzo Company Limited.
3. Nigerian Bricks and clay Products Limited.
4. Nigerian Kaolin Limited.
5. NIMCO Gold Mining Company Limited.
6. Nigerian Tin and Allied Minerals production Limited and
7. NIMCO Feldspar/Quartz project.

5.4.3 NMC ASSOCIATED COMPANIES

The Nigerian mining corporation has 23 associated companies. These companies with NMC holdings are as follows:-

1.	Nig. Bricks and Clay Products (plateau) Ltd	86%
2.	Ririwai mines Limited (Kano)	84%
3.	Nigerian Diatomite Company Ltd	80%
4.	Consolidated Tin Mines Limited	60%
5.	Nigerian Uranium Mining Company Ltd.	60%
6.	NIMCO concrete Roofing Tiles Ltd.	43%
7.	Nigerian Freedom Mining Company Ltd.	40%
8.	Oil Chem(TC) Limited	60%
9.	Makeri Smelting Company Ltd	39%
10.	Jakura marble Industry Ltd	35%
11.	Gombe Explosives Manufacturing Co. Ltd	35%
12.	NOMIL Mines	35%
13.	NIBOD Mines	30%
14.	Nigerian Dolomite Mining Co. Ltd	25%
15.	Nigerian Marble mining Co. Ltd	20%
16.	Primary mines (Iperindo)	20%
17.	Cross River Limestone Co. Ltd	18%
18.	Plateau Ceramics Industry Ltd	18%
19.	Arewa Ceramics Limited	18%
20.	Katsina Ceramics Co. Ltd.	15%
21.	Nigerian Electricity supply Corporation	9%
22.	Mubi Burnt Bricks Industry Ltd	86%
23.	Izom Clay and Brick Products Ltd.	40%.

5.4.4 NMC FOREIGN HOLDINGS

The Nigerian Mining Corporation has 4 foreign holdings on behalf of the Federal Government of Nigeria as follows:-

1.	Niger Uranium	30%
2.	Guinea Uranium	25%
3.	Guinea Bauxite	13%
4.	Niger Phosphate	10%

5.4.5 MINERAL EXPLORATION

The Nigeria mining Corporation uses information from Geological survey reports to identify areas that have minerals of economic interest. Reconnaissance surveys determined the extent of the mineral occurrence semi-detailed exploration work was carried out to determine extent of mineral recurrence that were of economic value. Detailed exploration was carried out to establish the reserves (in tonnes), its characteristics, the nature of associated mineral and host rock.(Table 8).

5.4.6 MINERAL PRODUCTION

Not all exploration works by the Nigerian mining corporation yielded ore reserves as such expenditure had to be written off. This not withstanding, NMC has established operating mines of Kaolin, Barytes, Feldspar, Gold, Marble-and tin. Nigerian mining corporation has also established reserves for some minerals but exploitation is yet to commence. These minerals included Magnetite, Diatomite, Talk, Lead/zinc and clay(Onibode).

Table 8 NIGERIA MINING CORPORATION

(MINERAL APPRAISALS (AUGUST 1985-TO-DATE)

S/N	MINERAL	LOCATION	WORK DONE	FURTHER WORK REQUIRED
1	Gold	Niger State	Reconnaissance	Detailed Investigation
2	Gold	Yauri - Bekki State	Detailed Investigation	Mine Development and
3	Gold	Waya - Kebbi State	Reconnaissance	Production
4	Gold	Birnin Gwari - Kaduna State	Reconnaissance	Detailed Investigation Detailed Investigation
5	Lead/Zinc	Abakaliki - Enugu State	Evaluation and	More drilling and Mine
6	Lead/Zinc	Zurak - Plateau State	Reserve Est Reconnaissance	Development Detailed Investigation
7	Baryter	Azara - Plateau State	Evaluation of Reserve Est	Production
8	Bentonite	Mbon - Borno State	Reconnaissance	Detailed Investigation
9	Soda Ash	Ngurn - Yobe State	Reconnaissance	Detailed Investigation
10	Kaolin	Darazo - Bauchi State	Detailed Investigation	Mine Development and Production
11	Talc	Okolom - Kogi State	Reconnaissance	Production (Okolom)
12	Talc	Ilesha - Osun State	- do -	- do -
13	Feldspar	Dass - Bauchi State	Reconnaissance	Detailed Investigation
14	Diatomite	Bularaba - Yobe State	Evaluation & Reserve Est	Mineral Processing Test work & Development.
15	Magnesite	Adamawa State	Evaluation & Reserve Est.	Mine Development and Production
16	Marble	Ugyu - Plateau State	Evaluation & Reserve	Awaiting Production
17	Marble	Lokoja - Kogi State	Est. Reserve Estimation	
18	Dolomite	Ozara - Kogi State	Evaluation & Reserve	Awaiting Production for
19	Dolomite	Ontbode - Ogun State	Est. - do -	Ajaokuta Steel Project - do -
20	Clay	Ontbode - Ogun State	Evaluation & Reserve Est.	Awaiting Production for Ajaokuta Steel Project
21	Salt	Oku Lake - Benue State	Geophysical Investigation	Awaiting Drilling and Reserve Estimation
22	Phosphate	Dange - Sokoto State	Reconnaissance and Preliminary Investigation	Detailed Investigation
23	Gypsum	Nationwide	Reconnaissance and Preliminary Investigation	Detailed Investigation
24	Ilmenite	B/Ladi - Plateau State	Detailed Investigation	Mine and mineral Processing Design

SOURCE: Nigerian Mining Corporation

Kaolin:Kaolin is being mined by Nigerian Kaolin Ltd. The national demand was estimated at 253,000 tonnes in 1990, but the present production level of the company is 10,000 tonnes per annum. Plans are into increase production to 25,000 tonnes per annum but this will require additional purchase of equipment.

Gold: Gold is currently being mined by NIMCO Gold Mining company Ltd. The national demand is unlimited. Present production is 480 0zs per annum, Acquisition of additional equipment is being proposed to increase production to 100 ozs per month(12,000 ozs per annum).

Tin ore: Two NMC companies NTAMP Ltd and CTM Ltd are engaged in the mining tin ore by surface mining in the Jos area. The present production of NTAMP Ltd is 10 tonnes per annum. To increase production to 240 tonnes per annum, equipment for mining and processing need to be purchased.

CTM Ltd has a production output of 100 tonnes per annum. The projected production rate of 1200 tonnes/annum can only be achieved if additional mining equipment are purchased.

Feldspar: Feldspar is currently being mined by NIMCO Feldspar/Quartz project. The yearly demand is 10,000 tonnes while the production level stands at 1,000 tonnes per annum. The plan to increase production to 5,000 tonnes will require the purchase of additional equipment for mining. The feldspar

produced is locally consumed by the glass and ceramic industries.

Barytes: The national demand is about 120,000 tonnes per year, while the production capacity of Nigerian Barytes mining and processing company Ltd is 5,000 tonnes per annum.
All barytes produced is consumed by oil drilling companies in Nigeria.

5.5 THE NIGERIAN COAL CORPORATION(NCC)

The Nigerian coal corporation ordinance No.23 of 9950 granted the corporation the right to exploit all coal deposits within Nigeria. This parastatal has the monopoly statutory responsibility to mine, treat and render saleable, supply and sell Nigerian coal.

Nigeria is estimated to have coal reserves of 1.5bn tonnes located at Udi, near Enugu and Kabba. The coal is one of the best in the world having low sulphur content which is suitable for the production for the production of tar and synthetic fertilizer.
It is also used for ordinary steam raising purpose, generating of electricity and manufacture of chemical and liquid fuels.

5.5.1 COAL PRODUCTION

Udi mine located near the range of Enugu Hills was the scene of the first ever coal mining in 1916. Between 1917 and 1967 coal was mined at Obwete, Iva-valley and Asata. The quantity

produced rose from 583,000 tonnes in 1959 to 925,000 tonnes in 1974. It dropped to 304,000 tonnes in 1974. The reason attributed to this was the discovery and use of oil and gas as a resources of energy and power.

The government is now opening up the coal industry for private investment to further boost production.
The government is now opening up the coal industry for private investment to further boost production. In 1997 the Nigerian coal corporation was allocated #260 million to enable the exploration of the coal deposits and rehabilitate its infrastructure, especially the coal export facilities.

Mining operations have extended to Okaba in Kogi state, with the Okaba open-cast mine accounting for about 90% of the operations present coal production. The coal industry plans to set up small and medium scale carbonization and Bracketing plants for the production of smokeless solid coal Briqueting, which is smokeless and burn efficiency, yielding high calorific value. Availabilities of this fuel will assist in solving the deforestation problem of the country, which has tended to promote erosion in the south and electrification in the North.

Three underground mines were idle and flooded in the past years.
These are Onyeama mine, Okapara East in and Okapara West Bank

mine. Recently, work started on the renovation of office buildings erection of a new store House, cleaning of the Okpara West Bank mine, and erection of the electric power line to the mine.

Two parallel edits have been opened to link up with the flooded developed part of the mine. From these adits some quantity of coal is being won from the development works. It is intended that as soon as power returns to the mine deiwatering will commence and the rehabilitation of access roads will proceed simultaneously to reactive the mine.
The present coal production at the Okaba mine is 100 tonnes per day.

Importers from United States, France, Germany, the United Kingdom, Japan, South Africa, Israel, Brazil and Russia have shown interest.

TABLE 9: GEMSTONE PRODUCTION/EXPORT (1992-1995)

GEMSTONES	PRODUCTION IN Kg.				EXPORT IN Kg.			
	1992	1993	1994	1995	1992	1993	1994	1995
Sapphire	N/A	N/A	N/A	N/A	0.584	0.128	0.390	1.455
Corundum	0.102	0.01	N/A	1.371	N/A	N/A	0.151	N/A
Ruby	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Emerald	0.117	0.669	0.05	0.797	0.116	0.847	0.679	0.488
Aquamarine	0.455	0.420	0.281	1.005	1.453	0.838	3.195	4.503
Tourmaline	0.087	0.115	0.871	0.914	1.187	2.397	2.484	4.063
Amethyst	0.166	100	62	1201	43.2	41.67	12.15	73.86
Garnet	87	21	423.5	822	32	40.61	275.5	360.03
Zircon	134	28	101	N/A	3	3.15	0.246	164.39
Topaz	574	129	222	2930	1677	833.58	1002.42	1280.6
Total	795.927	279.214	809.702	4,957.087	1,758.54	923.22	1,297.215	1,889.389

5.6 PRIVATE SECTOR PARTICIPATION IN MINERAL RESOURCES DEVELOPMENT

Since the withdrawal of multinational companies such as Amalgamated Tin Mining company of Nigeria(ATMN),after the indigenisation decree of 1985 the private sector participation in mining came almost to a halt. While the Nigerian Mining Corporation was in the filed exploring and establishing mines, the private sector was relatively active with only consolidated Tin Mining Company(CTM) exploiting tin through contractors.

The best private sector efforts in exploration work came from the cement manufacturers association for gypsum while the exploration for gold was carried out by Globemark Ltd.

As highlighted in chapter three, up stream mineral investments involves geological exploration and is associated with high risk.

The average indigenous mineral resources investor will like to invest in projects that give quick returns.
The average Nigerian businessman does not want to take calculated risks with his money. This general trend contributes to the low participation of private investors in mineral resources development.

After the withdrawal of multinational companies private sector participation was inclined more towards illegal mining and speculation in mineral trading tin, columbite gemstone etc. The distinction between speculation and mineral investment in the Nigeria content is difficult to differentiate. The main distinction between them is often a matter of period or time of transactions.

While the mineral investor is concerned with the direct benefits provided by the asset over the long run, the mineral speculator is concerned with the price of the asset In the relatively near future. It can also be said from above that while the mineral speculator is concerned more with absolute values. Until recently both the mineral investor and speculator depended on one source of the commodity which is from the illegal miners who indulge in sporadic mineral

exploitation usually outside the requisite norms of safety and technical requirements.

In this regards therefore, it is difficult to differentiate where mineral speculation starts. It can only be said that mineral speculation especially in gemstone trading take on high risks than investors. The gemstone speculator often falls a victim of dupers who may use spectulators inability to identify various gemstones.

Table 10 MAJOR MINING COMPANIES IN NIGERIA

S/No	Mining & Location Quarrying Company	Title	Mineral	LGA
1.	Dan C.C. Daniels Ashiagu	Mining Lease	Lead & Zn	Ohaozara
2.	Natural Chemical Uburu Co. Ltd	Mining Lease	Salt	Ohaozara
3.	Ind.Tech Develop- Abia ment Ltd Ohafia	Quarry Lease	Limestone	Arochukwu
4.	A.B.G Industries Ga-anda Ltd	Quarry Lease	Gypsum	Gombe
5.	Jos Alluvials Ltd Mkpume Atakpa	Mining Lease	Lead & Zinc	Ishielu
6.	PSPS Limited Uyo Licence	Quarrying	Kaolin	Uyo
7.	Benue Cement Co. Yaudev	Mining Lease	Limestone	Gboko
8.	Freedom Ushongo Industries Limited	Mining Lease	Barytes	Ushongo
9.	Midland Metals Ltd	Quarrying	Barytes Kat.Ala	Kat.Ala
10.	Quest Two Ent.Ltd Jige	Quarring	Feldspar/Quartz	Gwoza Hills

11.	Afric Mining	Quarring Kwajafa	Feldspar	Hawul
12.	Afric Concerns	Quarying Licence	Bentonite	Ngala
13.	Borno Mining Ada Syndicate	Quarrying Licence	Bentonite	Ngala
14.	Cross Rive Lime-Akampka Stone Ltd	Mining Lease	Limestone	Mfamosing
15.	Bendel Cement Ltd Okpella	Quarrying Licence	Limestone	Etsako East
16.	Nigigerian Cement Company Ltd	Quarrying Licence	Limestone	Ishielu
17.	Femace (Nig)Ltd Awe	Quarring	Barytes	Awe
18.	Dengroupco Orlu Limited	Quarring Licence	Diorite	Okigwe
19.	Indegeneous Nekede Technology	Do	Kaolin	Orlu
20.	Barthoway Dredging Company	Quarrying Itakpe Licence	Kaolin	Owerri

21.	N.I.O.M.P	Quarrying Oke-Luse	Iron Ore Licence	Okene
22.	Owo Oasis Co. Ltd Atakumos	Quarring Licence	Limestone	Ose
23.	Danson Orisunbare & Co. Ltd	Quarring Licence	Talc	Atakumosa
24.	Pateco (Nig) Ltd	Quarring	Talc	Ona-ara
25.	Ashaka Cement PLC Fune,	E.P.L	Limst,Gypsum,	Gujaba
26.	Ningi Mining Langtang Company Ltd	M.L./E.P.L	Lead,zinc,sphalerite	
27.	Abdama Mining Co. Langtang Ltd	E.P.L	Barytes	Langtang
28.	Chini Mines Ltd Wase	E.P.L	Barytes	Wase
29.	Al-Umna Trading Construction Company Limited	E.P.L	Kaolin	Duku

30.	Al-Makura (Nig) Limited	E.P.L	Barytes	Awe
31.	Jama'a Min.Co. Ltd.	E.P.L	Gypsum	B/Gwari
32.	Kanadi Mining Co. Bauchi Ltd	E.P.L	Felspar Marble	Bauchi
33.	Nagarta Intern. Aweu Tech.Co. Ltd	E.P.L	Barytes	Awe
34.	A.M. Kalumbu Ltd Langtang	Quarring Licence	Barytes	Langtang

SOURCE: Aliyu A. and Others (1996)

5.7 FOREIGN CAPITAL IN MINERAL INVESTMENT: THE BRAZILIAN EXPERIENCE

Foreign capital has accounted for a significant amount of the mining investments in Brazil. Indeed a large number of projects would not have been developed without the technological, financial, managerial and marketing support of overseas investors. Between 1978 and 1992 total investments in the Brazilian mining industry amounted to US 9.6 billion (in 1995 terms), 42% of which was derived from overseas companies. These included amongst others, Alkan, Alcoa, Anglo, Americans, Gencor, Inco, Homestake, Lafarge, Marubeni, Mitsubishi, Molycorp, Newmont, Noppon steel, Notanda, Norsk Hydro, pegasus, Placer Dome, RTZ, Teck, TVX and WMC.

These funds were directed towards exploration, expansion and greenfield projects encompassing more than 30 different minerals (which account for around 80% of the value of Brazilian mineral production) it is estimated that since 1994, about 40 new foreign groups have begun exploration activities in Brazil, especially for gold.

Despite this impressive array of overseas companies operating in the mineral sector, the mining investment climate worsened between 1994 and 1994. This was entirely due to the impression of a series of political, legal, and economic constraints on the decision-making process, causing a decline in Brazil, ability to attract mineral investments. This was

attributed to:-

1. a worsening macroeconomics environment, characterized fundamentally by along period of stagnation and high inflation rates, exacerbated by the poor management experience of the government plan.
2. the ever increasing taxation burden, and the prohibition of foreign companies from controlling local mining operations.

After 1994, however, the adoption of important measures by the government completely changed the economic and legal environment, restoring Brazilian mining sector to its proper place within the portfolio of the major and junior mining companies.

THE CHANGES IN BUSINESS CLIMATE

It is important to point out some legal and administrative instruments that address specifically the mining sector and that are going to impact positively on the investment climate.

1. Removal of constraints on foreign capital
2. A sensitive reduction in taxation
3. Review and mordernisation of the mining code, embracing several amendments focused on implementing more streautine procedures for the administration of mining permits and offering more operational flexibility.
4. Adopting better monitoring of work currently being conducted, and accelerating administrative procedures.

5. Reorganizing small and medium sized mining companies.
6. Administrative reform of the principal mining institution in order to better perform their promotional, regulatory and monitoring functions.
7. Reform of mining legislation.

The competitive disadvantages relating to infrastructure are being addressed by a wide-spread program of privatization and transfer of concessions of public sector operation to private entrepreneur.

As a result a series of new projects embracing energy, communications and transport, representing a multi-billion dollar portfolio of opportunities, are now under alone, the least of projects possible amenable to privatization represents a potential investment of around US$30 billion, associated with a consolidated new projected capacity of 29,000MW.

In recent years the Brazilian capital market has undergone continues revision in order to accompany the global financial integration process. These efforts have been motivated fundamentally by the increasing importance of institutional investors as a source of risk capital, the growing importance of the international capital markets in funding some major Brazilian companies.

CHAPTER SIX

6.0 ANALYSIS OF METHODOLOGY APPROACH TO IMPLEMENTATION OF TQM IN MINERAL RESOURCES DEVELOPMENT IN NIGERIA

6.1 The Role Of Federal Government

The historical perspective of Total Quality Management in Japan, Britain and America as highlighted in Chapter two started with the individual government propagating the ideals of this modern system of management. Forty years of TQM practice in these developed nations has launched them into highly competitive positions, which will take Nigeria many years of dedicated commitment to catch up with.

The drive of Nigeria to become an industrialized nation cannot be effectively achieved without imbibing the concept of Total Quality Nation.

Experiences of America and Britain proved that it is not enough to be industrialized, that industrialization must be seen from the point of production of quality goods and services in order to meet the overgrowing tastes of customers. In 1978 Britain lost 10 billion Pounds sterling due to bad quality goods and services. The quest of Nigeria to capture the African Market and if possible a share of the western market can only be establish through Total Quality management.

The impact of the Standards Organization of Nigeria is negligible if total rejunivation of the Nigerian poor management culture is not carried out. The role of the Federal Government of Nigeria in TQM can begin with an intensive national Quality Campaign which must continue unabated until it becomes the most sustained programme in our national life.

6.2 THE ROLE OF EXECUTIVE/MANAGEMENT

The first step towards implementation of TQM in the mineral sector is to instill awareness of Total Quality Management in the Chief Executive/Management and the private sector. cadres of the Federal Ministry of Solid Minerals Development, Government Parastatals and the private sector. Without the commitment of the top management to TQM, there is absolutely no point in a company or organization adopting a quality improvement process.

It is critically important that top management take the time out to fully understand TQM and what it can achieved for the organization, and develop an agreed (at board level) plan for implementation before attempting to implement the plan. The altitude of top management to TQM must be demonstrated in earnest everyday and in every action. All messages given from Top Team meetings deliberation and decisions must show the positive commitment to Total Quality Management. This must start with a clear statement of Quality Policy which encapsulates the ethics and values of the

organization/company. The chief executive will lead the thinking on Quality policy statement, but the Top Team must contribute and agree on a consensus statement, which will become the vision of the company's philosophy.

Having started from the general vision, it is possible to assess the company or organization"s current standing and to determine the necessary approach in all aspects of business endeavors.

As a matter of policy, aims must be expressed in "mission statement" focusing attention of everyone on all specific goals and objectives set by the Top Team for the organization. The approach defined by Quality policy statement must lead to Top Team to implement Total Quality Management from themselves and down through the organization until everyone is involved and committed.

The quality of management staff in the Federal Government Ministry, the Government parastatals and the private mining companies is directly linked to the quality of the business. By definitions it is the manager's role to manage the policy of government on minerals resources development or the mineral investment business. This point is further substantiated by the fact that it is management who determine the quality of information, the quality of organization and therefore the quality of systems, the quality of products and services which in turn determines the quality of the business.

The role of management is very critical in the collation and analysis of available information of mineral exploration data, activities of prospective mineral investors, mineral evaluation/reserve, mining/mineral processing equipment/machinery, production data etc. The role is that only useful information which has been specifically defined as a requirement should be received.

The systems, methods and procedures that the management of a mineral resources organization employs to output its products and services are critically important. In mineral resources development; the definition, development, implementation and control of relevant systems is a difficult task which only technically competent management can successfully handle. The ability to implement new systems successfully is important in achieving mineral policy or business requirements and thereby maintaining or improving a competitive edge. It is the duty of management to ensure that the correct methodology is used to implement systems that will guarantee continuity throughout the organizations.

There are three-steps universally accepted by TQM methodology which is applicable to all aspects of business. These are:-

Step 1. Analyses and define existing system

Step 2. Specify completed system

Step 3. Phased implementation.

This methodology is an essential element to the successful implementation of new and improved systems, methods and procedures in an organization. Difficulties in communications leads to in-accurate specifications for new system which in turn lead to implementation and continued operational difficulties.

Management changes is a frequent phenomenon in the Nigerian organizational and mineral investment sector. Too many changes can cause feeling of instability and division in an organization. The Total Quality Approach to organizational change demands that the people are informed clearly of the changes and why they are being done. The level of involvement in the organizational change decisions - making process need to be critically reviewed, as consensus management is one of the key secretes of Japanese success.

The management of all mineral resources investments in Nigeria have a *responsibility to recognize* that the quality of products and services is what determines the level of profitability and therefore appropriate norms must be adhered to, to support this ethics. Furthermore, is it management responsibility to re-focus on the quality of products and the quality of services.

6.3 *TQM STRUCTURE AND TOP-DOWN REQUIREMENTS IN MINERALS INVESTMENTS*

At this point of the study, it is assumed that all senior management team and senior executives of mineral investments

and the policy organ of government understand the concept of TQM and how it can be used as the management methodology to achieve the required business benefit, the next stage is plan the implementation.

The first requirement is to form at the highest level. Top-Team (also known as the steering group). At this level the TQm implementation group should comprise of senior employees amongst which are Chief Executive Officers (CEO) and the other directorate depending on the geographical or divisional aspects of the organizations.

The requirement is to lead by example, the first step in achieving this is to ensure that all the directorate, including the Chief Executive Officer, are active members of the Top Team. All are to get involved in planning and controlling the implementation of TQM top-down throughout the organization.

The most important of all their responsibilities is to be seen to own and manage the TQM process.

6.3.1 TOP TEAM SELECTION

The steering group (Top Team) responsible for creating the improvement climate is to be constituted from the top management. This study shall attempt to constitute such teams for the Federal Ministry of Solid Minerals Development, the

parastatals and their subsidiaries, Large mining Companies (Private) and small/medium sized companies.

6.4 STEERING GROUP AT THE FEDERAL MINISTRY OF SOLID MINERALS DEVELOPMENT

The federal ministry is basically a policy making organization which ensures that government directives of acquisition, exploration, mining rights, exploitation and marketing of of mineral resources are carried out correctly through its various organs such as the inspectorate divisions which are all over the country. The steering group shall consist of the following Top Management members:-

1. Director General Federal Ministry of Solid Minerals Development
2. Director of mines
3. Director of Geological Survey
4. Director of Personnel
5. Director of Research and Statistics
6. Managing Director of Nigerian Mining Corporation
7. Managing Director of Nigerian Coal Corporation

The inclusion of the two Managing Directors of the Ministry's Parastatals is to ensure is total compliance of the Parastatals in the quality control process of the total Quality Improvement process of the Total Quality Management. These managing Directors of NMC and NCC are in turn suppose to be members of Top Teams at the Corporation respective levels.

PROJECT GROUPS

Reporting to the Project Steering Group at the Federal level, shall be the PROJECT GROUP. The project Group shall consists of all the heads of the relevant departments headed by the respective directors of Mines Geological survey, Personal , Research and statistics, Managing Director NMC, Managing Director NCC. Two examples shall be given to reflect this arrangement as follows:

Mines Department.

1. Director of Mines - heads of the Project Group
2. Deputy Director Exploration
3. Deputy Director Parastatals
4. Deputy Director Mining/Quarrying

All the deputy Director shall be coordinators for their respective Departments.

6.5 TOTAL QUALITY MANAGEMENT IN STATE MINES OFFICES

Mines Department have been opened in about 25 states of the Federation including the Federal Capital Abuja. It is expected and planned that all the states of the Federation should have mines officers.

The state Mine Officers constitute vital operational organs of the Federal Ministry of Solid Minerals Developments. Through these state mines offices all the minerals policies of the Federal Government are executed through supervision of all

minesfield which may be very remotely situated even from state capitals. The state Mines officers are mostly pre-occupied with inspection works of mines field applications and operations. The successful inspectorate engagements of these mines offices determines the effectiveness of the Solid Mineral Resources harnessment. Their main areas of engagements include the following:-

1. Enforcement of safety regulation in all aspects of mineral resources developments. These includes; exploration, mining, mineral processing and marketing of mineral resources.
2. Monitoring of Mineral Production of Mineral Resources with the view to quantification of mineral out-puts.
3. Collection of royalties from mining quarrying and mineral processing concerns, which is based on mineral production and title holdings on mines field applications.
4. Processing of mines/and applications from prospective investors.
5. Issuance of blasting certificate to section 36 managers and personnel handling explosives
6. Supervision of mixing of ammonia with fuel (AMFO) by inspectors before any blasting activities are carried out. This point became necessary at the advent of growing numbers of bomb blasts recorded during the NADECO uprising.
7. Supervision of buildings to house explosives and accessories by marketers of such products and the

consumers in mines and quarries alike.

8. Collection of royalties from form "K" holders on behalf of the mines department.
9. Issuance of Gold dealers licenses and collection of requisite royalties.
10. Issuance of Quarrying licenses to prospective investors and supervision of production of mineral resources.

The aforementioned areas of engagement of the state mines inspectorate is sadled with various constraints which could be eliminated if the concept of Total Quality Management is imbibed by the Federal Ministry of Solid Minerals Development. *Major constraints faced by states mines offices include* the following:-

1. Absence of field operation vehicles such as land cruisers or Land Rovers, which are very necessary for penetration into the rugged and undulating hinterland roads and terraces .

   The total absence of these vehicles in all state mine offices renders the inspectors useless in terms of checking and monitoring of the activities of illegal miners who presently constitute the bulk of people engaged in mining of precious metals and gemstones in many states of the federation.

2. Legitimate investors who have peg a minesfield for prospecting, exploration or mining of various minerals

have been displaced by illegal miners who may posses better facilities for mineral haulage, information and possible escape which neither the police nor the state mines inspectorate posses to the unfortunate economic detriment of the nation.

3. The normal procedure in mines/land application is for investors to apply for prospecting license which is later followed by an application for mineral lease if the area prospected has minerals in economic quantities. Several mining investors do skip the second procedure, by going ahead to start mining and even processing without the requisite permission. Many of such investors have got away with such illegal acts because the inspectorate divisions lack the facilities (vehicles) for such timely inspection and monitoring.

4. The absence of aforementioned facilities has contributed negatively to the inspectorate division. In some cases depending on prospecting plans and even fictitious mineral reserve calculations presented by the mineral investors, cannot be verified by inspectors because of many constraints. The consequences are poor prospecting plans and lose of revenue by government which is forced to depend on a suppressed mineral reserve calculation. The act also makes impossible an attempt to statistically accurately quantify mineral production against marketing.

5. The state mines inspectorate are also not equipt with the laboratory facilities for mineral assessment, which leads

to accurate determination of mineral grades and reserve impossible.

6. The personnels of state mines inspectorate are not exposed to further training in order to be competitive in line with growing technical/technological advancement associated with mineral resources investment.

From the aforementioned primary responsibility of the inspectorate divisions and the constraints affecting their operations, an application of the concept of TQM will enhance performance of the internal customers (The employees) and the external customers. (the mineral resources investors).

The steering group of the states inspectorate offices should be headed by the state mines officer with departmental heads as members.

6.6 THE NIGERIAN MINING CORPORATION

The managing director of the Nigerian Mining Corporation has all the General Managers of the subsidiary companies answerable to him. In addition to this, the managing director has at NMC level various Directors also answerable to him. He shall therefore belong to two other Top Teams, one in regards to the NMC and the other in regards to all the subsidiaries as follows:-

6.6.1 NIGERIAN MINING CORPORATION STEERING GROUP

1. Managing Director of NMC - leader
2. Executive Director Mines

3. Executive Director Exploration

4. Executive Director Finance.

6.6.2 NMC PROJECT GROUP

At the Nigerian Mining Corporation there shall be three TQm project groups comprising of the three divisions of the corporation, these are the mines exploration and finance/administration. Taking the Mines Division for example, the TQM project group shall be headed by the Executive Director Mines. Other members of the group shall consists of all the General Managers of the subsidiary companies as explained earlier in chapter five.

At the level of the subsidiary companies, the steering group shall be headed by the individual General Managers. The steering group for the Nigerian Kaolin Limited for example shall be as follows:-

1. General Manager - leader
2. Manager operations
3. Quarry supervisor
4. Manager accounts

The projects group shall in turn be headed by the three stational managers mentioned above. While the members of the team shall be the various supervisor within the sections.

6.6.3 THE SUBSIDIARIES STEERING GROUP

1. Executive Director Mines - leader
2. General Manager NIMCO Quarry Products
3. General Manager NIMCO Terrazzo Products
4. General Manager Bricks and Clay Products
5. General Manager Nigerian Kaolin
6. General Manager Gold Ming Company
7. General Manager Tin and Allied Minerals
8. General Manager NIMCO Feldspar/Quartz

This Top Team will form the power house of Total Quality Management in the entire corporation. The individual General Managers will in turn lead their respective subsidiary companies.

6.6.4 PROJECT TEAMS AT SUBSIDIARY LEVEL

1. Executive Director - leader
2. General Operation
3. Manager Quarries
4. Manager Mineral Processing
5. Manager Marketing
26. Manager Administration/personnel

6.6.5 STEERING GROUP OF CONGLOMERATES

The planned expansion and modernization of Nigeria's Mineral Industry through the monetization programme will require a tremendous input of foreign technology and financing which may

result in the growth of conglomerates. The same strategy of Top-down implementation relates to the massive conglomerates-type companies. The system of To-Down implementation will be directed towards having steering group at each company level.

6.7 SMALL/MEDIUM SCALE ENTERPRISES

The scope of business of small and medium scale enterprises is much smaller than those in large companies and conglomerates. In this case, there will be only top-team and one plan for the implementation to Total Quality Management.

6.8 FRAMING A QUALITY POLICY

The essence of framing the new policy is to present it at a short, clear and succinct manner to the employers. This makes understanding and remembering of the points easier by everyone. The policy must be well circulated and placed in all strategic places within the organization. To ensure personal commitment to quality, the policy must be accepted and signed by everyone.

The TQM policy must underpin the following principles:-

1. That quality means meeting customers requirements
2. That customers are both internal and external
3. That meeting customer needs leads to achievement and maintenance of competitive edge against competition.
4. That quality means achieving a culture of continuous improvement in all areas of the company.

6.9 EDUCATION AND TRAINING

The development of the Mineral industry can best be achieved through the development of manpower. In this regards government has major role the play. The growth of mineral industry in a developing economy is best promoted by efficiency of small scale mine operator, while in some area of policy, eploration, research and processing, professionals will always create role provide most of the employment and generate the diffusion of technology far more effectively than a smaller cluster of big time operators.

A rapid upgrading of professional strength and quality of the scientist in the Federal Ministry, related Institutions and mining parastatals are critical for the successful geological mapping of the country. Detailed mineral exploration and investigation is required to facilitate private initiative and build up dissemination of accurate and up the date information data on solid mineral resources. Mining employees are exposed to health hazard, therefore training in health and safety procedures and methods minimize incidence of occupational hazards and accidence occurance.

The successful implementation of Total Quality Management in the mineral industry is anchored on training and re-training of employees. It is necessary to tailor the Total Education and Training plans to the achievement of company/organsiation goals and objectives.

Education and training in Total Quality Management is unique

in the sense that training all cadres of employees are involved.

6.9.1 Training Structure

As earlier mentioned, for Total Quality Management to succeed in an organsiation or company, it must have the blessing of Top Management.

Consequently, the training structure is usually top-down, starting with the Top Team and cascading down the organization as shown in Fig 17 below.

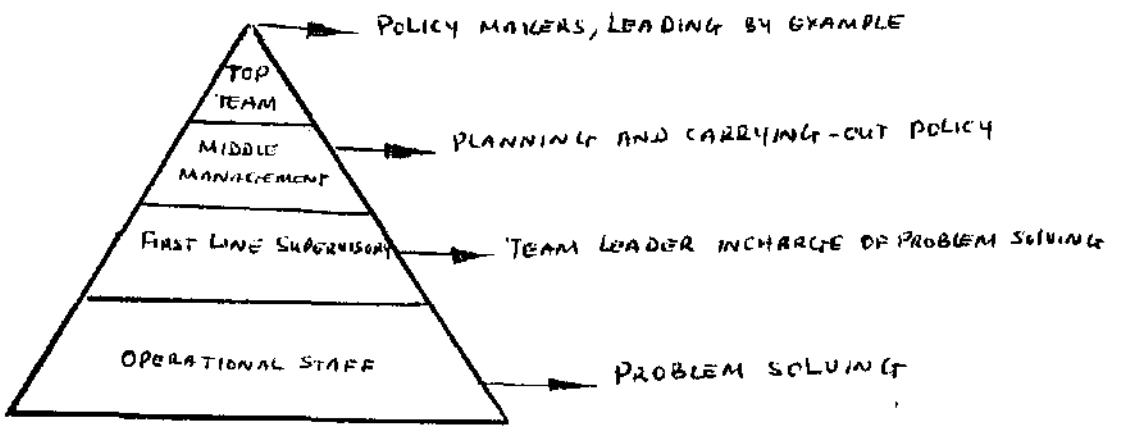


Fig 17 Training Structure TQM Top-Down

Source: World Class Performance Through TQM

It has been tested that the golden rule to successful implementation of Top-down structure is to ensure that managers train their own employees

6.9.2 PLANNING OF EDUCATION AND TRAINING

The training starts with the Top team, and followed by the other employees down the hierachy up to the operational staff. The training of Top Team in most cases is accomplished by relevant consulting firms, training organizations or individual consultants from business schools.
Total Quality Management being relatively new in Nigeria may call for foreign training in overseas or in-house training by foreign consultants in Nigeria. The bottom line is that the trainers must be well experienced in Total Quality Management so that the concept is taught right from the on-set.

It is very important that the Top Team understands clearly the principles of Total Quality Management so that the correct concept is taught right from the on-set.
It is very important that the Top-Team understands clearly the principles TQM and articulate the plasn of TQM implementation within the organization before launching the plan officially. This encourages implementation of TQM by example and paves ways for greater commitment by other employees of the organization.

The middle Management in mineral resources investment organizations carry-out policies and plans that are articulated by the To-Team. Their training is therefore very crucial to the success of Total Quality Management. The scope of training of this category of employees should cover TQM

principles, Team leadership, performance measures and problems solving.

6.9.3 TEAM LEADERSHIP AND PROBLEM SOLVING.

The first line supervisory cadre are principally pre-occupied with problem solving and team leadership management. This cadre of employees are closer to the shop-floor workers or employees. Their scope of training should cover TQM principles, Team leadership and problem solving. The first line supervisors should be well trained in order to constantly identify problems and profer possible solutions to the problems with the view of totally eliminating further occurrences and improve quality of products or services.

The operations staff constitute the bulk of employees of minerals organization.

The general out-put and quality of goods and services are produced by mineral organization depends on the inputs of these cadre. In total quality management these employees are trained in the need to identify problems individually and collectively profer solutions to these problems. Industrial democracy must be fully encouraged so that these employees feel free to discuss operational problems with supervisors-free of superior forbia.

It has been tested that freedom of expression by employees in technical and technological mater in form of brainstorming generates inherent talents that would otherwise have been hidden.

These shop-floor workers on whose shoulder lies the bulk of work are in a better position to contribute to the performance of equipment machinery and production facilities.

The scope pf their training should include TQM principles problems identification and problems solving.

Total Quality course structure is shown on table below:-

Table II Total Quality Course Structure

Team	Role	Course elements	Time
Top Team	Policy Planning	TQM Principles, Business Performance measure	5days
Middle management	Carry out Policy	TQM Principles, Team Leader Ship, performance measure Problem solving	5days
First line supervisor	Problem Solving Team leader	TQM Principles, Team Leader Ship, Problem solving	5days
Operation Staff	Problem Solving	TQM Principles, Problem solving	5 days

Source World Class Performance Through TQM

It must be mentioned that before the training on TQM begins all necessary facilities must be on ground, and must be qualitative enough as to project the new concept being launched. Decent training environment equipt with modern training facilities such as full audio vidual equipment and descent syndicate rooms for team working are very necessary.

6.9.4 PROBLEM SOLVING

From the table of Total Quality course structure it can be observed that problem solving is a measure ingredient of the course elements.

This clearly shows that the ability to solve problems is a key requirement of the continuous improvement process.

Depending on nature of problem in a mining organization may have, three categories of problem solving may be identified as follows:-

1. Problem solving by everyone.
2. Problem solving for teams.
3. Problem solving for specialists.

It can be seen that to ensure Total Quality management which hinges on continuous improvement of quality of service and products, everyone must be involved in problem solving. That is to say that problems could be identified at any level, at shop floor or otherwise and solutions to the problem should be freely proffered by the shop floor stewards the mine workers, for consideration and possible implementation.

The first requirement of Team problem solving is to observe good meeting discipline. This is followed by appointment of two categories of Team leadership; the Correction Continuous Improvement Teams(CITs) and the Correction Action Teams(CATs). Generally problem solving procedure is accomplished in a particular routine or cycle. The problem solving cycle which

consists of four major stages, must be followed strictly by all and Sunday as follows:-

1. Defining the problem. Organization have different problems that may be unique. Problems at the Federal Ministry may not necessarily be the same with those at the parastatals and private companies. However these various problems are defined with the sole aim of customer satisfaction.
2. Analyze the root cause of the problem. This is accomplished through individual and collective analyze to establish the root cause. For example, if the root cause of investors dissatisfaction is the activities, of illegal miners then, the root cause of illegal mining must be analyzed fully.
3. Correction of the problem. The essence of analyzing the root cause of a problem is to proffer solution. Attempts must be made individually and collectively to proffer such solutions.
4. Prevention of problem re-occurring again. The frequent break-down of a machine part even where spares are readily available is not enough reason not to attempt to prevent such incidence re-occurring. This is because even in the process of re-fixing of the machines parts essential man-hours are lost, which may result into a long-term customer dissatisfactions. In TQM solutions are proffered on a continuous base with the hope of totally eliminating such problems.

The problem solving cycle is illustrated in Fig. 18 below:-

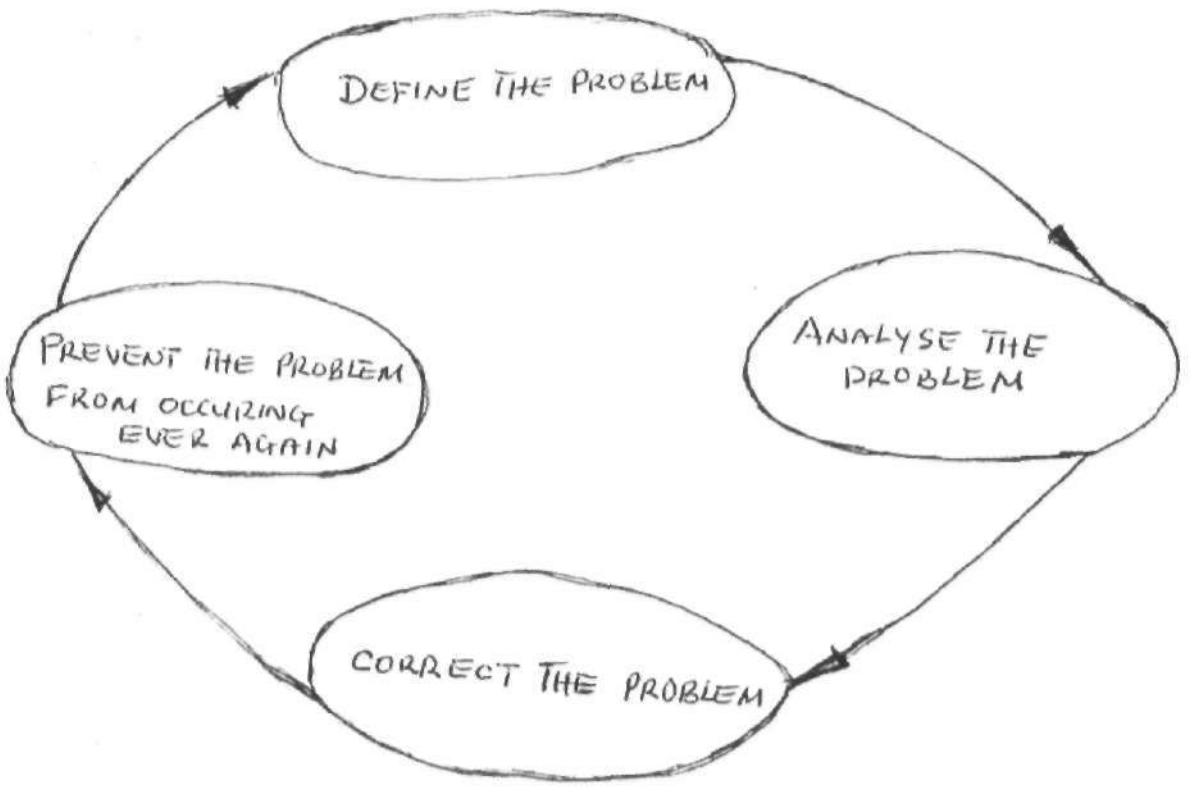


Fig 17. Four-step problem solving cycle.

Source: world class performance.

6.10 FEATURES OF MINERAL INVESTMENT ORGANIZATIONS THAT INTERNALIZE TQM CULTURE

There are particular features to look for in any mineral resources investment organizations that have successfully intenalise TQM culture. Generally the following features can be identified:-

1. Quality in recruitment and selection of employees.
2. Quality in orientation in line with TQM.
3. Quality in investment appraisals.

4. Quality in promotion and rewards of employees.
5. Quality in human resources development.
6. Quality in leadership at all levels of the organization.

These features are distinctively absent at present in Nigeria amongst the three tiers of minerals development, Government mining parastatals and the organized private sector of mineral resources investments.

Other features that may also be associated with internalized TQM culture include a business processes which are capable of delivering to their customers the right product and services, right every time and at the lowest cost possible. The organizations also invest heavily in cost of good quality in order to drive out cost of bad quality.

In the process, the working environment is made better and high quality products and services are produced. Similarly, work scrapping re-works and errors are substantially reduced to the barest minimum through meticulouse adherence to quality of delivery process, and the organization pro-actively deal with business problems by looking for problems to their work areas, through the passionate utilization of quality teams which deal with functional and cross- functional processes.

Mineral investment based TQM organizations exhibits visceral commitment to, and obsession for, internal customers and

external customers alike. Customers surveys are used in such organizations liberally to taken skin temperatures because of the important realization that huge and sustained profits which increase exponentially can only come about when customers are accorded primacy of place in their business focus and strategy.

All mineral investments have customers and suppliers. The customer-supplier chain (Fig 20) is maintained and also murmured by organizations through the practice of getting each work group to determine who its internal customer are, agreeing with them on what their needs and expectation are, and working towards those requirements one hundred percent. In other words, each work group, as a supplier, delivers quality to its customer who in turn can ten deliver quality products or service to the end user the external customer.

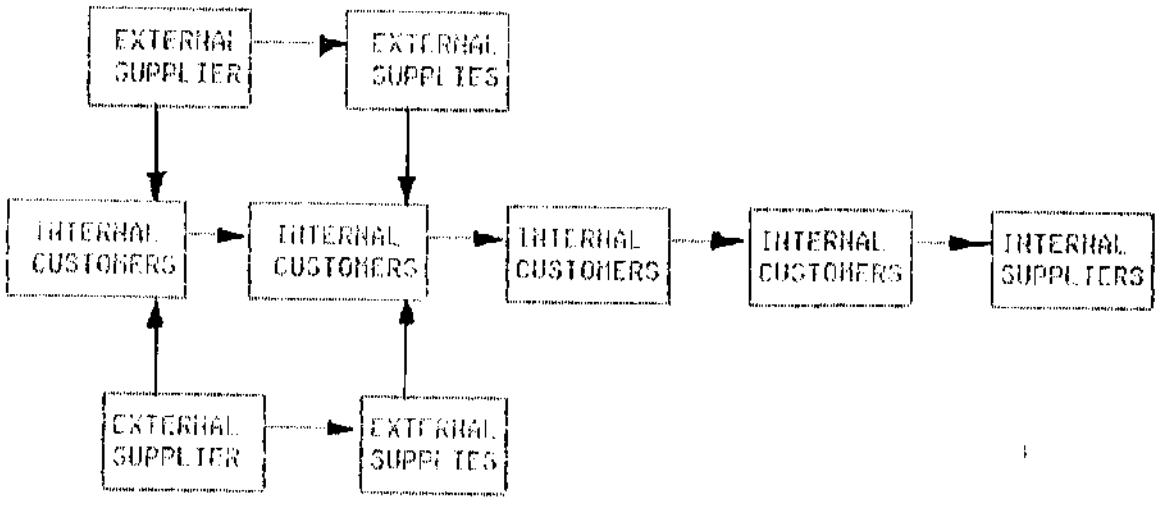


Fig 20 CUSTOMER-SUPPLIER CHAIN.

6.11. BENEFITS OF TQM TO MINERAL RESOURCES ORGANIZATIONS.

Minerals resources organizations that embrace TQM from experience are identifiable on the basis of their seeing Quality from the perspective of their customer satisfaction.

In such organizations, customer loyalty, customer retention and customer base increases exponeistially all round with immense benefit for the bottom-line. The benefits of Total Quality Management are easily identifiable with TQM practicing international mineral resources development organizations such as Anglo American, placer Dome, RIZ, Inco etc.

The benefits of Total Quality Management to mineral investment concerns are enormous and for the purpose of convenience can be subdivided into two:

a. BENEFITS TO THE ORGANIZATION.

i Continuous improvement in quality of products and services.

ii More effective/efficient use of equipment and materials.

iii Greater initiative and entreprenureship.

iv Improved Team spirit.

vi Improved communication.

vii Attitudinad change to work-which is positively directed.

vii Articulation, adoption and dissemination of shared values.

viii Focused and clear mission.

ix Improved corporate image.

B. BENEFITS TO EMPLOYEES.

i. Economic improvement.

ii. Training Benefits.

iii. Recognition and reward.

iv. Opportunity to improve personal competence.

v. Enhancement of job satisfaction.

6.12. EXTERNAL ASSISTANCE FOR THE DEVELOPMENT AND EXECUTION OF TQM PLANS.

The novelty of the concept of total quality management in mineral resources development in Nigeria may require foreign assistance from developed economics of the West. Implementing TQM is after all unique to each of the organizations studied and it is therefore beneficial to seek external assistance in developing and executing the TQM plan.[8]

The following resources are available which may be useful to the Federal Ministry of Solid Minerals Development, the Federal Government mining parastatals and the organized private mining investments:

1. European Foundation for Quality Management. This organization with its Headquarters in Netherlands promotes quality awareness for European rooted organizations.
2. Institute of Quality Assurance (IQA), 10 Grosvenor Gardens, London Manages the National Quality information centre(NQIC) and also provides professional membership for quality assurance personal.

3. British Quality Association(BQA) located at 10 Grosvenor Gardens, London; provides quality awareness to member organizations.
4. Department of Trade and Industry(DTI), leads and co-ordinates the National Quality Campaigning in Britain.
5. British Standards Institute(BSI) prepares British standards including BS 5750/ISO 9000 on Quality Management systems.
6. Involvement and Participation Association(IPA) is a London based independent voluntary body which promotes employee participation.

6.13 COMPUTERIZATION OF MINERAL RESOURCES DEVELOPMENT CONCERNS

Computerization of all the three major mineral resources concerns-the Federal Ministry, Government mining parastatals and the organized private mining sector is very necessary in order to keep abreast with the growing complexity of mineral resources development.

Through comprehensive manpower training in computer software design and programming within the concept of TQM it is possible for these organizations to provide a comprehensive software systems for the management, analysis, and display of all kinds of data used in mining and exploration.Acquired software and those designed should fall within the bracket of acceptable international standard for all aspects of mineral computing ranging from the manipulation of drill hole and sample data, to ore body modelling, and mine design, risk analysis and planning.

In the early 1970's when computer software design was gaining momentum in engineering and in the mining industry, there was no standard for the storage of data. Each company created its own proprietary format that fitted its own peculiar needs. Now in the age of window 95, NT and the internet, standards have emerged, making it much easier to share data with other programs users. TQM principles will enable mineral investment concerns to adopt these standards but continuously mordernising/upgrading them for their data storage solutions task in line with TQM principles, these concerns have to undertake extensive re-writing of software that have proven itself for many years, giving due consideration to compatibility with existing user data, speed and robutness.

Mineral Resources Development concerns in Nigeria could draw software design/application experience from internationally accredited leaders in earth resources software such as Gemcom of Canada, siemens of Germany, SUPRAC2000 of UK, GEOSOFT of Canada etc.

Currently, over 1,600 Gemcom systems are being used by over 500 companies in more than 60 countries around the world, attesting to the popularity and success of its products. The computer software company has developed Gemcom windows, which is an integrated package combining the functions of two of Gemcom most popular DOS-based applications, PC-XPLOR and GS32. The Gemcom for windows data-base sub-system is built around the microsoft Jet database Engine, the same as that

incorporated in Microsoft's Access Database program. By adopting this engine, Gemcom has enabled its clients and one of the hundreds of available tools to read, modify, convert and edit their data.

Modern geochemical surveys are a critical resources in mineral exploration, providing high volumes of multi-element data that, through systematic evaluation, can significantly increase the potential for a mineral discovery. As an aid to grassroots mineral exploration, detailed follow-up or drill target selection international softeway company Geosoft has a new exploration geochemistry software(CHIMERA) for window 95 and NT personal computer platforms. Designed for exploration geologists and geochemists, the system provides unique capabilities for conducting cost effective and efficient analysis of laboratory and field location data.

The new software is a comprehensive solution for chemistry data acquired from mineral exploration surveys and the system delivers a variety of easy-to-apply, interactive software tools for importing, verifying, analyzing, visualizing and mapping multi-element data.

6.13.DRAWING TQM EXPERIENCE FROM CONTACT MINING COMPANIES

The presently complete absence of foreign mining companies in Nigeria, coupled with the novelty of TQM concept, provides ample ground to suggest that some government mining companies can be contracted out to active international contract mining

contract mining, extending into south east Asia, South America and west Africa.

In 1991 the contract revenue of henry walker in south America was just A$ 71 million by 1997 the revenue rose to A$ 400 million. The south American contract mining offers great potential for expanding. The Australian contract mining companies are well placed to participate in the growth of this and other mining sectors bringing modern mining equipment and techniques, experience in operating in emote locations and a proven capability in servicing major Australian and international mining companies.

There are four listed contract mining companies Leighton Holdings, Henry walker, macmahon Holdings and Eltin, who have expanded their estimated aggregate annual revenue from contract mining from approximately As 600 million in 1990 to approximately AS1,400 million in 1996-an average growth rate of 15.4% per annum. Simply maintain this growth rate would result in the aggregate revenue of the four leading contact mining companies doubling by 2001, with the listed contractors aggregate revenue from mining increasing to AS2,800 million in 2001.

This envisaged remarkable growth is an indication that Nigeria could benefit both technologically and economically from this new mode of contract mining business. Nigeria inline with other nations should consider contracting out strategic

mineral projects, either as a first pass option, or as a measure by which its internal operations should be compared, as regards to Total Quality management of the mineral sector.

The decline in market prices in international market sub-sector minerals such as Iron Ore, gold, nickel, coal and base metals has substantially increased the receptiveness of resources developers to the efficiency and strategic advantages offered by mining contractors.
Contractors offer enhanced margins and strategic focus to base metal miners and developers, through capital, cost and labour efficiencies.

CONCLUSION

Total Quality management is important in mineral resources development which is capital intensive with unmatched long gestation periods. This brings to mind two important aspects of capital investment in exploration, mining,mineral processing equipment for mineral resources development. First, the technology must be reliable for it must continually pay its way, not just in the short term but also for the long run. Secondly, the investment must be receptive to integration of any innovation that comes along.

Only if these two preconditions are fulfilled will the mineral investment prove to be a good one.

The concept of Total Quality management which centres on continuous quality improvement to ensure customers satisfaction lives up to these two demands and should therefore be imbibed by the mineral resources sector of the Nigerian economy.

Nigeria has developed new mineral policies which are in the process of implementation and are necessary for a positive contribution to the nation economy. Although libralising the Nigerian economy has proved essential, it is common knowledge that, in itself, this is not sufficient. The mineral resources sector needs to build domestic productive capacity centered on Total Quality Management as the basis for its own long term development.

The potential build-up of the contribution of the mineral sector which is sine-qua-non for technology advancement could, to a large extent, be linked to the enormous untapped mineral resources available in all states of the federation. The Nation is already counting on the mineral industry to provide much needed foreign exchange and employment. With the considerable mineral potential in the country, the mining sector has a particularly significant contribution to make to the economic development of not only Nigeria but the entire sub-region.

The concept of Total Quality Management ought to be imbibed by the Federal ministry of solid minerals Development which since its inception has been supported by an extensive resource base. With a well articulated mineral policy exerted through a TQM enhanced personnel, the hitherto impediments associated with processing of minesfield application of potential investors, and the activities of illegal miners would have been eradicated. The result will lead to attraction of foreign investment, development, of infrastructure and spin-off industries should flow to the country as a result of its beckoning commodity wealth.

RECOMMENDATION

It is internationally acclaimed that mineral resources form the bed-rock of industrialization. Increasingly stringent demands on mineral product quality and operating economy require a high level of commitment by government to embark on good mineral policy that can invigorate private sector participation in mineral resources development.

Mineral resources development is associated with high technical and technological processes whose range includes systems for exploration, mine development, mining process monitoring, control and regulation and system to assure constant product quality. In order to effectively harness the mineral wealth of the Nation that can compete favorable with those produced in developed economies the concept of Total Quality Management must be imbibed and practiced in the three-tier of mineral investment- The Federal Ministry of Solid Development, Government Parastatals and the organized private mineral investment sectors.

The Federal Ministry of Solid Minerals Development must be seen to provide quality mineral policy. As a supervisory organ of Government the ministry must be staffed with highly qualified cadre of employees who should be trained and re-trained on the job in line with norms of TQM to ensure effectiveness of operation and customer satisfaction.

Foreign capitalization of the mineral industry can only be

achieved through a transparent and unambiguous mineral policy. Similarly, bureaucratic impediments which are inherently associated with Federal Ministry in terms of processing of Minesfield application should be discarded to enable ample participation of the private sector. Infact any process or engagements that does not identify the interest of the external customer, the mineral investor and vigorously pursued should be discarded.

The state mines offices which performs a supervisory role for mineral production, royalty collection and minesfield application processing, require the urgent attention of the Ministry for adequate equipping with requisite machinery and equipment to enable effective monitoring and control of the minesfield.

The concept of participative management style which leads to realizing of the potentials of employees should be practiced in the government mineral parastatals.

The responsibility for developing people to become committed to Total Quality rests on all managers who should first be educated on Total Quality Management.

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